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Reg. No : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2011.

(2008 Scheme)

ELECTIVE-III - 08-705 – EL3(F): PROJECT ENGINEERING (B)

Time: 3 Hours Max. Marks: **100**

PART –A

Answer ***all*** questions, each question carries **4** marks

1. Write a note on piping layout in a process industry. Also briefly discuss the piping colour codes being followed in such an industry
2. Briefly discuss about cost-plus contract
3. List the various steps involved in selecting contractors for project
4. Explain the different stages in site development
5. Write a note on start-up and commissioning of plants
6. Discuss the procurement procedures to be followed while purchasing equipments like heat exchangers and evaporators in a process industry
7. Discuss the various statutory sanctions required to be obtained before the commencement of a chemical/biochemical plant
8. Briefly explain the differences between a process flow diagram and a P&ID
9. Write a note on the two major financial reporting documents
10. What is a pilot plant? Explain its relevance in process development

(10x4=40 Marks)

P.T.O.

PART –B

Answer ***any one*** question from each module. Each question carries **20** marks.

MODULE – I

11. Discuss the following with reference to a project:

    (a) Process design (b) Engineering design and drafting

    (b) Financing of projects (d) Personnel recruitment and training in industries **(20)**

12. Discuss the factors to be considered for the selection of a process industry. Also discuss the role of a project engineer in a process industry

(10 +10=20)

MODULE - II

13 Discuss in detail about the planning and scheduling of projects with emphasis on the methods **(20)**

14 Discuss the various aspects of project financing. Also discuss the method of calculating capital requirement for process plants **(20)**

MODULE - III

15. Discuss the major aspects to be considered in piping design. Discuss the methods of cost estimation of equipments **(20)**

16 Explain the process and procedures for selecting equipments, materials and other machineries in a process plant. **(20)**

(Pages : 2) **6273**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
Biotechnology and Biochemical Engineering Branch
08.704(D) : MODELING AND SCALE-UP OF BIOREACTORS (B)
(EL 2D)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Describe the types of spargers used in bioreactors.
2. What are the advantages bubble column bioreactors ?
3. Describe the operation of jet loop reactor.
4. Differentiate between microfiltration and ultra filtration membrane systems.
5. What are the advantages of batch fermenter ?
6. When do you prefer fed batch system name any two industrial examples ?
7. With neat sketch describe the operation of continuous cultivation of biomass in a chemostat with cell recycle.
8. What is ideal chemostat ? Write the condition at steady state operation of chemostat.
9. Define the Dilution rate (D) ? What is the physical significance of $D=5h^{-1}$?
10. Discuss the different approaches used in development of the models.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. Derive the mathematical model for fluidized bed tower fermenter used for continuous brewing. **20**

12. With neat sketch describe the aseptic operation chemostate for cell cultivation. Derive the expressions for biomass, substrate and product. Derive the condition for steady state operation of chemostat. **(5+10+5)**

Module – II

13. Describe the

    i) Chemical similarity

    ii) Thermal similarity

    iii) Pilot plant and models. **(7+7+6)**

14. What is unstructured model ? Describe with mathematical equations unstructured model that is used in batch growth of micro organisms. **20**

Module – III

15. Discuss the scale-up of

    i) Fixed-bed adsorber

    ii) Extractor unit. **(10+10)**

16. With the help of examples differentiate between

    i) Segregated and unsegregated models

    ii) Deterministic and stoichastic models. **(10+10)**

(Pages : 2) **6269**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.703 : BIOINFORMATICS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question in Part A carries 4 marks.

1. Write notes on :
   a) CSD
   b) PDB
   c) PIR
   d) SWISS-PROT.
2. Differentiate Needleman-Wunsch algorithm and Smith-Waterman algorithm.
3. Describe the various file formats of GenBank.
4. Write notes on :
   a) KEGG b) MPW
   c) EcoCyc d) MetacCyc.
5. Write about sequence, patterns, motifs and profiles.
6. Describe Chao-Fasman algorithm.
7. Describe any *one* fold library.
8. Illustrate and describe the framework of neural network.
9. Describe any *two* protein interaction databases.
10. Discuss the role of energy minimization in homology modeling of proteins.

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. Classify and discuss sequence data banks based on functional specialization. **20**

OR

12. Describe in detail, the highthroughput genomic data in GenBank and also expand the phases 0-3 with appropriate organism division. **20**

Module – II

13. Describe any two sequence retrieval systems as well as analysis tools for sequence databanks. **20**

OR

14. Explain Needleman-Wunsch algorithm with the help of Dynamic Programming approach. **20**

Module – III

15. Explain Homology modeling in detail with the role of loop modeling. **20**

OR

16. Explain bond stretching, angle bending, torsion angle, electrostatic and non-bonded interaction calculations used in molecular modeling. **20**

(Pages : 2) **6279**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08-705 : Elective – III (EL3 E)
CANCER BIOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are metaphase/anaphase transition checkpoints ? How do they regulate metaphase/anaphase transition ?
2. Define cancer. Describe briefly the classification of human cancers.
3. Write a short note on chemical carcinogens and their cellular targets.
4. Describe briefly about proto oncogenes.
5. Write a short note on vascular endothelial growth factor (VEGF).
6. Describe briefly how cancer cells escape from the primary site to a metastatic site.
7. Outline a schematic to identify an oncogene from a cancer tissue.
8. Describe briefly about the imaging techniques used in the detection of cancer.
9. Write a short note on tubulin targeted anticancer drugs.
10. What are the advantages and limitations of immune therapy ?

(10×4=40 Marks)

P.T.O.

PART – B

Each question in Part **B** carries **20** marks. Answer **any one** question from **each** Module in Part **B**.

MODULE – I

11. Describe in detail the tumor suppressor activity of the

    a) Retinoblastoma protein (Rb) and

    b) p53. **20**

OR

12. Describe in detail the mechanism of cancer induced by

    a) Reactive Oxygen Species (ROS) and

    b) U-V radiations. **20**

MODULE – II

13. Explain the role of growth factor receptors in the development of cancer. **20**

OR

14. Describe in detail the various theories on tumor metastasis. **20**

MODULE – III

15. Describe in detail the significance of various molecular markers in the detection of cancer. **20**

OR

16. Discuss in detail about the various approaches in the treatment of cancer. **20**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.702 – BIOPROCESS INSTRUMENTATION (B)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. Briefly explain different types of transducers.

2. List out difference between static and dynamic error.

3. Write briefly on Indicating and recording Instruments.

4. What do you mean by filled system therometer ? Explain in detail.

5. Write short notes on mass flow meter.

6. Explain the working principle of resistance thermometer.

7. Explain strain gauges for flow measurement.

8. Write short notes on Sensors for physical environment.

9. What do you mean by Computer Interfaces and Peripheral devices ?

10. Write short notes on Fermentation software system. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain in detail LVDT with neat diagram. **10**

    b) With suitable sketch explain the working principle of optical transducer. **10**

12. a) Explain in detail the principle of analog and digital meters with example.

    b) Describe how a resistive strain gauge works. **(12+8=20)**

Module – II

13. a) With suitable sketch explain the working principle of optical pyrometer. **10**

    b) Discuss the pressure measurement by thermal conductivity gauges. **10**

14. a) Explain in detail the different instrument used for measurement of humidity and viscosity.

    b) Describe an instrument used for measuring vacuum. **(12+8=20)**

Module – III

15. Explain in detail the measurement of physical and chemical parameters in bioreactors. **20**

16. Write short notes on :

    a) Cascade control of metabolism. **5**

    b) Agitation and capacity co-efficient in fermenters. **10**

    c) Sensors for temperature control in stirred tank fermenter. **5**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08-704 Elective – II (EL2 B) BIOSENSORS AND DIAGNOSTICS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** carries **4** marks.

1. Explain the sensitivity of a biosensor.
2. What are Thermistors ? Explain the principle.
3. Explain briefly about how immunosensors are applicable in medical field.
4. Describe the concept of Flow Injection Analysis.
5. Comment on organic acid probes.
6. Explain the concept of Surface Plasma Resonance.
7. What is immobilization ? Make a flow chart for its steps.
8. List out any six medically applicable biosensors.
9. Comment on Biosensor Diversification.
10. Illustrate the principle of Noninvasive biosensor. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

MODULE – I

11. Explain in detail about the biological sensing elements and transducer system.

OR

12. a) Describe the biosensor instrumentation.

    b) Explain the transduction principle used in a biosensor. **20**

P.T.O.

MODULE – II

13. Explain the design, principle, construction and the applications of Microbial biosensor.

OR

14. Describe the sensors for pollution gases stability and reusability of sensors. **20**

MODULE – III

15. a) Explain the biosensors for diabetes Management.

    b) Describe the Evanescent waves. How it is used in biosensors ?

OR

16. Illustrate on Biochips. Explain in detail about its applications in modern sciences. **20**

(Pages : 2) **1669**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.704 EL2 (D) : MODELING AND SCALE UP OF BIOREACTORS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. What is meant by Deterministic and Stochastic Models ?
2. What are all the objectives of modelling ?
3. What is meant by modelling and explain ?
4. Describe Bubble column bioreactors.
5. Describe Aeration Behaviour in Submodels.
6. Define Mass Transfer Coefficient with the units and write the uses.
7. Explain dynamic similarity in scaling up.
8. What is meant by scale up and scale down processes ?
9. Explain virtual mass force.
10. Write the importance of submodels of bioreactor.

P.T.O.

PART – B

Answer **all** questions. **(3×20=60 Marks)**

MODULE – I

11. a) Explain in detail the models of Bioreactors. **10**

    b) Discuss the structured and unstructured models. **10**

OR

12. Write detailed explanation on :

    a) Steps involved in developing the model. **10**

    b) Obtain a model for thermal sterilization of the Medium. **10**

MODULE – II

13. Explain the modelling of Gas and Liquid flow in stirred tank reactor. **20**

OR

14. Write brief notes on submodels of Bioreactor process.

    a) pH model and reaction model. **10**

    b) Problems of Bubble coalescence and respiration. **10**

MODULE – III

15. Discuss the effect of scale up of oxygenation, mixing and sterilization. **20**

OR

16. Explain the usefulness of dimensional analysis and similarity criteria in scale up of bioreactors. **20**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2003 Scheme)
Branch : Chemical
03-702 : MASS TRANSFER OPERATIONS – II (B, H)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions in Part **A** and **any one** question from each Module in Part **B** (Graph sheets are to be supplied)*

PART – A

1. Distinguish between flash vaporisation and simple distillation.
2. State and explain Raoult's law.
3. Write a note on optimum reflux ratio in fractionation.
4. Explain the working of pulsed extraction columns.
5. Write briefly on the applications of liquid extraction.
6. Discuss the effect of temperature and pressure on a binodal solubility curve.
7. Explain countercurrent leaching.
8. What do you mean by adsorption hysteresis ?
9. What are the industrial applications of reverse osmosis ?
10. What is fractionation ? Explain. **(10x4=40 Marks)**

PART – B

Module – I

11. 2000 kg mole/hr of a mixture of A and B containing 40 mole % of A is to be fractionated to obtain 96 mole % of A distillate and a residue 96 mole % B Feed enters the column as a mixture of 50% saturated vapour and 50% saturated liquid.

Data to be used :

X_A, mol/hr	0	0.08	0.18	0.25	0.49	0.65	0.79	0.9	1.0
Y_A	0	0.28	0.43	0.51	0.73	0.83	0.9	0.96	1.0

H_L, KJ/mole	24.3	24.1	23.2	22.8	22	21.75	21.7	21.6	21.4
H_G, KJ/mole	61.2	59.6	58.5	58.1	56.5	55.2	54.4	53.8	53.3

Using Ponchon-Savarit method, determine minimum reflux ratio, the number of ideal stages if twice the minimum reflux ratio is used and condenser and reboiler duties. **20**

OR

12. a) Derive an expression for operating line in enriching and stripping section of a continuous fractionator by Mc Cable-Thiele method. 15

    b) Mention the advantages and disadvantages of the above method. 5

Module – II

13. a) Differentiate between HTU and HETP. 6

    b) Explain the various types of equilibrium curve encounted in leaching operations ? 14

OR

14. Acetic acid from a mixture containing 4000 kg water and 20 kg acetic acid is being extracted with benzene as solvent. 95% of acetic acid present in feed is to be extracted.

Equilibrium data :

g. of acetic acid	0.92	1.14	1.53	2.04	2.56	4.0	5.23
kg of water							
g. of acetic acid	1.02	1.62	2.91	5.35	7.94	20.1	36.0
kg. of Benzene							

Calculate the number of counter current stages required if benzene is used twice the minimum required. 20

Module – III

15. a) Write a note on adsorption hysteresis. 5

    b) Discuss the various types of membranes and their industrial applications. 15

OR

16. Write notes on :

    i) Cation exchange resins

    ii) Reverse Osmosis

    iii) Multistage fluidised bed adsorber. 20

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.705 : Elective – III (EL 3F)
PROJECT ENGINEERING (B)
Biotechnology and Biochemical Engineering Branch

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are plot plans ? How is a master plot plan different from a unit plot plan ?
2. Discuss the provisions that should be made in the layout of various units of the plant and layout of different equipment inside a unit to ensure safety of plant machinery and personnel.
3. Explain in short the necessity of pilot plant study.
4. Briefly describe the business and legal procedures for entering into a project contract.
5. What is a turn key contract ? What are its advantages and disadvantages ?
6. Write a note on procurement and inspection.
7. Explain the objectives of techno-socio-economic analysis in feasibility survey.
8. Explain the role of structural design group in process design.
9. Discuss on the design of plant sewer and waste disposal systems.
10. What are the safety factors to be considered for the storage and transportation of the raw material and products ? **(10×4=40 Marks)**

P.T.O.

Answer **any one** question from **each** Module in Part **B**.

PART – B

Module – I

1. A young process Engineers' consortium is planning to set up 100 TPD citric acid plant. What preliminary data are necessary ? Write on the sources and collection of required data. **20**

OR

2. Outline the activities of the design and drafting wing of a process plant project. **20**

Module – II

3. Explain the bar, PERT and CPM charts and their relative merits and demerits. **20**

OR

4. What are the various methods for raising finances for a project ? **20**

Module – III

5. Briefly describe how the following designs are done :

   a) Layout of pipelines

   b) Design for thermal stress relief

   c) Thickness of piping

   d) Anchors and supports for piping **20**

OR

6. Explain the types and selection of fire extinguishing equipment used in process industry. **20**

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Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.704 (3) : COMMUNICATIVE ENGLISH AND TECHNICAL WRITING (R)
(Common With F 08.705 D)

Time : 3 Hours Max. Marks : 100

PART – A
Module – I

I. Attempt **any six**. Give answers in **not** less than **five** complete sentences : **(6×5=30 Marks)**

1) State five principles of scientific vocabulary with examples.

2) Point out the major differences between technical and non-technical writing.

3) What are the difficulties one faces in 'effective communication' ? Suggest the ways to overcome them.

4) How is vertical communication different from horizontal communication ? Explain.

5) Write a situational dialogue between a corporation engineer and a complainant on water pollution in his locality.

6) What are the factors to be kept in mind to develop 'Listening' as a communication skill ?

7) Fill in the blanks with appropriate prepositions or conjunctions as required :

Laila was sitting _____ an armchair looking out _____ the window. She was thinking _____ a topic _____ which to speak _____ the meeting _____ the evening. _____ she was reflecting _____ the topic, suddenly there was a knock _____ the door. It was contrary to her expectation, _____ she did n't respond to it.

8) Use the following pairs of words in meaningful sentences. For each pair, write two sentences.

a) i) Negligent ii) Negligible
b) i) Popular ii) Populous
c) i) Metal ii) Mettle
d) i) Industrious ii) Industrial
e) i) Economic ii) Economical

P.T.O.

PART – B

Module – II

II. Attempt **any two** of the following : **(2×15=30 Marks)**

1) Write a job application letter to the H.R. Head of Wipro, Bangalore for the post of computer programmer.

2) Write a letter of enquiry to a world famous institution (outside India) regarding their advertisement on a 'Graduate Program' in Computer Applications.

3) Place an order letter for 150 copies of Wings of Fire for your institution, seeking a reasonable discount, since the purchase is for an educational institution.

4) Write briefly on the points to be kept in mind while preparing a technical report.

Module – III

III. Answer **any two** of the following : **(2×20=40 Marks)**

1) Give an account of the childhood of Abdul Kalam, highlighting the events and individuals that influenced him in his early days.

2) Recount the author's experiences in TERLS at Thumba during his career.

3) Write about Wernher Von Braun's acheivements as perceived by Abdul Kalam. In what ways that inspired him ?

4) What are the distinguishing qualities of Abdul Kalam as a leader of scientists ? Give suitable examples to highlight them.

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.703 : BIOINFORMATICS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question in Part **A** carries **4** marks.

1. Define (a) Domain (b) Pattern (c) Motif (d) Profiles.
2. Illustrate the FASTA format of a protein sequence.
3. Describe primary and secondary protein databases.
4. Write notes on (a) Gap (b) Mismatch (c) Similarity (d) Identity.
5. Describe the Cluster of Orthologous Genes (COGs).
6. Write the formula used to fill the matrix in dynamic programming approach.
7. Write notes on (a) DIP (b) BIND.
8. Differentiate SWISS-PROT and TrEMBL.
9. Describe (a) SMART (b) PRINTS (c) EMOTIF (d) SCOP.
10. Write a note on any two fold libraries.

PART – B

Answer **any one question from each** Module.

Module – I

11. Describe various structure data banks and explain their file formats. **20**

OR

12. Classify the data banks based on functional specialization. **20**

Module – II

13. Elaborate on any two analysis tools used for sequence data banks. **20**

OR

14. Describe (a) MSDN (b) Hybridoma database (c) Virus Information system (d) Cell line information system. **20**

Module – III

15. Discuss homology modeling and fold recognition methods. Which is more efficient in protein structure prediction ? Why ? **20**

OR

16. List out the important considerations in designing a drug. **20**

(Pages : 2) **1665**

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Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING BRANCH
08.703 : Bioinformatics (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question in Part **A** carries **4** marks.

1. Describe the entries extracting method in signal peptide databank.
2. What are the taxonomical divisions in EMBL databank ?
3. Interpret the rRNA databank.
4. Describe the structure of hybridoma databank.
5. What is cell line information system ? With example.
6. Differentiate local and global sequence alignment method.
7. Define gap and gap penalty.
8. What do you mean by neural network and defines the trial and error method ?
9. Draw the architecture of HMM.
10. What is protein folding ? Explain with example. **(10×4=40 Marks)**

PART – B

Answer **any one** question each from **each** Module.

Module – I

11. Enumerate the Genbank file format with example. **20**

OR

12. Describe the Cambridge structure database.

P.T.O.

Module – II

13. Align the following two sequences using Global alignment **20**

S_1 = GCGCATGGATTGAGCGA

S_2 = TGCGCCATTGATGACC

Scores : Match = 1, Mismatch = 0 and Gap = – 1

OR

14. Align the following two sequences using local alignment ?

S_1 = GCGCATGGATTGAGCGA

S_2 = TGCGCCATTGATGACC

Scores : Match = 1, Mismatch = 0 and Gap = –1

Module – III

15. Explain the protein structure prediction using homology modeling. **20**

OR

16. Explain the protein structure prediction using fold recognition (threading).

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING
08.701 : Downstream Processing (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **4** marks.

1. What are the salient features, advantages and disadvantages of bioprocesses compared to conventional chemical processes ?
2. Write a note on the operation and functioning of homogenizer in cell disruption.
3. Write a note on the necessity of pre-treatment of fermentation broths and the methods available for pre-treatment.
4. Explain the significance of RCF value in the selection of centrifuges.
5. What are adsorption isotherms ? How are they obtained ?
6. What is a supercritical fluid ? What are its characteristics ?
7. What is ultra filtration ? How is it useful in bio separations ?
8. What are the theoretical considerations involved in drying of products ?
9. Explain the term electrophoretic mobility.
10. What are ion exchangers ? Classify them. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) A broth of 2 litres of viscosity 2.8 cP containing 5.2% of compressible biomass was filtered on a filter of 10 cm diameter at a pressure drop of 1.6 bar. The filtration time was 16 minutes. The cake was found to have a compressibility of 0.4. Calculate the time required to filter 2500 litres of the broth on filter press of area 2.5 m^2 at a pressure drop of 2.8 bar. Assume the resistance of the filter medium to be negligible. **10**

    b) Explain the principle and scale up of centrifugal separation. **10**

12. Discuss in detail the chemical methods of cell disruption. **20**

Module – II

13. Explain in detail about aqueous two-phase extraction process with the help of flow chart. **20**

14. a) A broth of 80 litres contains the desired protein at 12.8 g/l as well as a contaminated protein at 1.8 g/l. Calculate the ammonium sulphate concentration required to recover 98% of the desired protein if the precipitation constants β and k of the desired protein are 9.33 and 1.1 respectively and that of the contaminated protein are 8.8 and 0.95 respectively. What will be the purity of the desired protein at 98% recovery. **10**

    b) Discuss the principle and operational aspects of microfiltration. **10**

Module – III

15. Write a note on :

    a) Design and working of spray dryers.

    b) Process crystallization of proteins. **20**

16. Discuss in detail about economic analysis and evaluation of bio product manufacture by fermentation. **20**

(Pages : 3)

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.701 : DOWNSTREAM PROCESSING (B)
Biotechnology and Biochemical Engineering

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part **A** and **any one full** question from Part **B**.*

PART – A **(10×4=40 Marks)**

1. Mention about the characteristics of fermentation broth.
2. Write the chemical methods for intracellular product release.
3. Note down the applications of foam and bubble fractionation in downstream processing.
4. State about funnel filtration test.
5. Mention about fractional extraction.
6. What is meant by adsorption equilibrium ?
7. Discuss the principle of precipitation process.
8. State about elution chromatography.
9. Note down about isoelectric focusing.
10. What are absorption isotherms ? How are they obtained ?

P.T.O.

PART – B

Module – I

11. How the bioproducts are classified ? Discuss about characteristics of fermentation broths and spectrum of bioseparations. Write about the criteria for choice of recovery process. **20**

12. a) Write note on (i) electrical double layer concept (ii) DLVO theory. **8**

    b) A suspension of spherical particle of 0.1 mm diameter was allowed to settle in a column of 50 cm length. The density difference between the solid particles and the liquid was 0.05 g/cm^3 and viscosity of liquid was 1.1 CP. (i) Calculate the setting time of the particle assuming the particles reach their terminal velocity almost instantaneously (ii) Calculate the settling time in a centrifuge rotating at 400 rpm if the distance between the axis of rotation and bottom of the centrifuge was 12 cm and the distance between the axis and the liquid surface was 3 cm. **12**

Module – II

13. a) Penicillin is extracted from a fermentation broth using isomyl alcohol as organic solvent in a counter-current extraction unit. The flow rates of organic and aqueous phases are 10 L/min and 100 L/min respectively. The distribution coefficient of penicillin between organce and aqueous phase is 50. If the penicillin concentration in feed stream is 20 g/L, determine the number of stages required to reduce penicillin concentration to 0.1 g/L in the effluent stream. **10**

    b) What is a supercritical fluid ? Explain the principals of supercritical fluid extraction and its advantages and applications. **10**

14. a) Explain about precipitate formation phenomena, Smoluchowski's equation and camp number. 12

b) The partition coefficient of an organic acid in organic acid-solvent water system is 2.7. (i) Calculate the volume of organic solvent required to extract 99% of acid from. 8

Module – III

15. a) Explain briefly about affinity chromatography. 10

b) Write a note on capillary zone electrophoresis. 10

16. a) Discuss the theory of crystallization. What are the advantages of crystallization as a finishing operation in bioseparation ? 10

b) 10 kg of adipic acid is stirred in 13.1 kg of water and heated to 90° C to solubilize the acid. The solution is then filtered to remove impurities. During the heating and filtration, 10% of the water is evaporated. The clarified solution is cooled to 35° C. The solubility of the acid in water is 0.05 kg acid per kg water. Determine the weight of crystals recovered in this operation. 10

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, Nov. 2012
Branch : Biotechnology and Biochemical Engineering
08.705 : Elective – III : BIO-FUEL TECHNOLOGY AND ENGINEERING (B)
(EL3C)
(2008 Scheme)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **All** questions carry **four** marks.

1. Write short notes on biosolubilization of coal.
2. Write the different types of bioconversion processes available with features.
3. Write the principle of thermo-chemical gasification process.
4. With a neat diagram explain KVIC floating dome digester.
5. Differentiate dry and wet fermentation.
6. Explain the effect of temperature on biogas production.
7. What is cogeneration in biomass processing industries ? Write its advantages.
8. Briefly discuss the two compartment microbial fuel cell.
9. Explain the recovery of petroleum by biosurfactants.
10. Derive an equation for the volumetric production rate of biogas in a digester.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one** full question from **each** Module. **One** full question carries **twenty** marks.

Module – 1

11. a) Explain the categories and primary sources of biomass and its characteristics. Justify the use of biomass for energy, comparing with fossil fuels. **10**

    b) Explain how preparatory size reduction, drying, briquetting methods are useful inpreparing raw biomass materials for the energy conversion operations. **10**

12. a) Explain a process for fast pyrolysis of biomass and discuss the product recovery and applications. **10**

    b) Explain how hazardous solids are safely disposed by incineration process. **10**

Module – 2

13. a) Discuss the stages of decomposition of biomass during the production of biogas. What are the effects of variation of temperature, pH, carbon to nitrogen ratio, of feedmaterial and concentration of volatile organic acids on biogas formation ? **10**

    b) Describe the trans-esterification of vegetable oils to produce bio-diesel. **10**

14. a) What is the potential of fuel ethanol by fermentation of sugars as energy source ? Briefly describe the process for molasses based distillery. **10**

    b) Discuss the design and operating modes of : Anaerobic contact digester, Up flow- Anaerobic Sludge Blanket (UASB) digester and circulating fluidized bed digester. **10**

Module – 3

15. Describe the construction, features and working of different types of fuel cells. **20**

16. a) Describe the method of production of H_2 by microbial route. **10**

    b) Discuss the application of fluidized bed/circulating fluidized bed system for gasification and/or combustion of particulate biomass. **10**

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Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.704 – Elective – II (EL2 B)
BIOSENSORS AND DIAGNOSTICS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are the basic characteristics of a Biosensor ?
2. Explain the principle of Electrochemical Biosensors.
3. Explain Impedimetric Biosensors.
4. Write a note on whole-cell bacterial biosensors and the detection of bioavailable arsenic.
5. Explain the application of whole-blood monitoring in diabetes control.
6. Write a short notes on FETs.
7. Write a note on fiber optics biosensors.
8. Explain the principle of organic acid biosensors.
9. Discuss about the reusability of biosensors.
10. What are the various advantages of whole-cell bacterial biosensors over conventional methods of detecting contaminants at a site ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one question from each** Module.

Module – I

11. Write a note on :
    a) Biosensors diversification
    b) Transduction principles used in a biosensor. **20**

12. Explain with a schematic diagram showing the main components of a biosensor and the construction of a typical biosensor. **20**

Module – II

13. Discuss the design, construction and operation of potentiometric and bioluminescence biosensors. **20**

14. Write a note on :
    a) Optoelectric biosensors
    b) DNA probes. **20**

Module – III

15. Discuss in detail the noninvasive biosensors in clinical analysis and health care. **20**

16. Write a note on :
    a) Biosensors application in Agriculture and Food production.
    b) Biochips and their application in modern sciences. **20**

PART – B

Answer **any one question from each** Module.

Module – I

11. Write a note on :
    a) Biosensors diversification
    b) Transduction principles used in a biosensor. **20**

12. Explain with a schematic diagram showing the main components of a biosensor and the construction of a typical biosensor. **20**

Module – II

13. Discuss the design, construction and operation of potentiometric and bioluminescence biosensors. **20**

14. Write a note on :
    a) Optoelectric biosensors
    b) DNA probes. **20**

Module – III

15. Discuss in detail the noninvasive biosensors in clinical analysis and health care. **20**

16. Write a note on :
    a) Biosensors application in Agriculture and Food production.
    b) Biochips and their application in modern sciences. **20**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
Branch : BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING
08.702 : Bio Process Instrumentation (B)

Time : 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. What are the methods available to measure local velocity ? How will you calculate the average velocity ?
2. Differentiate repeatability and reproducibility in data measurement.
3. Briefly explain the Sensitivity of measurement with an example.
4. Explain the difference between systematic and random errors. What are the typical sources of these two types of error ?
5. Write a note on indicating and signalling instruments.
6. Explain the principle of biosensors. Give example.
7. How will you measure the impeller speed, density of the medium, dissolved oxygen ?
8. Write a note on electro magnatic transducers.
9. Explain the off-line sensors for cell properties.
10. How will you maintain the isothermal condition of a fermenter ? Represent this using a drawing. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** full from **each** Module. **Each** full question carries **20** marks.

Module – I

11. A load cell is calibrated in an environment at a temperature of 21°C and has the following deflection/load characteristic : **20**

Load (kg)	0	50	100	150	200
Deflection (mm)	0.0	1.0	2.0	3.0	4.0

When used in an environment at 35°C, its characteristic changes to the following :

Load (kg)	0	50	100	150	200
Deflection (mm)	0.2	1.3	2.4	3.5	4.6

a) Determine the sensitivity at 21°C and 35°C.

b) Calculate the total zero drift and sensitivity drift at 35°C.

c) Hence determine the drift coefficients (in units of μm/°C).

12. i) Explain in detail the linear variable differential transformer with a neat diagram.

ii) Explain principle and working of optical transducers and its application in biomedical applications. **20**

Module – II

13. i) Explain the working principle of electrical pressure transducers and piezoelectric manometers with an example.

ii) Thermal radiation is significant at what condition, explain. Also write a note on P and I diagrams. **(12+8=20)**

14. i) Briefly explain the principle and working of Bourdon gauge.

ii) Explain different instruments for viscosity measurement of Newtonian and non-Newtonian fluids.

iii) Discuss the different types of thermocouples with its applicability ranges. **(6+6+8=20)**

Module – III

15. a) Explain the simulation of online control of the anaerobic process with the help of neat diagram.

b) Write a note on data acquisition systems. **(14+6=20)**

16. i) Discuss about cascade control of metabolism.

ii) What do you understand by data smoothing and interpolation ? Enumerate with an example **(6+14=20)**

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Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08-702 : BIOPROCESS INSTRUMENTATION (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions from Part – **A**. **Each** question in Part – **A** carries **4** marks.

1. Briefly explain how error analysis is done on a set of measured variables.
2. What are transducers ? Briefly explain the various sensing elements used in bioprocess industries.
3. Discuss recording and signaling instruments.
4. Explain the terms range, dead time and fidelity with respect to measurement.
5. Describe the principle and working of magnetic flow meters citing the working of any one type.
6. Explain the different symbols for instrumentation diagram.
7. Discuss how thermocouples are classified. Give the use and range of measurement of any two types of thermocouples.
8. Explain how humidity of air is measured.
9. Explain three types of drifts that can occur in measuring instruments.
10. What are energy meters ? Also explain the principle and working of strain gauges.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. Explain in detail the various types of errors in a measuring system. **20**

12. a) State and explain the principle of piezoelectric transducers and optical transducers.

    b) Write a note on analog and digital meters. **(10+10=20)**

Module – II

13. a) With sketches explain in detail the principle, construction and operation of low pressure measuring devices.

    b) Explain the direct and inferential type level measuring instruments. **(10+10=20)**

14. Discuss the principle, construction and operation of thermal conductivity and ionization gauges. **20**

Module – III

15. a) With neat control loop diagram describe the methods used for monitoring and control of different parameters in a stirred tank fermenter.

    b) Write a note on use and applicability of computer interfaces and peripherals with reference to a bioprocess plant. **(10+10=20)**

16. a) Write notes on :

        a) Data smoothing

        b) Cascade control of metabolism

        c) Programmed bioreactors.

    b) Write in detail about rheological property measurement. **(12+8=20)**

(Pages : 2) **6012**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.705 : Elective – III (EL 3 F)
PROJECT ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Write the duties and responsibilities of a project engineer.
2. Differentiate between Project engineer and Process engineer.
3. What are the different methods for recruitment ?
4. Briefly discuss about various methods of project scheduling.
5. List any four Project financing institution in India. Indicate their portfolios.
6. Discuss the advantages of Network techniques for planning.
7. Discuss the significance of ASTM and TEMA standards for Heat exchanger design.
8. What is interest safety ? Explain in brief.
9. Discuss about different types of building codes.
10. Discuss the classification of turbines. **(4×10=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) What are the various types of schematic diagrams that are in general use ? Explain. **10**

    b) Discuss the salient features of Engineering flow diagram. **10**

OR

12. a) Explain the various preliminary data necessary for the engineering of a process plant. **10**

OR

b) Explain the features of structural design and drafting. **10**

Module – II

13. Explain the following :

1) Basis of a contract

2) Selecting the contractor. **20**

OR

14. What is inventory ? How does this affect the project planning and scheduling ? Give examples. **20**

Module – III

15. a) List the various factors considered in the selection of a process pump. **10**

b) Discuss the significance of critical radius of insulation. **10**

OR

16. a) What are the factors to be considered to accommodate safety in plant designs ? **10**

b) Write short note.

1) Scale up in design

2) Piping layout. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.702 – BIOPROCESS INSTRUMENTATION (B)

Time: 3 Hours Max. Marks : 100

PART – A

Answer **all** the questions. **Each** question carries **four** marks.

1. Explain the different types of drifts that occur in measuring elements.
2. What do you mean by deadzone and fidelity lag ?
3. What is difference between manipulating element and functioning element ?
4. Write overview of P and I diagrams.
5. Explain the working principle of manometer.
6. Write the working principle of area flow meter.
7. Write short notes on sensors for cell properties.
8. What do you mean by programmed batch Bioreaction ? Give example.
9. Write short notes on medium chemical sensors.
10. Discuss about glass electrode for pH measurement in fermenter. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain in detail the static and dynamic characteristics of an Instrument.

    b) Explain the sensors for measurement of temperature, pressure and fluid flow.

(10+10)

P.T.O.

12. a) Explain the principle and working of Piezo electric transducers. 10

    b) Explain in detail the transducers used for biomedical applications. 10

Module – II

13. a) Briefly explain the principle and working of different head flow meters. 10

    b) Explain the working principle of Ionisation gauge with diagram. 10

14. a) Explain the different instruments used for specific gravity measurement. 10

    b) What is difference between direct and inferential type level measurement ? 10

Module – III

15. a) Explain the on-line and off-line sensors for measurement of cell properties and composition. 10

    b) Discuss about different types of probes for DO measurement. 10

16. Write short notes on :

    a) Data Smoothing and Interpolation. 8

    b) Data acquisition systems. 6

    c) Rheological measurement. 6

(Pages : 2) **6000**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
Biotechnology and Biochemical Engineering Branch
08.703 : BIOINFORMATICS (B)
(2008 Scheme)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. a) Expand : EMBL, NBFR-PIR, CSD and PDB (2 marks).
   b) Write short note on SWISSPROT (2 marks).
2. Write a brief note on metabolic pathway databases.
3. Write short note on CSD.
4. Give a brief account on EMBL.
5. Explain FASTA algorithm.
6. Write short note on Hybridoma Data Bank Structure.
7. Write short note on sequence patterns and profiles.
8. Explain Chou-Fasman algorithm.
9. Give an account on Hidden Markov mode.
10. Write short notes on classification of proteins. **(10×4=40 Marks)**

PART – B **(20×3=60 Marks)**

Answer **any one full** question from **each** Module.

Module – I

11. Write a detailed note on GenBank. **20**

OR

12. What are structural databases ? Explain PDB in detail. **20**

P.T.O.

Module – II

13. Describe in detail how the algorithm of BLAST works and discuss the output of BLAST search. **20**

OR

14. Explain the Needleman and Wunsch algorithm. **20**

Module – III

15. Describe in detail about fold recognition and comparative modeling. **20**

OR

16. Give a detailed account of molecular dynamics. **20**

(Pages : 3) **5998**

Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
Branch : Biotechnology and Biochemical Engineering
08.701 : DOWNSTREAM PROCESSING

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions in Part **A**. Answer **any one** full question from **each** Module in Part **B**. **Each** question in Part **A** carries **4** marks.*

PART – A

1. Explain the diafiltration mode of a cross flow filtration unit.
2. Explain the cell disruption kinetics of a homogenizer.
3. Briefly explain the principle of foam and bubble fractionation with its applications.
4. Explain the following terms associated with chromatography i) Resolution ii) Plate height iii) Number of theoretical plates iv) Relative Retention.
5. Explain the kinetics of cell disruption in a homogenizer with relevant mathematical equations.
6. Explain the principle and operation of an ultrasonicator used for cell lysis.
7. Discuss the factors that influence the performance of membrane in a membrane separation process. Also explain how to minimize the effect of such adverse problems ?
8. Explain the salting in and salting out processes pertaining to proteins.
9. Discuss how you would determine the molecular weight of a protein by gel filtration.
10. Discuss the theoretical principles involved in electrophoretic separation.

(10×4=40 Marks)

P.T.O.

PART – B

MODULE – I

11. a) Explain the process of continuous filtration of a broth with relevant mathematical expressions and describe an equipment with its construction and operation using a figure. **10**

    b) A broth of 2 litres having a viscosity 2.8 cP containing 5.2% of compressible biomass was filtered using a filter of 10 cm diameter at a pressure drop of 1.6 atm.The filtration time was 16 minutes. The cake was found to have a compressibility of 0.4. Determine the time required to filter 2.5 m^3 of the broth on a filter press of area 25000 cm^2 at a pressure drop of 2.8 atm. The filter medium resistance may be ignored. **10**

OR

12. a) Explain the principle of centrifugal sedimentation and explain how do you get the terminal settling velocity of a particle under the application of a centrifugal force. Also describe the principle of operation and scale up of a lab scale centrifuge. **10**

    b) Discuss the process of flocculation and its principle and the associated theories as a method of downstream processing. **10**

MODULE – II

13. a) Discuss the principle of aqueous two-phase extraction, the associated phase diagram along with its applications. **8**

    b) An antibiotic exhibits a K value of 10 in organic solvent-water system. If the aqueous feed has 25 mg of the solute. Determine a) the percentage extraction in single stage b) the percentage extraction if four equal portions of same volume of organic solvent is used. **12**

OR

14. a) With necessary diagram, explain the process of cross flow filtration. Explain the process of perstraction as a downstream operation. **(8+4=12)**

    b) Equipment is available for ultra filtration of a protein solution at constant volume to remove low molecular weight species. The flow channels for this system are tubes 10 mm in diameter and 1 m long. The protein has a diffusion coefficient of 9×10^{-11} m^2/s. The solution has a viscosity of 1.2 cP and a density of 1100 kg/m^3. The system is capable of operating at a bulk stream velocity of 3 m/s. At this velocity, determine the polarization modulus for a transmembrane flux of 45 litres/m^2 hr. **8**

MODULE – III

15. a) Write notes on :
    i) Adsorption isotherms
    ii) Orthokinetic aggregation
    iii) Membrane modules in membrane separation process. **9**

    b) Describe in detail the method of ion exchange chromatography. What do you mean by capacity of ion exchangers ? Discuss the various ways by which capacity is expressed and specify how they are determined. **11**

OR

16. a) A chromatographic separation of a two component sample on a 50 cm column gave the retention times for the solutes A and B as 2.5 and 3.1 minutes with base widths of the two chromatographic peaks being 0.24 and 0.3 minutes respectively. Determine a) number of theoretical plates b) plate height c) resolution of the two peaks. Also obtain the resolution of the two peaks when the column is scaled up to 80 cm with the same data applicable to the 50 cm column. Comment of the resolutions obtained. **10**

    b) Briefly discuss about the electrokinetic separations in downstream processing. **10**

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Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.704: Elective – II (EL2 A)
BIOPHARMACEUTICAL TECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Write a short note on Pharmacopoeias.
2. What do you mean by edible vaccines ? Explain with suitable examples.
3. Write briefly on the natural substances used as pharmaceuticals.
4. State the significance of screening of drugs.
5. What do you mean by targeted drug delivery ?
6. What is Protein Engineering ? Write a short note.
7. Write a note on ion-channel trans-membrane proteins of pharmacological importance.
8. Explain any three factors affecting bioavailability of drugs.
9. What are the advantages of oral drug delivery ?
10. Write a note on shelf life of biological preparations. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. What do you mean by clinical trials ? Explain their significance. State the general regulatory requirements associated with clinical trials.

12. Write in detail on biopharmaceuticals with a note on their delivery through various routes.

Module – II

13. Write notes on :
    a) Solid phase synthesis
    b) Pharmacokinetic behavior of Protein-based drugs.

14. State and explain the different aspects of post-production handling of Biopharmaceuticals.

Module – III

15. a) Write in detail the factors to be considered for drug targeting to the brain.
    b) Classify the different Cardio-vascular drugs with their uses and suitable examples for each.

16. Write notes on :
    a) Synthetic antibacterial agents.
    b) Application of enzymes in therapeutics.
    c) Screening of antibiotic procedures.
    d) Gene therapy in cancer treatment and HIV infection.
    e) Advantages and disadvantages of different drug delivery systems. **(5×4=20 Marks)**

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Seventh Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

08.704 : Elective – II (EL 2 E)

DESIGN OF BIOLOGICAL WASTE TREATMENT SYSTEMS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4= 40 Marks)**

1. Explain briefly microbiology of waste water.
2. Give a note on oxidation ponds.
3. Classify the trickling filter with explanation.
4. Discuss the merits of biological treatment processes.
5. Explain the process of energy production by a digester.
6. What is meant by anaerobic sludge blanket process ? Explain.
7. Illustrate the physical and chemical removal of dissolved materials.
8. List the problems encountered in the installed biogas plants. Explain.
9. Discuss the application of kinetic parameters in biological reactors.
10. List the merits and demerits of immobilization techniques.

P.T.O.

PART – B

Answer **any one** full question from **each** Module. **(3×20= 60 Marks)**

Module – I

11. Explain in detail the principles involved in reactor design and process flow sheets of waste water treatment. **20**

OR

12. Discuss in detail the integrated design procedure of biological waste treatment and list the merits and demerits. **20**

Module – II

13. Illustrate the fundamentals of anaerobic treatment and its types. **20**

OR

14. Give notes on :

    a) Gas transfer and mass models. **10**

    b) Concept of sustainable waste water treatment. **10**

Module – III

15. Give the engineering design of various types of domes in biogas plants. **20**

OR

16. Give a brief note on :

    a) Design optimization for biogas production. **10**

    b) Alternate feed stock for biogas production. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.702 : BIOPROCESS INSTRUMENTATION (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the terms sensitivity, dead zone and hysteresis.
2. Write short notes on step change, linear and sinusoidal change.
3. Explain the terms fidelity lag and speed of response.
4. Write short notes on RTD and LVDT.
5. Discuss in detail about bourdan gauge.
6. Explain about piezoelectric manometers.
7. Give brief overview of P & I diagrams.
8. Discuss about the on-line sensors for cell properties.
9. What is meant by rheological properties and how to measure these in a fermenter ?
10. Define state and parameter estimation. **(4×10=40 Marks)**

PART – B

Answer **any one** question from **each** module.

Module – I

11. a) Write short notes on sensing element, transducing element and manipulating element. **12**

    b) Explain the different types of transducers. **8**

P.T.O.

12. a) Explain the working principle of electron magnetic transducers. **10**

    b) Discuss the working principle and operation of energy meters and frequency meters. **10**

Module – II

13. a) Describe the working principle and construction of radiation pyrometers. **8**

    b) Discuss in detail about the ionisation gauge high pressure measuring instrument. **12**

14. a) Explain the construction and working principle of any one of positive displacement flow meters. **10**

    b) Write down the working principle operation and constructional features of any two instruments for measurement of viscosity. **10**

Module – III

15. a) How do you measure the physical and chemical parameters in bioreactors ? Explain. **10**

    b) Explain the on-line and off line sensors for measuring cell properties. **10**

16. a) Explain the term data acquisition systems. **12**

    b) Write short notes on direct regulatory control. **8**

(Pages : 2) **5652**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.705 : Elective – III (EL 3F)
PROJECT ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Write about steps involved in the company formation.
2. Discuss the duties and responsibility of process licensor.
3. Write a short note on plot plan and equipment layout.
4. What are the functions of personnel and training departments in process industries ?
5. Name the different types of project planning techniques.
6. Differentiate between PERT and CPM.
7. Discuss the steps involved in procurement for process plant construction.
8. With example describe the difference between start up and commissioning.
9. Discuss the classification of turbines.
10. Discuss about vacuum producing equipments. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** full question from **each** Module.

Module – I

11. a) What are the different types of flow diagrams used in process industry ?

    b) What are the preliminary data necessary for the construction of a flow diagram and plot plan ? **(10+10)**

OR

12. a) What are the functions to be performed by the engineering design and drafting group of a process plant project ?

    b) Discuss the role of a process engineer in project engineering.

    c) Name the major industrial financial institutions in India. **(10+6+4)**

Module – II

13. a) What are the various activities to be considered while planning and scheduling a project ?

    b) Discuss the role of contractors and how the selection of contractors is to be performed ? **(10+10)**

OR

14. a) What are the various methods of raising finances for a project ? Explain.

    b) What are the statutory sanctions to be obtained for a project ? **(10+10)**

Module – III

15. a) Explain how piping design is carried out.

    b) What are the types of hazards to be considered while designing a process plant ? **(10+10)**

OR

16. a) Write a detailed specification for a cooler used in a fermentation industry.

    b) Explain the selection procedure for compressors used in a bioprocess industry. **(10+10)**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.705 : Elective – III (EL3 C) : BIO-FUEL TECHNOLOGY AND ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks. **(10×4=40 Marks)**

1. What are the biomass sources ? List all sources.
2. Briefly discuss the pyrolysis processes.
3. Describe about recent advances in bioprocessing of coal.
4. Describe about bio-diesel technology.
5. Write short notes on biogas digester.
6. Explain about sludge treatment.
7. What are the types of biological fuel cells ?
8. Explain about biosurfactants.
9. Write about the combustion of biomass.
10. Differentiate between dry and wet fermentation.

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. a) Explain about woody biomass and its preparation. **10**

    b) Write short notes on thermochemical gasification principles and the effect of various parameters on gasification. **10**

12. a) Describe about aerobic and anaerobic pathway of coal degradation. **10**

    b) Write short note on coal bio-solubilization. **10**

P.T.O.

Module – II

13. a) With a neat diagram explain the high rate digesters for industrial waste water treatment. **10**

    b) Explain the operating parameters for biogas production along with the microbial and biochemical aspects. **10**

14. a) Describe about production of bio-ethanol. **10**

    b) Explain about feedstock for biogas and gasohol production. **10**

Module – III

15. a) What are the applications of biological fuel cells ? Explain the principle, construction and operation of biofuel cells. **10**

    b) Explain about hydrogen production by bacteria. **10**

16. Write short notes on : **20**

    i) Biophotolysis of water

    ii) Fluidized bed gasifiers and its design

    iii) Cogeneration system

    iv) Microbial recovery of petroleum by biopolymers.

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Reg. No. : ....

Name : ....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
Biotechnology and Biochemical Engg. Branch
08.704 : BIOSENSORS AND DIAGNOSTICS – Elective 2B (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** carries **4** marks.

1. What are the advantages and disadvantages of microbial biosensors over enzyme biosensor ?

2. Write short note on immunosensors.

3. What is surface Plasmon resonance ?

4. How biosensors are useful in agriculture and food production ?

5. Give the applications of Biochips in modern sciences.

6. What are ion selective field effect transistors ?

7. Write a short note on biochemical detection of organelles.

8. How biosensors are used in environmental control and pollution monitoring ?

9. What are Biochips ?

10. Explain transduction principle used in biosensors. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from each Module.

Module – I

11. Explain the immobilization methods used for construction of biosensors. **20**

OR

12. Write short note on biosensor diversification and explain in detail the applications of biosensors. **20**

Module – II

13. Describe the design, construction and operation of affinity biosensors. **20**

OR

14. Explain the design, construction and operation of piezoelectric crystals. **20**

Module – III

15. a) Discuss micro fabricated sensors. **10**

    b) Explain applications of biosensors for personal diabetes management. **10**

OR

16. Describe the applications of biosensors in clinical analysis and health care. **20**

(Pages : 2) **5637**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
Biotechnology and Biochemical Engineering
08.701 : DOWNSTREAM PROCESSING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions; **each** carries **4** marks.

1. What is a supercritical fluid ? What are its characteristics ?
2. What is ultra filtration ? How is it useful in bio separations ?
3. What are the theoretical considerations involved in drying of products ?
4. Explain the term electrophoretic mobility.
5. What are ion exchangers ? Classify them.
6. What are aqueous biphasic systems ? Give examples. How are they useful ?
7. What are the advantages of membrane separation processes ?
8. Discuss the theory of crystallization.
9. Explain the principle of immunoelectrophoresis.
10. Explain the terms : (i) partition coefficient (ii) retention time. What is their significance ? **(10×4=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. Discuss in detail the chemical methods of cell disruption. **20**

OR

12. a) A suspension of spherical particles of 0.1 mm diameter was allowed to settle in a column of 50 cm length. The density difference between the solid particles and the liquid was 0.05 g/cm^3 and the viscosity of the liquid was 1.1 cp. (i) calculate the settling time of the particles assuming that the particles reach their terminal velocity almost instantaneously. (ii) Calculate the settling time in a centrifuge rotating at 400 rpm if the distance between the axis of rotation and bottom of the centrifuge was 12 cm and the distance between the axis and the liquid surface was 3 cm. **10**

b) Explain the working principle and mechanism of rotary drum filter with a neat diagram. **10**

Module – II

13. a) A broth of 80 litres contains the desired protein at 12.8 g/l as well as a contaminated protein at 1.8 g/l. Calculate the ammonium sulphate concentration required to recover 98% of the desired protein if the precipitation constants β and k of the desired protein are 9.33 and 1.1 respectively and that of the contaminated protein are 8.8 and 0.95 respectively. What will be the purity of the desired protein at 98% recovery ? **10**

b) Discuss the principle and operational aspects of microfiltration. **10**

OR

14. a) What are the factors you have to take into consideration before selecting a membrane ? **10**

b) Discuss the operating principles and analysis of single and multistage batch extractions. **10**

Module – III

15. Discuss in detail about economic analysis and evaluation of bio product manufactured by fermentation. **20**

OR

16. a) Discuss the principles involved in HPLC and affinity chromatography. **10**

b) Write a note on in-situ bio-product recovery and Waste disposal. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.705 : Elective III (EL3 C)
BIO- FUEL TECHNOLOGY AND ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **All** questions carry **four** marks.

1. Write a note on the applications of sugar cane molasses.
2. Write the principles of thermo-chemical gasification.
3. Write the mechanism of coal biosolubilization.
4. Write a note on enzymes that depolymerize coal.
5. Write the principle of KVIC floating dome digester.
6. Describe the different sources for fermentation of ethanol.
7. Derive an equation for the retention time of volatile solids in a digester.
8. Explain the principle of using biosurfactants for the petroleum recovery.
9. Write the different types of biological fuel cells and give their applications.
10. Explain biophotolysis of water. **(10×4=40 Marks)**

PART – B

Answer **any one full** question from **each** Module. **One full** question carries **twenty** marks.

Module – 1

11. a) With specific examples explain the chemical composition and properties of various biomass materials. **10**

    b) Write short notes on storage and handling of biomass. **10**

P.T.O.

12. a) Briefly explain the thermo-chemical conversion of ligno-cellulose biomass. **10**

    b) Briefly explain the anaerobic pathway of coal degradation. **10**

Module – 2

13. a) Explain the designs of any one rural biogas digesters popularized in India. **10**

    b) Explain the production of biodiesel by trans-esterification of oils. **10**

14. a) With a neat diagram explain the operation of UASB digester. **10**

    b) Differentiate dry and wet fermentation. **10**

Module – 3

15. a) Explain the principle of condensing extraction steam turbine cogeneration system. **10**

    b) Explain the microbial recovery of petroleum by Xanthum gum. **10**

16. a) Explain the design and operation of fluidized bed gasifier. **10**

    b) Briefly describe the production of hydrogen by photosynthetic bacteria. **10**

(Pages : 2) **5639**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
Biotechnology and Biochemical Engineering Branch
08.703 : BIOINFORMATICS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question in Part **A** carries **4** marks.

1. Define the NBRF-PIR sequence format.
2. Interpret AIDS virus sequence databank ?
3. What is PDB and explain the xyz co-ordinates ?
4. Define the homologous gene sequences with example.
5. What do you meant by sequence alignment ?
6. Define dynamic programming algorithm.
7. What are the steps in FASTA algorithm ?
8. What are the classifications of protein structure ?
9. What is threading ? Elaborate.
10. What is molecular dynamics and its types ? **(10×4=40 Marks)**

PART – B

Answer **any one** question **each** from **each** Module.

Module – I **(20 Marks)**

11. Explain the following databases :
    a) Metabolic pathway databank
    b) Microbial and cellular databank

OR

12. Describe the Genbank file format.

P.T.O.

Module – II **(20 Marks)**

13. Explain the BLAST algorithms in detail.

OR

14. Describe the microbial strain data network.

Module – III **(20 Marks)**

15. Explain the molecular modeling and molecular dynamics.

OR

16. Summarize the protein structure prediction using comparative modeling.

(Pages : 2) **2906**

Reg. No. : .....

Name : .....

VII Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.702 : BIOPROCESS INSTRUMENTATION (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** the questions. **Each** question carries **four** marks.

1. Explain the elements of a measuring instrument with a suitable example.
2. What are the different methods of measurement ? Explain briefly.
3. Explain the uses of CRO energy meters and frequency meters in a bioprocess plant.
4. List out different dynamic characteristics and explain any two.
5. Write short notes on thermal conductivity gauges.
6. Explain in detail the mass flow meter.
7. Write short notes on measurement of composition.
8. Write briefly on control application of micro computer in microbial process.
9. Write short notes on measurement of dissolved oxygen in fermenter.
10. Explain different types of Biosensors. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

MODULE – I

11. a) Discuss various sensing elements and transducers used in measurement of pressure and Temperature. **10**

    b) With neat sketch explain the working principle of Electromagnetic transducer. **10**

P.T.O.

12. Write short notes on :
    a) Recording Instrument **5**
    b) Indicating Instrument **5**
    c) Transmission of Instrument reading **5**
    d) LVDT **5**

MODULE – II

13. a) Explain different instruments for density and viscosity measurement. **10**
    b) Explain the working principle of Knudsen gauge. **10**

14. a) With suitable sketch explain the working principle of radiation pyrometer. **10**
    b) Explain briefly the working principle of positive displacement flow meters. **10**

MODULE – III

15. Discuss in detail how the monitoring and control of dissolved oxygen, carbon dioxide, pH and impeller speed is done. **20**

16. Write short notes on :
    a) Physical and chemical sensors. **5**
    b) Programmed batch bio-reaction. **5**
    c) Operational strategies for batch bioprocess reactor. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08-705 : Elective – III (EL3 E) : CANCER BIOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries 4 marks.

1. Write notes on :
   a) CpG islands
   b) Epigenetics
   c) SNP
   d) Survivin ?
2. Explain the role of p53 in cancer biology.
3. Discuss how protein chip technology is useful in cancer detection.
4. Glycaus as cancer biomarkers. Explain.
5. Describe DNA methylation in cancer biology.
6. Discuss the role of miRNA in cancer.
7. Write notes on :
   a) Rnes sarcoma virus
   b) Akt pathway in cancer ?
8. Explain the role of angiogenesis in cancer.
9. Write a note on the role of diet in cancer.
10. Describe tumor markers. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. Discuss the importance of cell cycle regulation in tumor initiation and progression. **20**

OR

12. Discuss the various types of cancer. **20**

Module – II

13. Explain the role of growth factors and their receptors in cancer transformations. **20**

OR

14. Explain :
    a) Three-step theory of invasion
    b) Multiple hit hypothesis
    c) Seed and soil hypothesis
    d) Gene mutation hypothesis. **20**

Module – III

15. Give a detailed note on cancer screening and the types of tests available to detect various cancer. **20**

OR

16. Write a note on :
    a) Complementary and alternative (CAM) in cancer care
    b) Chemotherapy
    c) Targetted therapies
    d) Immunotherapy.

(Pages : 2) **7811**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.704 Elective – II (EL2 B) : BIOSENSORS AND DIAGNOSTICS (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** carries **4** marks :

1. Explicate the linearity of a biosensor.
2. What is immobilization ? Explain how it is used in biosensor construction.
3. Elucidate with a neat sketch, how antigen-antibodies reaction occurs.
4. How sensors are used in pollution control ?
5. What are probes ? Write the types of probes you have studied.
6. With a neat sketch explain how you can biochemically detect the organelles ?
7. What is Evanescent Waves ? Will biosensor is has any contact with this ? Why ?
8. Explain the instrumentation of fiber optic biosensors.
9. Illuminate the applications of Biosensors in veterinary.
10. What is micro fabrication ? What is the impact of this on Biosensors ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module :

MODULE – I

11. Explain the different components of the Biosensor, each with a neat sketch and flow chart. **20**

OR

12. a) Explain the sensitivity specificity and linearity of transducer system.
    b) Clarify about Biological sensing elements. **20**

MODULE – II

13. Compare and contrast between affinity, amperometric and immunosensors. **20**

OR

14. Explain how microbial biosensors were applicable in agriculture and food production industries. **20**

MODULE – III

15. a) Explain the non-invasive Biosensors in clinical and healthcare analysis.
    b) What is Biochip ? Will the creation of biochip is advantage ? If yes explain. Give their applications. **20**

OR

16. Explain the applications of Biosensors in (A) Pollution Monitoring (B) Agriculture (C) Diabetic Management. **20**

(Pages : 2) **7813**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.704 : Elective – II (EL 2 E) : DESIGN OF BIOLOGICAL WASTE TREATMENT SYSTEMS (B)

Time : 3 Hours Max. Marks : 100

PART – A **(10×4=40 Marks)**

Answer **all** questions.

1. Enumerate the objectives of biological treatment.
2. Illustrate the biological film flow process.
3. What is meant by suspended growth system ? Explain.
4. Explain biological nitrogen removal.
5. Illustrate method of sewage plant layout.
6. Discuss briefly the application of immobilization.
7. Analyse the microbiology of biogas production.
8. Explain modular biogas system.
9. List the effects of herbicide on anaerobic digestion.
10. Explain the sludge drying and incineration.

PART – B **(3×20=60 Marks)**

Answer **any one full** question from **each** Module.

Module – I

11. a) Illustrate the theory and design of aerobic attached growth systems. **10**
    b) Write a note on municipal and compost treatment. **10**

OR

12. Explain the principle and discuss in detail the process design considerations of trickling filter. **20**

P.T.O.

Module – II

13. Explain in detail the design considerations for upflow anaerobic sludge blanket process and hybrid reactors. **20**

OR

14. Write short notes on :

    a) Chemical and physical removal of desolved materials. **10**

    b) Sedimentation and thickening of discrete particles. **10**

Module – III

15. Discuss the design parameters affecting the success and failure of the biological plant. **20**

OR

16. Give brief note on :

    a) Methods to enhance the biogas production. **10**

    b) Alternate construction material for biogas plant construction. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, Nov. 2015

(2008 Scheme)

Branch : Biotechnology and Biochemical Engineering

08-702 : BIOPROCESS INSTRUMENTATION

Time : 3 Hours Max. Marks : 100

***Instructions** : Answer **all** questions from Part **A**. **Each** question in Part **A** carries **4** marks.*

PART – A

1. Explain about Direct and Indirect measurements. **(10×4=40 Marks)**
2. Write account on Transducing and manipulating element.
3. Briefly discuss on static and dynamic characteristics of measuring instrument.
4. Give an account on CRO and energy meters.
5. Filled system thermometer – Explain.
6. Write short notes on McLeod Gauge.
7. Give brief overview of P and I diagrams.
8. Give an account on Physical and Chemical sensors.
9. Data smoothing and Interpolation – Define.
10. Monitoring and Control of dissolved CO_2 – Discuss.

P.T.O.

PART – B

Answer **any one** question from **each** Module.

MODULE – I

11. a) Explain about error analysis. **10**

    b) Discuss about the classification of measurements. **10**

OR

12. Explain about Piezoelectric transducer, electromagnetic transducer, optical transducer and its biological applications. **20**

MODULE – II

13. a) Discuss different types of Temperature measuring instruments. **10**

    b) Write a note on different types of Gauges. **10**

OR

14. Give brief overview of the methods of transmission of measured data signals. Also discuss the methods of humidity measurement. **20**

MODULE – III

15. a) Discuss about measurements of different parameters in bioreactors. **10**

    b) Biosensors – Give an account. **10**

OR

16. a) Explain the uses of microcomputers in microbial process. **10**

    b) Write note on :

    i) Data acquisitions systems. **5**

    ii) Fermentation software systems. **5**

(Pages : 3) **7807**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
Branch : BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING
08.701 : Downstream Processing (B)

Time : 3 Hours Max. Marks : 100

Instructions *: Answer* ***all*** *questions in Part – **A**. Answer* ***any one full*** *question from* ***each*** *Module in Part – **B**.* ***Each*** *question in Part – **A** carries **4** marks.*

PART – A

1. Explain the cell disruption kinetics of a homogenizer.

2. Explain the concept of electric double layer and its significance in bioseparations. List any two bioseparations in which this theory is applied.

3. Briefly discuss the separation of solids by a basket centrifuge. List the other types of centrifuges used for bioseparations. What is a gyro-tester ? What is its use ?

4. Explain the terms :
   i) Return on investment
   ii) Pay back time.

5. Determine the fold decrease in the heat transmission surface to volume ratio and the fold increase in power input required to maintain constant speed, when the diameter of the bead mill and the diameter of the impeller are doubled ?

6. Define (i) Permeability coefficient (ii) membrane resistance (iii) membrane flux with reference to membrane separation process. Explain how you would obtain the values for the initial flux for batch concentration of protein solution using a UF membrane.

7. Give a brief account of the different operating modes of high performance liquid chromatography.

P.T.O.

8. Briefly explain the basic principle of gel permeation chromatography. How is molecular weight of a protein determined by gel filtration ?

9. Write a note on freeze drying and its advantage.

10. Explain the term process intensification. **(10x4=40 Marks)**

PART – B

Module – I

11. a) Describe the various mechanical and non mechanical methods used for disruption. **10**

    b) With a neat diagram describe the working of a bead mill. Derive the expression relating the concentration of the products released at a given time in terms of the concentration of products that can be released from a given amount of cells suspensions. **10**

OR

12. a) Describe the role of electro kinetic phenomena in the flocculation of cells and insoluble particles. Also explain the theories associated with this. **10**

    b) A cell broth is to be filtered at a rate of 3 m^3/h on a rotary vacuum filter at a vacuum pressure of 0.7 bar. The cycle time for the drum is 1 minute and the filtration time is 20 s. The broth has a viscosity of 2 cP and a cake solid concentration of 12 g per litre of filtrate. The specific cake resistance is 9×10^9 cm/g. Determine the area of the filter that is required. **10**

Module – II

13. a) Explain orthokinetic and perikinetic aggregation with reference to precipitation process. Explain the significance of Camp number. **8**

    b) A counter current extraction with 4 equilibrium stages is available for separating a desired product from a contaminating impurity which is 10% of weight of the by product in a feed stream. For the extraction solvent being used, which is immiscible with the feed stream, the product has a partition co-efficient (K) of 10, and for impurity, K is 1. For a solvent to feed ratio of 0.2 what will be the ratio of impurity to by product in the extract phase at the outlet of the extract ? **12**

OR

14. a) With necessary diagram, explain the process of cross flow filtration. Also discuss about pervaporation. **(8+4=12)**

b) Equipment is available for ultra filtration of a protein solution at constant volume to remove low molecular weight species. The flow channels for this system are tubes 10 mm in diameter and 1 m long. The protein has a diffusion coefficient of 9×10^{-11} m^2/s. The solution has a viscosity of 1.2 cP and a density of 1100 kg/m^3. The system is capable of operating at a bulk stream velocity of 3 m/s. At this velocity, determine the polarization modulus for a transmembrane flux of 45 litres/m^2.hr. **8**

Module – III

15. a) A chromatographic separation of a two component sample on a 50 cm column gave the retention times for the solutes A and B as 2.5 and 3.1 minutes with base widths of the two chromatographic peaks being 0.24 and 0.3 minutes respectively. Determine

a) number of theoretical plates

b) plate height

c) resolution of the two peaks. Also obtain the resolution of the two peaks when the column is scaled up to 80 cm with the same data applicable to the 50 cm column. Comment on the resolutions obtained. **11**

b) Write notes on :

i) Chiral chromatography

ii) Immunoelectrophoresis

iii) Mier's supersaturation theory of crystallization. **9**

OR

16. a) Describe in detail the method of ion exchange chromatography. What do you mean by capacity of ion exchangers ? Discuss the various ways by which capacity is expressed and specify how they are determined ? **10**

b) Describe the constructional features of any one type of crystallizer used in bioprocess industries. **10**

8. Briefly explain the basic principle of gel permeation chromatography. How is molecular weight of a protein determined by gel filtration ?

9. Write a note on freeze drying and its advantage.

10. Explain the term process intensification. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Describe the various mechanical and non mechanical methods used for disruption. **10**

    b) With a neat diagram describe the working of a bead mill. Derive the expression relating the concentration of the products released at a given time in terms of the concentration of products that can be released from a given amount of cells suspensions. **10**

OR

12. a) Describe the role of electro kinetic phenomena in the flocculation of cells and insoluble particles. Also explain the theories associated with this. **10**

    b) A cell broth is to be filtered at a rate of 3 m^3/h on a rotary vacuum filter at a vacuum pressure of 0.7 bar. The cycle time for the drum is 1 minute and the filtration time is 20 s. The broth has a viscosity of 2 cP and a cake solid concentration of 12 g per litre of filtrate. The specific cake resistance is 9×10^9 cm/g. Determine the area of the filter that is required. **10**

Module – II

13. a) Explain orthokinetic and perikinetic aggregation with reference to precipitation process. Explain the significance of Camp number. **8**

    b) A counter current extraction with 4 equilibrium stages is available for separating a desired product from a contaminating impurity which is 10% of weight of the by product in a feed stream. For the extraction solvent being used, which is immiscible with the feed stream, the product has a partition co-efficient (K) of 10, and for impurity, K is 1. For a solvent to feed ratio of 0.2 what will be the ratio of impurity to by product in the extract phase at the outlet of the extract ? **12**

OR

(Pages : 2) **2917**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2015
(2008 Scheme)
08.705 : Elective – III (EL 3F)
PROJECT ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What are the factors affecting the selection of plot plan ?
2. What are the steps involved in the evolution of a process ?
3. Write the significance of process Engineering.
4. What are the different methods of planning ?
5. Discuss the advantages of CPM.
6. Write the basis of a contract.
7. Discuss about different types of heads used in the pressure vessels.
8. Write the specification of a cooling tower pump.
9. Discuss about different types of piping support.
10. What do you mean by guarantee run ? Explain. **(4×10=40 Marks)**

PART – B

Answer **any one** question from **each** Module in Part **B**.

Module – I

11. a) Write the features of Engineering design and drafting.

    b) Discuss the role of process Engineer with suitable examples. **(12+8=20)**

OR

12. a) Suggest a suitable location for Nuclear power plant in Kerala.

    b) What are the factors affecting site selection of process plants ? **(12+8=20)**

Module – II

13. a) What are the different techniques for planning and scheduling ? Explain any one of them in detail.

    b) Write the salient features of turnkey contract. **(12+8=20)**

OR

14. a) What are the different types of project financing methods ? Explain.

    b) Discuss about venture capital fund. **(12+8=20)**

Module – III

15. a) Explain in detail about the installation of a turbine driven centrifugal compressor.

    b) Explain how the safety in plant design is to be improved ? **(12+8=20)**

OR

16. a) Write the steps involved in the plant construction. What are the hazards associated with plant construction.

    b) What are the features of Industrial buildings ? **(12+8=20)**

(Pages : 2) **2908**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2015
(2008 Scheme)
08.704 : Elective – II (EL-2A)
BIOPHARMACEUTICAL TECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions from Part – **A**. and* ***one full*** *questions from* ***each*** *Module in Part – **B**.*

PART – A

1. With instance explain the importance of biotechnology application in biopharmaceuticals.
2. Discuss the preparation method of edible vaccine.
3. Mention the strategies involved in rational drug design.
4. How proteins are engineered to yield peptidomimetics.
5. Discuss on the major drug metabolizing enzyme.
6. What are the advantages and disadvantages of gene therapy ?
7. Discuss on the natural anticoagulant in the circulation system.
8. List the agents affecting immune response.
9. Write a short note on cisplatin compound as DNA target.
10. List few anti-HIV agents with their drug targets. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. A) Discuss the role of regulatory authorities in clinical trial of drug development process. **8**

    B) Discuss the formulation and clinical use of recombinant vaccine. **12**

OR

12. A) Explain how good manufacturing practice helps to ensure a quality product ? **10**

    B) Describe the current status and future prospects of biopharmaceuticals ? **10**

Module – II

13. A) Compare and contrast between pharmacokinetic and pharmacodynamics process. **5**

    B) Discuss the purification and characterization of protein based drugs. **15**

OR

14. Explain the ligand binding and activation mechanism of G-protein coupled receptor and ion channels. **20**

Module – III

15. Discuss the different class of non-pathogenic viral vectors used in gene therapy. **20**

OR

16. A) Explain preparation of carbohydrate-based cancer vaccine. **8**

    B) Discuss the inoculums and medium for commercial production of penicillin and cephalosporin antibiotics. **12**

(Pages : 2) **2905**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
Biotechnology and Biochemical Engineering
08.701 : DOWNSTREAM PROCESSING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** carries **4** marks.

1. What are the different steps in the downstream processing of biochemical products ?
2. Write a note on the operation and functioning of bead mill in cell disruption.
3. How does the compressibility of the cake alter the filtration characteristics of the broth ?
4. Write a note on the scale up of centrifugation.
5. Give an account on the fixed bed adsorption process.
6. What are aqueous biphasic systems ? Give examples. How are they useful ?
7. What are the advantages of membrane separation processes ?
8. Discuss the theory of crystallization.
9. Explain the principle of immunoelectrophoresis.
10. Explain the terms :

    i) Partition coefficient

    ii) Retention time.

    What is their significance ? **(10x4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11 a) A suspension of spherical particles of 0.1 mm diameter was allowed to settle in a column of 50 cm length. The density difference between the solid particles and the liquid was 0.05 g/cm^3 and the viscosity of the liquid was 1.1 cp.

i) Calculate the settling time of the particles assuming that the particles reach their terminal velocity almost instantaneously.

ii) Calculate the settling time in a centrifuge rotating at 400 rpm if the distance between the axis of rotation and bottom of the centrifuge was 12 cm and the distance between the axis and the liquid surface was 3 cm. **10**

b) Explain the working principle and mechanism of rotary drum filter with a neat diagram. **10**

12. Discuss in detail the steps involved in the product isolation and purification of an enzyme. **20**

Module – II

13. a) Describe about different agents employed in precipitation which renders the compounds of interest insoluble. **10**

b) Write a note on Supercritical fluid extraction and Electrodialysis. **10**

14. a) What are the factors you have to take into consideration before selecting a membrane ? **10**

b) Discuss the operating principles and analysis of single and multistage batch extractions. **10**

Module – III

15. a) Give a schematic diagram of the chromatographic set-up and describe the functions of the components. **10**

b) A solute 'x' of a sample mixture is not retained on the chromatographic column and elutes out of 4 minute after injection. Another solute in the sample 'y' elutes out of12 minute. The mobile phase flow rate is 20 L/min. Calculate the value of the capacity factor and time spent by 'y' in the mobile and stationary phase. **10**

16. a) Discuss the principles involved in HPLC and affinity chromatography. **10**

b) Write a note on in-situ bio-product recovery and waste disposal. **10**

(3x20=60 Marks)

(Pages : 2) **2907**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
Biotechnology and Biochemical Engineering Branch
08.703 : BIOINFORMATICS

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. When was Uniprot created and why ?
2. Write a brief note on EMBL.
3. List the microbial data bases and a note on any one.
4. Give a brief account on rRNA data base.
5. Analyze BLAST algorithm.
6. Pen a short note on Microbial Strain Data Network.
7. Differentiate Needle from Water (Pair wise alignment tools).
8. How are neural networks used for predicting protein structural elements ?
9. Why protein motifs are important in protein activity studies ?
10. Define docking in bioinformatics terms. Mention the applications. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. Write a detailed note on NCBI database. **20**

OR

12. Describe the AIDS data base. **20**

Module – II

13. Describe in detail how the algorithm of FASTA works and discuss the output of FASTA search. **20**

OR

14. Explain the algorithms for multiple sequence alignment. **20**

Module – III

15. Describe in detail about homology modeling. **20**

OR

16. Write an account on *in-silico* drug designing. **20**

(Pages : 2) **2912**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2015
(2008 Scheme)
08.704 : Elective II (EL 2 E)
DESIGN OF BIOLOGICAL WASTE TREATMENT SYSTEMS (B)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions. **Each** question carries **4** marks.*

PART – A

1. Illustrate the factors affecting the design of trickling filter.
2. Explain the theory of suspended aerobic growth system.
3. Explain briefly the mathematical modeling.
4. Explain the principle of biological nitrogen removal.
5. Explain the concept of bubble aeration.
6. Explain the effect of heating on gas production.
7. Differentiate sedimentation from thickening.
8. Define anaerobic process.
9. Write a note on alternate feed stock for biogas production.
10. Briefly explain microbiology of biogas production. **(10×4=40 Marks)**

PART – B

Answer **any one** full question from **each** Module. **Each** question carries **20** marks.

Module – I

1. Explain in detail the waste water characteristics and kinetics of waste water treatment. **20**

OR

2. Discuss in detail the theories of aerobic attached growth system and explain one industrial application. **20**

P.T.O.

Module – II

3. Give a brief note on general design considerations of anaerobic reactors and explain anaerobic sludge blanket process. **20**

OR

4. Write a short note on.

   a) Aerobic and anaerobic digestion of sludge. **10**

   b) Sewage treatment plant layout. **10**

Module – III

5. Discuss the parameters affecting the success and failure of biogas plants. **20**

OR

6. Explain the principle and applications of immobilization technique. **20**

(Pages : 2) **2912**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2015
(2008 Scheme)
08.704 : Elective II (EL 2 E)
DESIGN OF BIOLOGICAL WASTE TREATMENT SYSTEMS (B)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions. **Each** question carries **4** marks.*

PART – A

1. Illustrate the factors affecting the design of trickling filter.
2. Explain the theory of suspended aerobic growth system.
3. Explain briefly the mathematical modeling.
4. Explain the principle of biological nitrogen removal.
5. Explain the concept of bubble aeration.
6. Explain the effect of heating on gas production.
7. Differentiate sedimentation from thickening.
8. Define anaerobic process.
9. Write a note on alternate feed stock for biogas production.
10. Briefly explain microbiology of biogas production. **(10×4=40 Marks)**

PART – B

Answer **any one** full question from **each** Module. **Each** question carries **20** marks.

Module – I

1. Explain in detail the waste water characteristics and kinetics of waste water treatment. **20**

OR

2. Discuss in detail the theories of aerobic attached growth system and explain one industrial application. **20**

P.T.O.

(Pages : 2) **7816**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
PROJECT ENGINEERING (B)
08.705 : Elective – III (EL 3 F)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions :

1. Briefly explain the role of project engineer.
2. What is a Techno Economic Feasibility Report for a project ? Explain its significance.
3. Discuss the importance of process engineering.
4. Differentiate between plant location and site selection.
5. Explain the purpose of project schedule.
6. Discuss the duties of equipment speciality engineering.
7. Write the limitations of Bar Chart.
8. Discuss the classification of heat transfer equipments used in process industries.
9. Discuss the specifications to be considered for the selection of pumps and the associated purchase of the same.
10. List the major steps involved in the construction of a process plant. **(10x4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module :

Module – I

11. a) Discuss the scope of project engineering.
    b) What are the various stages through which a project is likely to pass ? **(10+10)**

OR

12. a) A young chemical engineer's consortium in planning to set up 1200 TPD. Ammina-urea plant. What are the preliminary data that are necessary for the plant and write on the source and collection of required data ?
    b) Suggest suitable site for the above project in Kerala and give the justification for the selection. **(12+8=20)**

Module – II

13. a) Discuss in detail on the inspection and expediting aspects in procurement of process plant equipments.
    b) Write about the purchase order and its format. **(15+5)**

OR

14. a) What is inventory with regard to a process plant. How does this affect the project planning and scheduling.
    b) Briefly discuss about CPM and PERT techniques that are applied to project engineering. **(10+10)**

Module – III

15. a) Discuss the role of inherent safety techniques in plant design.
    b) Discuss about fire protection installations in process plants. **(10+10)**

OR

16. a) Explain the term surging in centrifugal compressor. With neat diagram explain the anti surging devices.
    b) Write the specification to order a centrifugal compressor. **(10+10)**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.802 : BIOMATERIALS AND TISSUE ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – I

Answer **all** questions (**Each** question carries **4** marks).

1. How are lubricants produced for biomedical applications ?
2. How and why is recombinant human collagen produced ?
3. Outline how you would produce poly dextrose from bacteria.
4. How would you modify carbohydrate enzymatually and provide examples for its role in tissue engineering ?
5. What is the ideal range of pore sizes and porosity percentage for scaffolds ? How would you create pores in scaffolds made of inorganic materials ?
6. With suitable examples, explain surface modification of carbon as a bone analogue material.
7. Outline the major properties of Alumina and Zirconic in tissue engineering.
8. Outline the basic steps in wound healing.
9. Why is tissue typing necessary ? Differentiate autologous and heterologous transplants.
10. Illustrate the principle of ESCA and Auger spectroscopy and its relevance in tissue engineering. **(10×4=40 Marks)**

P.T.O.

PART – II

MODULE – I

11. a) How would you cross link collagen using physical, chemical and biological methods (suitable examples) and how would you evaluate its properties separately and in combination with other biomaterials ? (natural/and in synthetic biomaterials). **20**

OR

12. Elaborate upon 4 polymer processing methods with suitable diagrams. **20**

MODULE – II

13. a) i) Outline the importance of Tg and Te in evaluating biomaterials. **4**

ii) What is interface bonding and outline its significance in composites. **4**

b) Elaborate upon the following thermal methods. **12**
(DTA, TGA, DSC and DMA) in characterizing biomaterials.

OR

14. Classify composite materials and outline their applications in tissue engineering. **20**

MODULE – III

15. a) i) Briefly outline the role of PDGF in tissue engineering. **4**

ii) Briefly outline the concepts involved in enriching for cells based on surface markers. **4**

b) Elaborate upon the following dynamic 3D culture systems. **12**

1) Spinner flask bioreactors
2) Rotator Wall bioreactors
3) Perfusion system bioreactors.

OR

16. Using the bottom up approach and fundamental principles of tissue engineering, how will you produce Bone ? **20**

(Pages : 3) **6120**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
Branch : BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING
08.801 : Bioprocess Plant and Equipment Design (B)

Time: 3 Hours Max. Marks: 100

Instructions : *The following books and codes are* ***permitted*** *in the* ***examination hall.***

1) *IS codes, Steam tables and Psychometric charts.*
2) *Chemical Engineer's Hand book by J. H. Perry.*
3) *Process Equipment Design – M .V. Joshi*
4) *Introduction to Chemical Equipment Design – Mechanical Aspects – B. C. Bhattacharya.*
5) ***All*** *the missing data may be* ***assumed*** *suitably.*

Answer **any one** question from **each** Module.

Module – 1

1. Design a double pipe heat exchanger for cooling dilute corn steep liquor from 95° C to 30° C at the rate of 440kg/hr. Cooling water enters the inner pipe at 15° C and is circulated at 500kg/hr. Choose 13mm ID and 25.4 mm ID mild steel pipes (wall thickness of each = 2 mm) for constructing the exchanger. Thermal conductivity of mild steel = 45 W/mK. Fouling conditions demand on overall dirt factor of 3×10^{-5} m^2 K/W. The maximum permissible pressure drop on either stream is 70 kN/m^2. Property values of liquid handled are given below : **35**

	Corn steep liquor (at 62.5° C)	Water (at 45.8° C)
Density kg/m^3	960	994
Viscosity kg/ms	0.0008	0.00075
Thermal conductivity W/mK	0.672	0.625
Specific heat kJ/kgK	4.5	4.18

P.T.O.

2. A fermenter containing $10m^3$ of medium (25° C) is going to be sterilized by passing saturated steam (500kPa, gauge pressure) through the coil in the fermenter. The typical bacterial count of the medium is about $3 \times 10^{12} m^{-3}$, which needs to be reduced to such an extent that the chance for a contaminant surviving the sterilization is 1 in 100. The fermenter will be heated until the medium reaches 115° C. During the holding time, the heat loss through the vessel is assumed to be negligible. After the proper holding time, the fermenter will be cooled by passing 20 m^3/hr of 25° C water through the coil in the fermenter until the medium reaches 40° C. The coils have a heat transfer area of 40 m^2 and for this operation the average overall heat transfer coefficient (U) for heating and cooling are 5500 and 2500 kJ/hrm^2K, respectively. The heat resistant bacterial spores in the medium can be characterized by an Arrhenius coefficient (k_{do}) of 5.7×10^{39} hr^{-1} and an activation energy (E_d) of 2.834×10^5 kJ/kmol. The heat capacity and density of the medium are 4.187 kJ/kgK and 1000 kg/m^3, respectively. Estimate the required holding time. **35**

Module – 2

3. A continuous fractionator is to be designed for distilling 5000 kg/hr of liquid mixture containing 35 mole% of methanol and 65 mole% water into an overhead product containing 95 mole% methanol and a bottom product containing 95 mole% water. A reflux ratio of 3 is to be used. Design the column diameter and number of bubble caps. Equilibrium data : **35**

x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
y	0.417	0.579	0.669	0.729	0.79	0.825	0.871	0.91	0.959

4. It is desired to absorb 96% Acetone from a feed mixture containing 2% acetone and rest air. The liquid used is 1.2 times the minimum. Pure water is the solvent and the gas enters at a rate of 450 kg/hr. Estimate the height and diameter of the tower packed with 2.54 cm, Raschig rings. The unit is operated at 1 atm. and 300 K. The equilibrium relation is y = 2.5 x [x, y : mole fraction of Acetone in water and air respectively]H t OG = $H_g + \frac{mG}{L} H_l$.

H_g and H_l are 0.54 and 0.32 m respectively. Density of gas mixture and that of water are 1.18 and 998 kg/m^3. Viscosity of solution is 0.86 and characteristic factor of packing is 160. **35**

Module – 3

5. A vessel 2.0 m in internal diameter and 2.8 m in height is to be provided with bracket supports. Clearance from the vessel bottom to foundation is 1.2 m. Weight of the vessel with all its contents is 8600 kg. Wind pressure acting over the vessel is 125 kg/cm^2; Thickness of the vessel is 10 mm. The vessel is provided with 4 brackets. Diameter of anchor bolt circle is 2.25 m. Height of the bracket from foundation is 2.7 m. Permissible stress for the structural steel; tension = 1360 kg./cm^2; compressive = 1200 kg/cm^2; Bending stress = 1550 kg/cm^2; Permissible stress for concrete foundation is 40 kg/cm^2; Estimate the maximum total compressive load on the bracket due to wind and dead load. **30**

6. i) Design a cylindrical pressure vessel of 3 m outside diameter and 6 m t/t length operating under full vacuum at 400° C. The material of construction is IS-1962 Gr I carbon steel and designed under class 2 specification.

   ii) A spherical vessel having inside diameter 2 m operating at a vacuum of 200 mm Hg and 250° C is used for the process. The material of construction is IS-1962 Gr I carbon steel and designed under class 2 specification. Design the vessel. **30**

(Pages : 3) **1864**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
Biotechnology and Biochemical Engineering Branch
08.801 : BIOPROCESS PLANT AND EQUIPMENT DESIGN (B)

Time : 3 Hours Max. Marks : 100

*The following are **permitted** in the **examination hall** :*

1) *Steam tables and Psychrometric Charts.*
2) *Process Engineer's Equipment Design by M.V. Joshi, McMillan and Co., India, Delhi.*
3) *Perry's Hand Book of Chemical Engineering, McGraw Hill (Various Editions).*
4) *Introduction to Chemical Equipment Design - Mechanical Aspects by B.C. Bhattacharya.*
5) *IS Code for Unfired Pressure Vessels IS 4503, BIS, New Delhi, 1969.*
6) *The certified copies or originals of the Codes **IS 2825: 1969; IS 803: 1976; IS 1730: 1989.***
7) *Certified copies of the handouts of complex equations and tables required for the design.*

Answer **any one** question from **each** Module. **Each** full question in Module **I** and **II** carries **35** marks and that in Module **III** carries **30** marks. Logical assumption of data is acceptable.

MODULE – I

1. A solution of sodium hydroxide leaves a dissolver at 90°C and is to be cooled to 40°C using cooling water. The maximum flow rate of the solution will be 10000 Kg/hr. The inlet temperature of the cooling water will be 20°C and the temperature rise is limited to 20°C. Design a double pipe heat exchanger for the duty using standard

carbon steel pipe and fittings and check whether the pressure drops are acceptable. The physical properties of caustic solution are given below.

	Caustic solution
Specific Heat (kJ/kg K)	3.84
Density (kg/m^3)	980
Thermal Conductivity (W/mK)	0.65
Viscosity (Centipoise)	0.95

2. A dilute solution containing 10% dissolved solids is to be concentrated to 50% solids at a feed rate of 10 tons/h. Saturated steam is available at 205 kN/m^2 absolute. The feed solution enters the evaporator at 21°C and the evaporator is operated under vacuum at 13.3 kN/m^2. The boiling point elevation may be neglected. The specific heat of the solution may be assumed to equal to that of water. Design a triple effect short tube vertical evaporator system and provide the design details of one unit as to the Calendria and vapour space design. The overall heat transfer coefficients in the three effects are respectively 3100, 2000 and 1100 W/m^2.K. **35**

MODULE – II

3. A mixture of 35% mole Benzene in a Benzene- Toluene binary mixture is to be fractionated at normal atmospheric pressure to produce a distillate containing 93 mole % Benzene and a residue containing 98% Toluene. The feed is half vapour and at the rate of 10000 kg/h with columna reflux ratio of 4 maintained in the tower. The vapour-liquid equilibrium data of the given mixture at normal atmosphere is given below.

x	0	0.200	0.400	0.500	0.600	0.800	1.0
y	0	0.333	0.571	0.667	0.750	0.889	1.0

Design a sieve tray tower as to the number of theoretical plates and column diameter, pressure drop. Check the tray hydraulics and to ascertain the design. Assuming a reasonable overall efficiency determine the column height. **35**

4. A sieve tray is to be used to absorb vapors of methanol using fresh water as solvent. The feed gas contains 100 g methanol per m^3 of dry air and is available at 27°C and 1 atm. The feed rate of inerts into the tower is 1200 m^3/h. It is required to remove 98% of methanol in the feed. The equilibrium relation is given by the equation $y^* = 1.15\,x$, where y^* and x are the mole ratios in vapor and liquid phases at equilibrium respectively. A reflux ratio of 1.5 times the minimum may be used for the design. Propose the process design of the tower. **35**

MODULE – III

5. A horizontal vessel has 1.8 m tangent to tangent length. The vessel has torrispherical heads. The operating pressure in the vessel is 1.5 atm and the operating temperature is 300°C. Weight of the vessel with its contents is 21500 kg. The material of construction of the equipment is IS 2002 Gr 2B steel. Design a suitable support. Also design the head. Use logical assumptions. **30**

6. Design a cylindrical vertical storage tank with a nominal capacity of 2.5 m^3 with a diameter such that H/D should not exceed 2. Assume the operating pressure as 5 kg/cm^2 and operating temperature is 30°C. Assume that a light hydrocarbon with a density of 900 kg/m^3 will be stored in the tank. The bottom of the tank is a flanged head welded to the tank. The top may be assumed to be a torrispherical head with a manhole at the top. No compensation need be assumed for the opening. Material of construction may be assumed as IS 2002 – 1968 grade II. Calculate the diameter, height, thickness of the cylindrical shell, thickness of the bottom flat head and the dimensions of top torrispherical head. **30**

(Pages : 2) 6121

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : Biomaterials and Tissue Engineering (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. How would you produce collagen with reduced immunogenicity ? How would you produce gelatin ?
2. List four major aspects of hyaluronic acid with relevance to tissue engineering applications.
3. Differentiate homopolymers and copolymers. What is the significance of producing copolymers for tissue engineering applications ?
4. What is the significance of Hooke's law for evaluating Biomaterials ? With suitable examples, explain how tensile strength of biomaterials can be altered ?
5. What was Griffith's findings in 1920 in the field of ceramics ? List 3 typical flaws in ceramics with an example of each.
6. How can you modify / alter wettability (hydrophobic / hydrophilic) properties of glass or quartz ?
7. Differentiate porous ceramic Vs bioactive ceramic polymer composite.
8. Define rheological properties of biomaterials.
9. What is the role of a soluble morphogen as well as a RGD motif in tissue engineering ?
10. Provide 4 advantages of 3 D in comparison with 2–D cultures. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

MODULE – I

11. a) i) List 4 major properties of alginate as a biomaterial. **4**
    ii) List 4 major properties of chiltosan and chitin as a biomaterial. **4**

    b) Explain in detail how are polyhydroxybutyrate and polycaprolactone produced by bacteria and fungi with suitable schematic diagrams. **12**

OR

12. 'Explain in detail the methodology involved in the synthesis of artificial wood. **10**
    Explain in detail the production of polyphenol resins on an industrial scale. **10**

MODULE – II

13. Elaborate upon the following 4 different methods of characterizing biomaterials : **20**
    1) Electron Microscopy
    2) Optical Microscopy
    3) Atomic Force Microscopy
    4) Confocal Laser Scanning Microscopy

OR

14. a) i) Briefly, explain the following terms in the equation, **4**

    Quality Index = Fracture toughness × index of bioactivity × Index of bioactivity × tensile strength/ Young's modulus

    ii) List four major steps involved in the conventional processing of bioceramics. **4**

    b) How will you evaluate the following four variables in composite materials ? **12**
    a) Elastic behaviour b) Fracture behaviour
    c) Fatigue behaviour d) Creep behaviour

MODULE – III

15. Elaborate upon how cell interactions in natural tissues can be mimicked in producing /modifying artificial surfaces for tissue engineering. **20**

OR

16. Using the bottom-up approach and fundamental principles of tissue engineering, how will you produce cartilage ? **20**

(Pages : 2) **1872**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
Branch : Biotechnology and Biochemical Engineering
Elective – IV (EL4 E) : IMMUNOLOGY AND IMMUNOTECHNOLOGY

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Write a note on :
   a) bone marrow, b) thymus, c) MALT, d) CALT.
2. Explain the immunological basis of memory and generation of antibody diversity.
3. Write short notes on :
   a) anti-idiotypic antibodies, b) macrophage activation.
4. Explain the role of various cytokines.
5. Discuss the role of the complement system in immunity.
6. Briefly explain :
   a) immunocytochemistry, b) immune-electron microscopy.
7. Explain the application of PCR in the production of antibodies.
8. List out the differences between indirect, sandwich and competitive ELISA assays.
9. Write a note on "inflammation".
10. Explain :
    a) catalytic antibodies, b) active immunity. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** from **each** Module. **Each** question carries **20** marks.

Module – I

11. Write a note on the milestone discoveries in the field of immunology.

OR

12. Explain the molecular structure of antibody with neat diagram. Discuss the role different types of antibodies in immunological defense.

Module – II

13 Explain various types of hypersensitivity reactions.

OR

14. Write a short note on various types of transplantation. Discuss the immunological basis of graft rejection.

Module – III

15. Discuss the potentials of immunotherapy with genetically engineered antibodies.

OR

16. Write an introductory note on monoclonal and polyclonal antibodies. Give a detailed explanation of their production. **(3×20=60 Marks)**

(Pages : 2) 6128

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.805 : Elective – IV (EL4 E)
IMMUNOLOGY AND IMMUNOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. Give a brief account on the defensive barriers of the innate immunity.
2. Write short notes on :
   a) Macrophages
   b) NK cells
3. Briefly discuss with suitable example how antigens differ from haptens.
4. Write a short note on MHC – Class I.
5. How lymphocytes are classified into different subsets ?
6. Write a short note on immunoelectrophoresis.
7. Write a short note on Hashimoto's Thyroiditis.
8. Distinguish between polyclonal and monoclonal antibody.
9. Briefly explain the principle and protocol for Western blot analysis.
10. Write a short note on anti-idiotypic antibodies. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks :

Module – I

11. Give a detailed account on the primary and secondary lymphoid organs. 20

OR

12. Give an account on the structure and properties of the different classes of the immunoglobulin molecules. **20**

Module – II

13. Discuss how cell-cell interactions are mediated by cytokines with suitable examples. **20**

OR

14. a) Give an account on the immunological basis of graft rejection. **10**

    b) Give an account on immunosuppressive therapy. **10**

Module – III

15. Discuss the application of PCR technology to produce antibodies and other immunological reagents. **20**

OR

16. Describe the principle and applications of :

    a) Radio Immuno assays **10**

    b) ELISA. **10**

(Pages : 2) **1874**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012

(2008 Scheme)

Biotechnology and Biochemical Engg. Branch

08.806 : MOLECULAR MODELING (EL 5A)

(Elective – V)

Time : 3 Hours Max. Marks : 100

PART – I

Answer **all** questions. **Each** question carries **4** marks.

1. How do you calculate the total energy of a molecule ?
2. Brief about 3D pharmacophores.
3. Differentiate Molecular Dynamics and Monte Carlo methods.
4. Explain outside in and inside out approach.
5. What are pharmacophores ? Illustrate with a diagram.
6. Explain hydrogen bonding in molecular mechanics.
7. Explain fold recognition by threading.
8. Describe in detail about Bond Stretching, Angle Bending, Torsional angle, Electrostatic interactions and Van der Waals interactions.
9. Write a note on 1D, 2D and 3D descriptors with examples.
10. Differentiate Lead-likeness from Drug-likeness. **(10×4=40 Marks)**

P.T.O.

PART – II

Answer **any one full** question from **each** Module.

Module – I

11. a) How do you use Monte Carlo (MC) algorithm for Born-Oppenheimer (BO) approximation ? **10**

    b) Describe the postulates of Quantum Mechanics. **10**

OR

12. a) Elaborate virtual screening and inverse docking. **10**

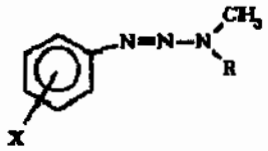
    b) Explain the protein modeling steps based on homology and also emphasize on loop modeling. **10**

Module – II

13. How do you validate the modeled protein structure ? Brief about the various plots used to check the quality of the model. Draw the Ramachandran plot and explain the quadrants. **20**

OR

14. Explain the role of QSAR in drug design with 1-(X-phenyl)-3, 3-dialkyl triazenes as an example. Add a note on the effects of substitution on mutagenicity of the same. **20**



Module – III

15. a) Elaborate about Embrical force field model. **10**

    b) Describe do novo ligand design with an example. **10**

OR

16. a) Explain the methods to handle the susceptible groups so as to increase the stability of drugs. **10**

    b) Explain the outlooks and challenges for the next 20 years on the future of computer aided drug design. **10**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
Branch – Biotechnology
03.804 : PROCESS INSTRUMENTATION

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the principle of optical pyrometers.

2. Define the terms :
   i) accuracy
   ii) dynamic error
   iii) fidelity
   iv) reproducibility

3. Explain the classification of instruments.

4. Explain the operation of a Calomel electrode.

5. With a neat diagram explain how an inclined type manometer is used for differential pressure measurement.

6. Differentiate between the direct and inferential methods for the measurement of liquid level.

7. What is conductometric analysis ? Mention its applications.

8. Explain differential Thermal Analysis methods.

9. Explain the working of nutating-disc meter.

10. Describe any one method for measuring the flow of a dry solid material.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one** question from **each** Module.

MODULE – I

11. a) i) What are the functional elements of an instrument ? Explain the classification of instrument. **12**

ii) Explain the various transmission methods. **8**

b) i) How are errors in measuring instruments classified ? Discuss in deatil. **14**

ii) Explain the classification of transducers with examples. **6**

MODULE – II

12. a) i) Explain the working principle of Mc Leod gauge with a neat diagram. **15**

ii) Explain how Thermal conductivity bridge can be used for flue gas analysis. **5**

b) i) Explain the pressure measurement using bourdon tube. **10**

ii) Describe hot cathode type ionization gauges. Mention their short comings. **10**

MODULE – III

13. a) i) With a neat sketch explain the principle and working of a rotameter. **10**

ii) Develop the P and I diagram for temperature control of heat exchangers. **10**

b) i) Explain the principle and operation of a magnetic flow meter. **10**

ii) Explain the measurement of flow through open channels. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.804 : MANAGERIAL ECONOMICS FOR PROCESS ENGINEERS AND PRINCIPLES OF INDUSTRIAL MANAGEMENT (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **4** marks.

1. Explain Hoskold's formula.
2. Discuss the effect of depreciation on tax.
3. What annual payments should be made to make 5,00,000 after 10 years from now if money is worth 12% ?
4. Discuss the factors involved in direct costs.
5. Discuss about order of magnitude estimate.
6. Discuss cost investment involved in insulation costs, instrumentation and control.
7. What is plant overhead cost ? Explain.
8. Discuss break-even point. What is its significance ?
9. What is Net Present worth and venture worth ?
10. Discuss the terms Assets and Liabilities in a balance sheet. **(10×4=40 Marks)**
11. An asset has 1,50,000 initial cost. Salvage value is 2,000 after 5 years. Calculate the annual depreciation by i) Straight line method ii) Declining balance method iii) Sum of years digit method iv) Sinking fund method @ 10%. **20**

OR

12. a) An amount of Rs. 2,500/- is required to repair a machine so that its life is extended for one year, Rs. 5,000/- is regd for extending life by 2 years, Rs. 7,500/- for 3 years and so on. A new machine costs Rs. 15,000/- and service life is 5 years. How long should the tank be repaired ? **15**

    b) Discuss the logic of continuous interest **5**

13. Discuss the different techniques used for capital cost estimation. **20**

OR

14. a) What is unaburden ? **6**

    b) Discuss the effect of inflation on the investment. **6**

    c) Discuss Williams six-tenth factor method. **8**

15. Discuss the mathematical methods used for profitability analysis. **20**

OR

16. The following is the Trial Balance of a Merchant on 31st March 2008. Prepare Trading, Profit and Loss Account and the Balance Sheet as on 31st March 2008.

Bills Payable	8,000	Salaries	6,700
Land and Buildings	41,000	Rent and Taxes	3,000
Stock of goods as on 1st April	50,000	General Expenses	3,000
Capital	1,60,000	Interest on capital	10,000
Plant and Machinery	75,000	Furniture	5,000
Bills Receivable	16,000	Cash at Bank	4,300
Purchases	1,20,000	Discounts	2,000
Sales	2,00,000	Debtors	27,000
Wages	15,000	Creditors	10,000
Closing stock	46,000		

20

(3×20=60 Marks)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.816 BIOMEDICAL ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Name the EEG signals. Specify their frequency bands.
2. What are the requirements of implantable pacemaker ?
3. Explain how action potentials are generated within the cell ?
4. Write down the steps involved in Korotkoff method of blood pressure measurement.
5. Suggest the different techniques used to protect patents from electric shock hazards.
6. What do you mean by bioinformatics ? Discuss its applications.
7. Illustrate the sequence of events taking place in neuronal communication.
8. Explain the biological effects of NMR imaging.
9. Define characteristic impedance of a medium.
10. List the applications and advantages of positron emission tomography.

(10×4=40 Marks)

PART – B

Answer **any two** questions from **each** module. **Each** question carries **10** marks.

MODULE – I

11. Explain the unipolar and bipolar lead systems used for ECG measurement.

12. With block diagram explain electromagnetic blood flow meter.

13. What do you mean by fibrillation ? With schematic explain a cardiac defibrillator.

(10×2=20 Marks)

MODULE – II

14. With schematic explain 10 – 20 electrode placement system of EEG measurement.

15. Explain the operation of heart-lung machine with the help of a diagram.

16. With block diagram explain the operation of flame photometer.

(10×2=20 Marks)

MODULE – III

17. What are the components of NMR imaging system ? Explain with the help of block diagram.

18. With block diagram describe the working of X-ray machine.

19. What is biotelemetry ? Name the major components of a biotelemetry system and explain with the help of block diagram. **(10×2=20 Marks)**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.804 : MANAGERIAL ECONOMICS FOR PROCESS ENGINEERS AND PRINCIPLES OF INDUSTRIAL MANAGEMENT (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Discuss unacost method used for cost comparison.
2. Discuss declining balance method of calculating depreciation.
3. Discuss the methods used for cost comparison after taxes.
4. Discuss the effect of inflation on investment.
5. Discuss the use of cost indices.
6. Discuss about William $6/10^{th}$ rule of cost estimation.
7. Discuss the components involved in direct production cost.
8. What is present worth and venture worth ?
9. Discuss any two ratios used for analysis of balance sheet.
10. What is economic production chart ? **(10×4=40 Marks)**

PART – B

Module – I

11. a) The cost of erecting an oil well is Rs. 1,50,00,00,000. The annual equivalent yield from the oil well is Rs. 30,00,000. The salvage value is Rs. 2,00,000 [illegible] of 10 years. Assuming an interest rate of 18% compounded

12. Compare different methods for calculating depreciation with the help of an example. 20

Module – II

13. Discuss the factors affecting the investment and production costs in detail. 20

OR

14. a) Discuss about cost indices and its use in cost estimation. 15

    b) Discuss the term unaburden. 5

Module – III

15. Discuss the mathematical methods used for profitability evaluation with the help of an example. 20

OR

16. a) A company now sells 1000 units per week at a profit of 20000/week with a fixed cost of Rs. 10,000/ week and a variable cost of 5000/week. If the fixed cost increase by 15% by what fraction selling price must be raised to maintain the existing profit if output is same. 12

    b) Discuss ratios used for comparison of profit and loss account. 8

(Pages : 2) **6916**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806 – Elective – V (EL5 A)
MOLECULAR MODELING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Brief about molecular assembly.
2. How do you calculate the total energy of a molecule ?
3. List out the drawbacks of mechanical and graphical models.
4. Explain the main parameters used in running molecular dynamics simulation.
5. Brief about the simulation of liquid water.
6. Describe fold recognition by threading.
7. Explain conformation search in molecular dynamics.
8. What are pharmacophores ? Illustrate with a diagram.
9. Write a note on 1D, 2D and 3D descriptors with examples.
10. Brief the scoring function and dimensionality used in molecular docking.

(10×4=40 Marks)

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) Explain the two matrix coordinate systems with examples.
    b) Describe the postulates of Quantum Mechanics. **20**

OR

12. a) Describe about side chain placement and refinement.

    b) Explain the protein modeling steps based on homology. **20**

Module – II

13. a) Describe QSAR and its applications.

    b) Explain the steps in Monte Carlo simulation. **20**

OR

14. Explain the significance of the following plots :

    a) Ramachandran plot for the entire protein

    b) Ramachandran plot for all residue types

    c) Chi1-Chi2 plots

    d) Main-chain parameters

    e) Side-chain parameters

    f) Residue properties

    g) Main-chain bond lengths

    h) Main-chain bond angles

    i) RMS distances from planarity and

    j) Distorted geometry. **20**

Module – III

15. a) Explain the various steps involved in virtual screening with an illustration.

    b) Describe de novo ligand design with an example. **20**

OR

16. a) Describe the linear and non-linear modeled equations.

    b) Explain the electrostatic and non-electrostatic contribution to free energies. Add a note on their role in docking and drug design. **20**

(Pages : 3)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.801 : BIOPROCESS PLANT AND EQUIPMENT DESIGN (B)
(Open Book University Examination)

Time : 3 Hours Max. Marks : 100

***Instructions** : The following books and codes are permitted in the examination hall*

1) *IS codes, Steam tables and Psychometric charts.*
2) *Chemical Engineer's Hand book by J.H. Perry.*
3) *Process Equipment Design – M.V. Joshi.*
4) *Introduction to Chemical Equipment Design – Mechanical Aspects – B.C. Bhattacharya.*
5) *All the missing data may be assumed suitably.*

Answer **any one** question from **each** Module.

Module – 1

1. In a food processing plant, a process liquor is to be cooled from 205°C to 80°C at the rate of 10000 kg/hr in a fixed tube sheet 1-2 shell and tube heat exchanger. Cooling water enters the tubes at 25°C and leaves at 50°C. Design the exchanger if fouling conditions demand an overall minimum dirt factor of 0.0004 $(m^2K)/W$ and the maximum permissible pressure drop on either side (on the tubeside as well as on the shell side) is 70 kN/m^2. Choose 19 mm OD, 15.75 mm ID copper tubes (each 5 m long) laid on 23.8 mm triangular pitch. Thermal conductivity of copper = 380 W/mK. The property values of the process liquor and those of cooling water at their arithmetic average temperatures are given below. **35**

	Process liquor (at 142.5°C)	**Water (at 37.5°C)**
Density kg/m^3	688.85	983.184
Viscosity kg/ms	0.00045	0.000686
Thermal conductivity W/mK	0.1342	0.6265
Specific heat kJ/kgK	2.4283	4.1868

P.T.O.

2. A given evaporator is to be fed with 10000 lb/hr of solution containing 1% solute by weight. The feed is at a temperature of 100°F. It is to be concentrated to a solute of 1.5% solute by weight in an evaporator operating at a pressure of 1 atm. in the vapour space. In order to carry out the evaporation the heating surface is supplied with steam at 5 Psi at 227°F. If the overall heat transfer coefficient of evaporator is 250 Btu/hrft^2 °F. Design all parts of the evaporator. **35**

Module – 2

3. Methanol water solution containing 50% by wt methanol at 26°C is to be continuously rectified at 1 std. atm. pressure at a rate of 5000 kg/hr to provide a distillate containing 95% methanol and a residue containing 1% methanol by wt. The feed enters at boiling point. The relative volatility is 3.2 and the reflux ratio is 1.5 times the minimum. If the overall efficiency is 75%. Design a suitable sieve tray distillation column by calculating its number of plates, height and diameter. **35**

4. Stirred Tank Bioreactor is being employed for the production of SCP (single cell protein) at the rate of 35.5 kg/hr by growing yeast cells on paraffinic hydrocarbons. The hydrocarbon oil (density = 850 kg/m^3) is dispersed in water and fed to the reactor at the rate of 265 L/hr. Air is sparged into the reactor and the reaction mixture is agitated with an 800 rpm six bladed turbine impeller (impeller diameter = 0.5 m). The reactor is baffled (number of baffles = 4, each of width = 10% of vessel diameter). Determine the volume of reactor required. The feed to the reactor may be treated as sterile, with substrate concentration = 318.75 g/L. Experimental values of kinetic constants are μ_m = 0.2 hr^{-1}, Ks = 0.175 g/Lμ. Take overall yield coefficient for cell mass production = 0.70. Assume constant density system and the reactor performance as equivalent to an ideal CSTR. Take interfacial tension = 0.022 N/m. **35**

Module – 3

5. A tall vertical vessel 1.5 m in diameter and 13 m in height is to be provided skirt support. Weight of a vessel with all its attachments is 80,000 kg. Diameter of skirt is equal to the diameter of the vessel. Height of skirt is 2.2 m. Wind pressure acting over the vessel is 100 kg/m^2. The coefficient due to wind force, k_1 = 0.7 for cylindrical vessel; Seismic coefficient c = 0.08; Permissible tensile stress of skirt material = 960 kg/cm^2; Permissible Compressive stress is 1/3 of yield stress of material. Yield stress of material is 2400 kg/cm^2. Estimate the thickness of the support. Size of the base plate for a wide range of over turning moment 15662.5 kg/cm and vertical thrust of 52090 kg. Allowable stress on bulk material = 1400 kg/cm^2; Allowable stress on concrete = 50 kg/cm^2; Allowable building stress for bearing ring = 1400 kg/cm^2; Base ring projection beyond column outside diameter = 10 cm. **30**

6. A vertical vessel with a cylindrical shell and hemispherical heads is to be installed in a closed shed. Internal diameter of the vessel is 1800 mm and its thickness is 12 mm. Tangent to tangent length of the vessel is 10 m and filled to 75% of its capacity. Determine the total weight of the vessel and the longitudinal stress in the cylindrical shell above and below the support which is at the lower head to shell junction. Assume the permissible stress of the material and density of the material as 1040 kgf/cm^2 and 9800 kg/m^3 respectively. Vessel contain a liquid of density 0.8 gm/cc, J = 0.85, C = 0.5 and corrosion allowance = 2 mm. Also design the shell and head plate for its thickness. Design a bracket support for the vessel. **30**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.803 : ENVIRONMENTAL POLLUTION, MONITORING AND CONTROL (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** carries **4** marks.

1. Define the following :
   i) COD
   ii) BOD.
2. What is CETP and write its important function ?
3. What are xenobiotics ?
4. Define the terms :
   i) Phytoremediation
   ii) Bioaugmentation.
5. What is meant by temperature lapse rate ?
6. Name the secondary air pollutants.
7. Explain in brief about effluent recycle.
8. What is aerobic suspended process ?
9. What are the kinetic models used for the microbial growth ?
10. Differentiate between aerobic and anaerobic composting.

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. a) Discuss in detail about aerobic and anaerobic wastewater treatment process. **10**

    b) Discuss the importance and needs of legislations for pollution control and the role of a pollution control board in meeting the pollution standards. **10**

OR

12. Explain the need of ETP in industry, design and function of ETP process for a specific wastewater. **20**

Module – II

13. a) What are primary pollutants of air ? How do they affect the atmosphere ? **5**

    b) Briefly explain how the following kinds of air pollution be minimized or controlled :

    i) exhaust gases from automobiles

    ii) acid mist from sulphuric acid industry

    iii) floating fine dust from cement industry. **15**

OR

14. Explain about noise pollution and its control measures. **20**

Module – III

15. What is bioremediation ? Discuss the types of bioremediation in detail. **20**

OR

16. a) What is biooxidation ? Discuss in detail about the direct and indirect process. **10**

    b) Describe the carbon adsorption techniques used in advanced wastewater treatment. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806 : Elective – V (EL5 B) : ENERGY ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions in Part – **A** and **any one** question from **each** Module in Part – **B**.*

PART – A

1. Discuss the classification of coal.
2. Discuss the reasons and solutions of gap between demand and supply of energy sources.
3. Write a short note on pulverised coal furnaces.
4. What is fast breeder reaction ? Explain.
5. Discuss the principle and uses of solar pond.
6. Discuss the methods of harnessing geothermal energy.
7. Discuss the advantages and disadvantages of hydro-electric energy.
8. What is cogeneration ?
9. What are the problem faced in the conversion of heat to power ?
10. Discuss the principle of MHD. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Discuss the present scenario of petroleum world reserves. **10**
    b) Discuss the analysis and testing of coal. **10**

OR

12. Discuss in detail the combusting methods of coal. **20**

P.T.O.

Module – II

13. a) Discuss different techniques used for conversion of solar energy to electrical energy. **10**

    b) Discuss the properties of fuels used in nuclear reactors. **10**

OR

14. a) Discuss the wind energy utilisation in India. **10**

    b) With the help of a layout discuss the nuclear power generation. Discuss the problems of nuclear power generation. **10**

Module – III

15. a) Discuss the parameters to be considered white designing a biogas plant. **10**

    b) What is energy audit ? What are the benefits of conducting an energy audit ? **10**

OR

16. a) Discuss about the energy conservation measures that can be implemented in a petrochemical industry. **10**

    b) Discuss the classification of fuel cell. **10**

(3x20=60 Marks)

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013

(2008 Scheme)

08.805 : Elective – IV (EL4 E)

IMMUNOLOGY AND IMMUNOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Give an overview of the structure and function of the immune system and its significance.
2. Describe the mediators of inflammatory reactions and their functions.
3. Discuss the mechanisms of killing of engulfed bacteria in neutrophils and macrophages.
4. Give an account of B-cells, their characteristics and function.
5. Describe the mucus immune system.
6. Write a note on a) PAMPs and b) PRPs.
7. Write a note on the genetic determination of antibodies.
8. Briefly explain regulatory proteins and receptors of complement system.
9. Write a short note on Cytokines.
10. Briefly describe CD-I mediated antigen presentation. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. Give a detailed account of MHC complex. **20**

OR

12. Discuss "Immunity and its forms". **20**

Module – II

13. Describe the molecular basis of immunology and antibody diversity. **20**

OR

14. Give an account of a) IHC, b) Immuno-electron microscopy c) immuno enzymatic and d) immunoferritin techniques. **20**

Module – III

15. Briefly describe the production of monoclonal and polyclonal antibodies. **20**

OR

16. Write a note on a) Western Blot b) RIA c) ELISA and d) PCRs. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.802 : BIOMATERIALS AND TISSUE ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. How will you study the surface characteristics of polymeric scaffold ?
2. Write a note on ethical concerns related to tissue engineering ?
3. What are the primary sources of stem cells ? Which is the most adopted source and why ?
4. Describe the significance of tailoring the mechanical property of a polymer for developing a scaffold.
5. Write a short note on bioactive glasses and their clinical applications.
6. What are the properties a material should possess to be used as an implant or in tissue engineering ?
7. Write a short note on synthetic biodegradable polymers.
8. Show mechanism of anti-oxidant preventing oxidative degradation of polymers ?
9. Describe the significance of surface characteristics of biomaterials. How it can be modified ?
10. Write the difference between elastic and viscoelastic behaviour.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. A) Describe the structural properties of Collagen. How this is produced synthesized ? **10**

    B) Write the note on synthetic and natural biomaterial and their role in biomedical application. **10**

OR

12. Explain the lubricative properties of natural and modified carbohydrates with example and their role in biomedical application. Describe the methods used for modifying the natural carbohydrates to a better lubricant. **20**

Module – II

13. Write notes on the following with respect to the characterization of biomaterials.

    A) Electron and Neutron diffraction

    B) Confocal Laser scanning microscopy

    C) EDAX

    D) Optical profilometer. **(5×4=20 Marks)**

OR

14. A) Write notes on the following :

    1) Fluorescence and phosphorescence IR,

    2) Raman and NMR spectroscopy,

    3) ESCA and Auger spectroscopy. **15**

    B) What are biocomposites ? Give an example of biocomposite with its application in tissue engineering. **5**

Module – III

15. A) Explain in detail about structure and composition of calcified tissues. **10**

    B) Discuss on the biomaterials used in bone tissue engineering with their biomedical applications. **10**

OR

16. A) Discuss about the design consideration of a novel material for replacement of diseased blood vessel wall tissue (Vascular Graft). **10**

    B) What are the techniques used for the synthesis of scaffolds ? Describe any three of them. **10**

(Pages : 2)

5871

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.803 : ENVIRONMENTAL POLLUTION, MONITORING AND CONTROL (B)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions, **each** carries **4** marks.

1. What is meant by waste water sampling and analysis ?
2. Write drinking water quality standards.
3. Describe anaerobic oxidation.
4. Write a note on electro dialysis.
5. State about primary pollutants.
6. Describe inversion.
7. What is meant by particulate sampling ?
8. What is anaerobic composting ?
9. What is meant by solar detoxification process ?
10. Write about bio oxidation.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain principles, operation and design aspects of Activated Sludge process in waste water treatment. **10**

    b) Describe physical methods of waste water treatment. **10**

12. Explain primary, secondary and tertiary treatments of waste water. **20**

Module – II

13. a) Discuss about control aspects of gaseous pollutants in detail. **10**

    b) Explain noise control, principle, working and use of noise meter. **10**

14. Describe about particulate matter control equipments. **20**

Module – III

15. a) Explain the methods to remove heavy metals such as chromium, mercury etc. from industrial effluents. **10**

    b) Discuss about solar detoxification process and carbon adsorption. **10**

16. a) What is bioremediation ? Explain the bioremediation techniques. **10**

    b) Explain membrane based waste water treatment process. **10**

(Pages : 3) **5869**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
Branch : Biotechnology and Biochemical Engineering
08.801 : BIOPROCESS PLANT AND EQUIPMENT DESIGN (B)

Time : 3 Hours Max. Marks : 100

Instructions : *The following books and codes are permitted in the Examination Hall.*

1) *IS codes, Steam tables and Psychometric charts.*
2) *Chemical Engineer's Hand book by J.H. Perry.*
3) *Process Equipment Design – M. V. Joshi.*
4) *Introduction to Chemical Equipment Design – Mechanical Aspects – B.C. Bhattacharya.*
5) ***All** the missing data may be assumed **suitably**.*

Answer **any one** question from **each** Module.

Module – 1

1. In a food processing plant, a process liquor is to be cooled from 205° C to 80°C at the rate of 10000 kg/hr in a fixed tube sheet 1-2 shell and tube heat exchanger. Cooling water enters the tubes at 25°C and leaves at 50°C. Design the exchanger if fouling conditions demand an overall minimum dirt factor of 0.0004 $(m^2K)/W$ and the maximum permissible pressure drop on either side (on the tube side as well as on the shell side) is $70kN/m^2$. Choose 19 mm OD, 15.75 mmID copper tubes (each 5 m long) laid on 23.8 mm triangular pitch. Thermal conductivity of copper = 380 W/mK. The property values of the process liquor and those of cooling water at their arithmetic average temperatures are given below :

	Process liquor (at 142.5°C)	**Water (at 37.5°C)**
Density kg/m^3	688.85	983.184
Viscosity kg/ms	0.00045	0.000686
Thermal conductivity W/mK	0.1342	0.6265
Specific heat kJ/kgK	2.4283	4.1868

35

P.T.O.

2. A fermenter containing 40 m^3 of medium (25°C) is going to be sterilized by the direct injection of saturated steam. The typical bacterial count of the medium is about $5\times10^{12}m^{-3}$, which needs to be reduced to such an extent that the chance for a contaminant surviving the sterilization is 1 in 1000. The steam (345 kPa, absolute pressure) will be injected with a flow rate of 5000 kg/hr, which will be stopped when the medium temperature reaches 122°C. During the holding time, the heat loss through the vessel is assumed to be negligible. After the proper holding time, the fermenter will be cooled by passing 100 m^3/hr of 20°C water through the cooling coil in the fermenter until the medium reaches 30°C. The coil has a heat transfer area of 40 m^2 and for this operation the average overall heat transfer coefficient (U) for cooling is 2500 kJ/hrm^2K. The heat resistant bacterial spores in the medium can be characterized by an Arrhenius coefficient (k_{do}) of $5.7\times10^{39}hr^{-1}$ and an activation energy (E_d) of 2.83×10^5kJ/kmol. The heat capacity and density of the medium are 4.187 kJ/kgK and 1000kg/m^3, respectively. Estimate the required holding time. **35**

Module – 2

3. Methanol water solution containing 50% by wt methanol at 26°C is to be continuously rectified at 1 std.atm. pressure at a rate of 5000 kg/hr to provide a distillate containing 95% methanol and a residue containing 1% methanol by wt. The feed enters at boiling point. The relative volatility is 3.2 and the reflux ratio is 1.5 times the minimum. If the overall efficiency is 75%. Design a suitable sieve tray distillation column by calculating its number of plates, height and diameter. Also sketch the tray with all the designed details. **35**

4. 1000 kg/hr of mixture of SO_2 and air is to be cleaned. The % of SO_2 in the inlet air is 12% and outlet air is 1% by wt. The absorbing fluid in water at 30°C. Design a suitable packed absorption column $HtOG = Hg + \frac{mG}{L}Hl$.

   H_g and H_l are 0.75 and 0.68 m respectively. Take equilibrium data from Hand Book. **35**

Module – 3

5. A tall vertical vessel 1.5 m in diameter and 13 m. in height is to be provided skirt support. Weight of a vessel with all its attachments is 80,000 kg. Diameter of skirt is equal to the diameter of the vessel. Height of skirt is 2.2 m. Wind pressure acting over the vessel is 100 kg/m^2. The coefficient due to wind force, $k_1 = 0.7$ for cylindrical vessel ; Seismic coefficient c = 0.08 ; Permissible tensile stress of skirt material = 960 kg/cm^2 ; Permissible Compressive stress is 1/3 of yield stress of material. Yield stress of material is 2400 kg/cm^2. Estimate the thickness of the support. Size of the base plate for a wide range of over turning moment 15662.5 kg/cm and vertical thrust of 52090 kg. Allowable stress on bulk material = 1400 kg/cm^2 ; Allowable stress on concrete = 50 kg/cm^2 ; Allowable building stress for bearing ring = 1400 kg/cm^2 ; Base ring projection beyond column outside diameter = 10 cm. **30**

6. i) A spherical vessel having inside diameter 2 m operating at a vacuum of 200 mm Hg and 250°C is used for the process. The material of construction is IS-1962 Gr I carbon steel and designed under class 2 specification. Design the vessel.

   ii) Design a cylindrical pressure vessel of 3 m outside diameter and 6 m t/t length operating under full vacuum at 400°C. The material of construction is IS-1962 Gr I carbon steel and designed under class 2 specification. **30**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
Biotechnology and Biochemical Engineering Branch
08.806 (Elective – V) (EL5 B) : ENERGY ENGINEERING (B)

Time : 3 Hours · Max. Marks : 100

Instructions : *1) Answer **all** questions in Part – **A**.*
*2) Answer **any one full** question from **each** Module in Part – **B**.*
*3) **Each** question in Part – **A** carries **4** marks.*

PART – A

1. Give a brief account of mining and exploration of petroleum.
2. Give the chemical composition of petroleum.
3. List the different types of furnaces used for solid and liquid fuels and briefly discuss about any one type.
4. Compare and contrast BW, PW and HW nuclear reactors.
5. Discuss the process of briquetting and pelletization.
6. Explain the principle of radiation measurement and discuss any one type.
7. Explain the principle and applications of a solar heat pump. Explain how a heat pump is different from a heat engine.
8. Explain the principle of MHD.
9. Discuss briefly about the methods of converting chemical energy into electrical energy.
10. What is a solar pond and describe its principle and working. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) Discuss the origin, occurrence and chemical composition of petroleum. **10**

    b) Explain the process of coal carbonization, coal hydrogenation and coal gasification. **10**

12. Write notes on :

    i) Aviation gasoline

    ii) Oil shale and oil sand

    iii) Waste heat boilers. **20**

Module – II

13. a) Discuss about the solar energy plant and the associated sub systems. **10**

    b) Explain with a diagram the working of OTEC power plants, its limitations advantages and scope. **10**

14. Describe in detail the construction, features of various components and working of gas cooled reactors, fast breeder reactors, their thermal design and associated problems and the performance comparison among them. **20**

Module – III

15. Discuss in detail the principle, construction, working and types of fuel cells. Highlight the scope of fuel cell in future considering the increase in energy demand. Also specify the disadvantages. Give sketches wherever necessary. **20**

16. Write notes on :

    i) Cogeneration

    ii) Methodology of Energy audit

    iii) Thermoelectric refrigerators

    iv) Process kinetics of biogas plants. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
Branch : Biotechnology and Biochemical Engineering
08.801 : BIOPROCESS PLANT AND EQUIPMENT DESIGN (B)

Time : 3 Hours Max. Marks : 100

Instructions : *The following books and codes are permitted in the Examination Hall.*

1) *IS codes, Steam tables and Psychometric charts.*
2) *Chemical Engineer's Hand book by J.H. Perry.*
3) *Process Equipment Design – M. V. Joshi.*
4) *Introduction to Chemical Equipment Design – Mechanical Aspects – B.C. Bhattacharya.*
5) ***All** the missing data may be assumed **suitably**.*

Answer **any one** question from **each** Module.

Module – 1

1. In a food processing plant, a process liquor is to be cooled from 205° C to 80°C at the rate of 10000 kg/hr in a fixed tube sheet 1-2 shell and tube heat exchanger. Cooling water enters the tubes at 25°C and leaves at 50°C. Design the exchanger if fouling conditions demand an overall minimum dirt factor of 0.0004 $(m^2K)/W$ and the maximum permissible pressure drop on either side (on the tube side as well as on the shell side) is 70kN/m^2. Choose 19 mm OD, 15.75 mmID copper tubes (each 5 m long) laid on 23.8 mm triangular pitch. Thermal conductivity of copper = 380 W/mK. The property values of the process liquor and those of cooling water at their arithmetic average temperatures are given below :

	Process liquor (at 142.5°C)	**Water (at 37.5°C)**
Density kg/m^3	688.85	983.184
Viscosity kg/ms	0.00045	0.000686
Thermal conductivity W/mK	0.1342	0.6265
Specific heat kJ/kgK	2.4283	4.1868

35

P.T.O.

2. A fermenter containing 40 m^3 of medium (25°C) is going to be sterilized by the direct injection of saturated steam. The typical bacterial count of the medium is about $5\times10^{12}m^{-3}$, which needs to be reduced to such an extent that the chance for a contaminant surviving the sterilization is 1 in 1000. The steam (345 kPa, absolute pressure) will be injected with a flow rate of 5000 kg/hr, which will be stopped when the medium temperature reaches 122°C. During the holding time, the heat loss through the vessel is assumed to be negligible. After the proper holding time, the fermenter will be cooled by passing 100 m^3/hr of 20°C water through the cooling coil in the fermenter until the medium reaches 30°C. The coil has a heat transfer area of 40 m^2 and for this operation the average overall heat transfer coefficient (U) for cooling is 2500 kJ/hrm^2K. The heat resistant bacterial spores in the medium can be characterized by an Arrhenius coefficient (k_{do}) of $5.7\times10^{39}hr^{-1}$ and an activation energy (E_d) of 2.83×10^5kJ/kmol. The heat capacity and density of the medium are 4.187 kJ/kgK and 1000kg/m^3, respectively. Estimate the required holding time. **35**

Module – 2

3. Methanol water solution containing 50% by wt methanol at 26°C is to be continuously rectified at 1 std.atm. pressure at a rate of 5000 kg/hr to provide a distillate containing 95% methanol and a residue containing 1% methanol by wt. The feed enters at boiling point. The relative volatility is 3.2 and the reflux ratio is 1.5 times the minimum. If the overall efficiency is 75%. Design a suitable sieve tray distillation column by calculating its number of plates, height and diameter. Also sketch the tray with all the designed details. **35**

4. 1000 kg/hr of mixture of SO_2 and air is to be cleaned. The % of SO_2 in the inlet air is 12% and outlet air is 1% by wt. The absorbing fluid in water at 30°C. Design a suitable packed absorption column $HtOG = Hg + \frac{mG}{L}Hl$.

   H_g and H_l are 0.75 and 0.68 m respectively. Take equilibrium data from Hand Book. **35**

Module – 3

5. A tall vertical vessel 1.5 m in diameter and 13 m. in height is to be provided skirt support. Weight of a vessel with all its attachments is 80,000 kg. Diameter of skirt is equal to the diameter of the vessel. Height of skirt is 2.2 m. Wind pressure acting over the vessel is 100 kg/m^2. The coefficient due to wind force, $k_1 = 0.7$ for cylindrical vessel ; Seismic coefficient c = 0.08 ; Permissible tensile stress of skirt material = 960 kg/cm^2 ; Permissible Compressive stress is 1/3 of yield stress of material. Yield stress of material is 2400 kg/cm^2. Estimate the thickness of the support. Size of the base plate for a wide range of over turning moment 15662.5 kg/cm and vertical thrust of 52090 kg. Allowable stress on bulk material = 1400 kg/cm^2 ; Allowable stress on concrete = 50 kg/cm^2 ; Allowable building stress for bearing ring = 1400 kg/cm^2 ; Base ring projection beyond column outside diameter = 10 cm. **30**

6. i) A spherical vessel having inside diameter 2 m operating at a vacuum of 200 mm Hg and 250°C is used for the process. The material of construction is IS-1962 Gr I carbon steel and designed under class 2 specification. Design the vessel.

   ii) Design a cylindrical pressure vessel of 3 m outside diameter and 6 m t/t length operating under full vacuum at 400°C. The material of construction is IS-1962 Gr I carbon steel and designed under class 2 specification. **30**

(Pages : 3) **5872**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.804 : MANAGERIAL ECONOMICS FOR PROCESS ENGINEERS AND PRINCIPLES OF INDUSTRIAL MANAGEMENT (B)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions in Part – **A**. Answer **any one full** question from **each** Module in Part – **B**.*

PART – A

1. Discuss Hoskold's formula.
2. An amount of 2,00,000 is deposited for 5 years. The compounding is done quarterly at a rate of 8%. Find the accumulated amount.
3. Discuss units of production method for calculating depreciation. How it is different from other methods ?
4. Discuss the logic of continuous interest rate.
5. What is unaburden ? When it is used for cost comparison ?
6. Discuss the components of working capital.
7. Discuss about material cost indices.
8. Discuss the ratios used for comparing the Balance Sheet.
9. Discuss economic production charts above 100% capacity.
10. What is pay and time ? What are its advantages and disadvantages ?

(10×4=40 Marks)

P.T.O.

PART – B

Module – I

11. a) A heat exchanger with an initial investment of Rs. 3,00,000 has a 6 year life. How much can be spent on an improved design which has a life of 12 years and is expected to save Rs. 10,000 per year. **12**

    b) Discuss sum of digits method and sinking fund method for calculating depreciation. **8**

OR

12. a) An asset costs Rs. 14,000 and has a useful life of 10 years and salvage value of Rs. 2,000. Find the declining balance factor which will give the same as does straight line depreciation. **5**

    b) Discuss any two methods used for cost comparison of assets with unequal duration. **15**

Module – II

13. a) Discuss different cost indices used in cost estimation. **10**

    b) Discuss about start up expenses. **10**

OR

14. Discuss the component of direct costs and its estimation techniques. **20**

Module – III

15. a) Discuss the use of economic production charts in break even and minimum cost analysis. **12**

    b) Discuss the benefits of using discounted cashflow rate of return for profitability evaluation. **8**

OR

16. From the following data M/s Brothers Pvt. Ltd. prepare a Trading Account, Profit and Loss Account and Balance Sheet as on 31st March 2010.

Credit Balances	**Rs.**
Capital	36,000
Creditors	8,720
Bills payable	2,527
Sales	78,182
Loan	12,000
Debit Balances	
Debtors	3,885
Salaries	4,000
Discount	1,000
Postage	273
Bad debts	287
Interest	1,295
Insurance	417
Machinery	10,000
Opening stock	9,945
Purchases	62,092
Wages	4,300
Buildings	23,780
Fittings	16,155
Value of goods on hand	14,300 **20**

(3×20=60 Marks)

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.802 : BIOMATERIALS AND TISSUE ENGINEERING (B)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. How do you classify biomaterials ?
2. Differentiate between 3D and 2D culture system.
3. Differentiate between creep behaviour and stress relaxation.
4. What are the possible host responses to implant ?
5. Write a note on bioreactor and their application in functional tissue engineering.
6. How the degradation rate is measured for biomaterials ?
7. What are the different metallic biomaterials ?
8. Discuss the problems associated with vascular implants.
9. Write short notes on bone cements.
10. What are antimicrobial polymers ? How are they synthesized ?

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any one full** question from each **Module** :

Module – I

11. A) What do you understand by biopolymers ? How the properties of a biopolymer is evaluated ? **7**

    B) What are PHA and PHB ? Discuss in detail PHA production and its application. **7**

    C) Write the detail methodology of the synthesis of different types of biopolymers and their use in biomedical application. **6**

OR

12. A) Describe in brief the significance of silk fibroin in tissue engineering and different techniques used for its production. **(10×2)**

    B) Explain the properties and biomedical applications of three natural polysaccharides.

Module – II

13. A) Explain the advantages and disadvantages of ceramics as biomaterials. Discuss in detail any two medical applications of ceramics. **10**

    B) Describe Macromechanics of biocomposites. **10**

OR

14. Explain analysis of material performance requirements as biomaterial. Correlate surface properties of materials with biological responses ? **20**

Module – III

15. Write an account on drug delivery system in skin tissue engineering with reference to burn tissues. **20**

OR

16. What are Scaffolds ? Describe the methods which are used for the synthesis of scaffolds. Explain how porosity and other characteristics can be controlled and measured in scaffolds. **20**

(Pages : 2) **7703**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.805 : ELECTIVE – IV (EL4 E)
IMMUNOLOGY AND IMMUNOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Discuss about innate immunity and acquired immunity.
2. Give a brief account on primary lymphoid organs.
3. Discuss about the characteristics of haptens.
4. Write a short note on MHC-Class II.
5. Write a short note on Ouchterlony double immunodiffusion assay.
6. Write a short note on a) Immunofluorescence b) Immunoelectron microscopy.
7. Discuss briefly about the pathogenesis of Myasthenia Gravis.
8. Give an account on type IV hypersensitivity reactions.
9. Describe the principle of enhanced chemiluminescence assays.
10. Write a short note on anti-idiotypic antibodies. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Give an account on the structure and properties of IgG and IgM. **10**
    b) Discuss in detail about the various factors that influence immunogenicity. **10**

OR

12. a) Explain the organization and rearrangement of heavy chain genes. **10**
    b) Give an account on the generation of antibody diversity. **10**

P.T.O.

Module – II

13. Discuss about the positive and negative selection of thymocytes in the thymus. **20**

OR

14. Discuss about the formation of the Membrane Attack Complex (MAC) through various pathways and the biological functions of the complement. **20**

Module – III

15. a) Explain the production of polyclonal antibodies and their characteristics. **10**

    b) Discuss the application of genetically engineered antibodies in immunotherapy. **10**

OR

16. Discuss the principle and applications of

    a) SDS-PAGE and Western blot analysis **10**

    b) ELISA and PCR. **10**

(Pages : 2) **7705**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
Branch : Biotechnology and Biochemical Engineering (Elective – V)
08.806 : NOVEL ANALYTICAL METHODS IN BIOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions in Part **A**.*
*2) Answer **any one full** question from **each** Module in Part **B**.*
*3) **Each** question in Part **A** carries **4** marks.*

PART – A

1. What is ultra centrifugation ? Mention its application in determination of molecular weight of macromolecules.
2. Briefly describe the working principle of a transmission electron microscope.
3. Write a note on isoelectric focusing.
4. Explain about validation and calibration of a HPLC.
5. Give any four applications of GC.
6. Enlist the factors affecting the efficiency of chromatographic separation.
7. Mention the key features of some commonly used radioisotopes for biological work.
8. Discuss briefly the limitations of Beer-Lambert's law.
9. Write a note on differential thermal analysis.
10. Mention the use of NMR in elucidation biosynthesis pathway.

(10×4=40 Marks)

P.T.O.

PART – B

Module – I

11. a) Discuss in detail about the different types of microscope used to identify various microorganisms. **12**

    b) Write a note on gel documentation. **8**

OR

12. a) Explain the working principle of Dialysis and Seitz filter with a neat diagram. **12**

    b) Write a note on preparative and analytical centrifuges. **8**

Module – II

13. a) Discuss the principle, instrumentation and applications of HPLC. **10**

    b) Explain the detectors used in GC with neat labelled diagram. **10**

OR

14. a) Explain the principle of size exclusion chromatography. Describe the stationary phases used in SEC. **10**

    b) Describe the principle, instrumentation and applications of gel filtration chromatography. **10**

Module – III

15. a) Explain the principle, instrumentation and applications of UV-Spectrophotometer. **10**

    b) Define and describe the instrumentation and methodology of thermogravimetry. **10**

OR

16. a) Write a note on principle and applications of tracer techniques. **8**

    b) Describe the principle, instrumentation and applications of NMR spectroscopy. **12**

(20×3=60 Marks)

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806 EL – V (B) : ENERGY ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions in Part **A** and **one full** question from Part **B**.*

PART – A

1. Discuss the prospects of shale oil in Indian context.
2. What is pulverisation of coal ? What are the advantages of using pulverised coal ?
3. Write a note on coal carbonization.
4. Discuss the factors to be considered in transportation of fuels.
5. Discuss about heavy water nuclear reactors.
6. Write a note on solar heat pump.
7. What are the sources of geothermal energy ?
8. What are thermoelectric convertors ?
9. Write note on cogeneration.
10. What is energy audit ? **(10×4=40 Marks)**

PART – B

Module – I

11. Demand and supply of energy in India is increasing. How this situation can be handled ? Write your suggestion with reference to the present global scenario. **20**

OR

12. a) Explain the working and advantages of cyclone furnaces. **10**

    b) What are the qualities of a good lubricating oil ? How testing of lubricating oil is done ? **10**

P.T.O.

Module – II

13. With the help of a layout explain the components and working of a nuclear power plant. **20**

OR

14. What are the types of solar collectors available ? Discuss its working with the help of neat sketches. **20**

Module – III

15. a) Discuss the prospects of biogas plants in India. **10**

    b) What are the factors to be considered in biogas plant design ? **10**

OR

16. Discuss the energy conservation in a fertilizer industry. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805 : Elective – IV (EL4 E)
IMMUNOLOGY AND IMMUNOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks. **(10×4=40 Marks)**

1. Describe the "Milestones of Immunology".
2. Write an overview of mechanisms of innate and acquired immunity.
3. Discuss the cellular and molecular basis of phagocytosis.
4. Write short notes on T-cells and their subpopulations.
5. Discuss the basic characteristics of antigens.
6. Describe Type II hyper sensitivity reactions.
7. Briefly discuss the immunological tolerance.
8. Write a note on ABO and Rh blood groups.
9. Compare conventional and monoclonal antibodies.
10. Write briefly about the genetic determination of antibodies.

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. Give a detailed account on the organs of the immune system. **20**

OR

12. Discuss the basic structure of immunoglobulin molecules and the functions of individual classes. **20**

Module – II

13. Give an account of the "Complement system". **20**

OR

14. Describe the general principles of donor-recipient selection for organ transplantation. **20**

Module – III

15. Write a note on : a) ELISA b) PCR **(10+10)**

OR

16. Give an overview of classical serological techniques and their principles. **20**

(Pages : 3) **2769**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
08.804 : MANAGERIAL ECONOMICS FOR PROCESS ENGINEERS AND PRINCIPLES OF INDUSTRIAL MANAGEMENT (B)
(2008 Scheme)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is effective interest rate ? Obtain the relation between nominal interest and effective interest rate.
2. Discuss sinking fund method of calculating depreciation.
3. What is net present worth ?
4. Discuss Hoskolds' formula.
5. What is unburden ?
6. Discuss about material cost indices.
7. Discuss about study and preliminary estimate for capital cost estimation.
8. Discuss about differential analysis of economic production charts.
9. What is discounted cash flow rate of return ?
10. What is break even analysis ? **(10×4 = 40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) A company has a proposal to purchase a flow controller costing Rs. 2 lakhs which permits the elimination of use of an employee per day. The salary of the employee is Rs. 50,000 per year. The expected life of the controller is 6 years. If the value of the money is 10%, comment whether the company should continue with the employee or the new controller. **15**

    b) What is capitalised cost ? Discuss its use for cost comparison ? **5**

OR

12. a) An investment of Rs. 1,00,000 is carrying an interest of 10% compound quarterly. Calculate the value of the investment at the end of five years. **7**

    b) Discuss declining balance and sum of years digit method of depreciation with the help of an example. **13**

Module – II

13. Discuss briefly about the types of capital cost estimates. **20**

OR

14. Discuss the components of fixed costs and their estimation. **20**

Module – III

15. The Balance Sheet of a company gives the following details. Obtain the Balance Sheet. Workout economics and comment on the financial stability of company

Current assets	400 lakhs	
Current liabilities	85 lakhs	
Stocks and shares	600 lakhs	
Quick assets	225 lakhs	
Surplus	715 lakhs	
Funded debts	200 lakhs	
Depreciation reserve	600 lakhs	**20**

OR

16. What is break even and minimum cost analysis ? Discuss the use of economic production chart for analysis. **20**

(Pages : 2)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806 EL5F : NOVEL ANALYTICAL METHODS IN BIOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are the chambers present in Laminar air flow ?
2. Write the steps involved in flow cytometry.
3. Explain isoelectric focusing.
4. What is specific and non-specific elution ?
5. Write about stationary phase for GC.
6. Explain about distribution coefficient.
7. Explain about thermogravity.
8. Write the principle of Mass spectroscopy.
9. Explain about Dosimetry.
10. Explain in brief about immunoassay. **(10×4=40 Marks)**

PART – B

Answer **any one full** question from **each** module **each** question carries **20** marks.

Module – I

11. a) Explain about scanning ion conductance microscopy and atomic force microscopy. **10**

    b) Enumerate the differences between starch, agarose and polyacrylamide gels. Further discuss the features of gel electrophoresis. **10**

OR

12. a) Explain about density gradient methods and their applications in Biotechnology. **15**

    b) Write about sedimentation equilibrium. **5**

Module – II

13. What are the steps to be followed to construct a well established HPLC system ? Share your ideas. **20**

OR

14. a) Explain the principle of GC system in detail. **10**

    b) Explain about distribution coefficient and fractionation range for gel filtration chromatography. **10**

Module – III

15. a) Differentiate Flame spectrophotometry and Atomic absorption spectrometry. **10**

    b) List out and discuss the advancement in the field of spectrophotometry. **10**

OR

16. a) Explain the limitations of Beers Lamberts law. **10**

    b) Write in detail about autoradiography and its applications. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805 Elective – IV (EL4 D) : ETHICS AND INTELLECTUAL PROPERTY RIGHTS IN BIOTECHNOLOGY (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Differentiate between genetic testing and genetic screening.
2. State the ethical conflicts in biotechnology.
3. What is risk assessment and risk management ?
4. What is a code of ethics ?
5. What is the rule for transfer of copy right ?
6. Give an account of TRIPs.
7. How are terms certification trade mark and collective marks defined in the act ?
8. Enumerate the challenges ahead in food processing industries.
9. Highlight the substaritive aspects of patent litigation.
10. Explain about the patent for collaborative research. **(10×4 = 40 Marks)**

PART – B

Answer **one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. Give an account of ethical and safety aspects of genetic engineering. **20**

OR

12. Compare and contrast between bioethics and business ethics. **20**

P.T.O.

Module – II

13. Briefly discuss the ethical issues associated with clinical trials. **20**

OR

14. Give a brief account on WTO with reference to biotechnological affairs. **20**

Module – III

15. Elaborate the role of patents in biotechnological development. **20**

OR

16. Discuss in detail about **20**
    i) methods of application of patents
    ii) trade secrets copyrights.

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
Biotechnology and Biochemical Engineering Branch
08.801 : BIOPROCESS PLANT AND EQUIPMENT DESIGN (B)

Time : 4 Hours Max. Marks : 100

The following are permitted in the examination hall

1) Steam tables and Psychrometric Charts.
2) Process engineer's Equipment Design by M.V. Joshi, McMillan and Co. India, Delhi.
3) Perry's Hand Book of Chemical engineering, McGraw Hill (Various Editions)
4) Introduction to chemical Equipment Design-Mechanical Aspects by B.C. Bhattacharya.
5) IS Code for Unfired Pressure Vessels IS 4503, BIS New Delhi, 1969.
6) The certified copies or originals of the Codes IS 2825 : 1969; IS 803 : 1976; IS 1730 : 1989.
7) Certified copies of the handouts of complex equations and tables required for the design.

***Instructions** : 1) Answer **any one** questions from **each** Module.*
*2) Each full question in Module **I** and **II** carries **35** marks and that in Module **III** carries **30** Marks. Logical assumption of data is acceptable.*

Module – I

1. In a bioprocessing plant there is a requirement to heat 50,000 kg/h of raw water from 10 to 70 °C. Steam at 2.7 bar is available for heating the water. An existing heat exchanger is available with the following specifications.

Shell inside diameter	: 337 mm, E Type shell
Baffles	: 25% cut segmental
Baffle spacing	: 106 mm

Tubes : 15 mm ID and 19 mm OD

Length of tubes : 4.094 m

Triangular tube layout with tube pitch equal to 1.25 times outer tube diameter.

Number of tubes – 124, arranged in a single pass. Perform the process design and say whether the available exchanger is suitable for the specified duty, if not suggest a suitable configuration based on your analysis. You may also provide your comments by checking the design with respect to the pressure drop constraints also. **35**

2. A double pipe heat exchanger is to be used to heat 6000 kg/h of 22 mole% hydochloric acid. The exchanger will be constructed from the material Karbate and steel tubing. The inner tube is made of Karbate and steel tube for the outer pipe. Saturated steam at 100°C which will be used for heating. The tube dimensions are

Karbate tube inside diameter : 50 mm

Outside diameter : 60 mm

Steel tube inside diameter : 100mm

The exchanger will be constructed in sections, with an effective length of 3 m each. Perform the process design of the double pipe exchanger unit and suggest the number of sections required to heat the acid from 15 to 65°C. The physical properties of 22% HCl at 40°C are :

Specific heat : 4.93 kJ/kg.K

Thermal conductivity : 0.39 W/m.K

Density : 866 Kg/m^3

The viscosity of the acid at different temperatures is given in the table below.

Temperture (°C)	20	30	40	50	60	70
Viscosity ($mNm^{-2}s$)	0.68	0.55	0.44	0.36	0.33	0.30

35

Module – II

3. A solution of CS_2 and CCl_4 containing 45% (weight %) CS_2 is to be fractionated at 1 atm into a distillate containing 95% weight CS_2 and a residue containing 0.5 % weight CS_2. 5000 kg/h of feed, 40 mole % vaporized enters the tower. A total condenser returns the reflux at the bubble point at a reflux ratio of twice the minimum. The equilibrium data is given below. Here x and y are the molefractions of CS_2 in the liquid and vapour phases respectively.

Temp (K)	349.7	347.9	346.1	343.3	341.6	336.8	332.3	328.3	325.3	323.4	321.5	319.3
x	0	0.03	0.06	0.11	0.14	0.26	0.39	0.53	0.66	0.76	0.86	1.00
y	0.0	0.08	0.16	0.27	0.33	0.50	0.63	0.75	0.83	0.88	0.93	1.0

Perform the process design of the tower and determine :

i) The tangent to tangent length of the tower if the tray efficiency is 50%

ii) Diameter of the column if operated at 70% flooding velocity

iii) The condenser and reboiler heat duty. **35**

4. An air steam containing 6 mole % ammonia is to be scrubbed with water to recover 95% of the ammonia in a tower packed with 25 mm ceramic Raschig rings and operating at 20°C and 1 atm. The feed gas is supplied at the rate of 1000 kg/h and the liquid to gas ratio of three times the minimum is used. The equilibrium data is given below.

Molefraction in liquid, x*	0.09574	0.07357	0.05028	0.04063	0.03078	0.02073
Molefraction in gas, y*	0.09158	0.0658	0.04171	0.03276	0.0239	0.015799

Design the absorption tower by providing the details mentioned below.

i) Diameter of the column

ii) Height of the column

iii) design of internal peripherals **35**

Module – III

5. A cylindrical horizontal vessel has 1.8 m tangent to tangent length. The vessel has to be provided with a suitable type of head based on the minimum design thickness only and no other parameters need to be considered in this respect for the given situation. The operating pressure in the vessel is 2 atm and the operating temperature is 250°C. The material of construction of the equipment is IS 2002 Gr 2 B steel. Design the following types of heads for the above vessel and comment on the thickness obtained. Also sketch the designed vessel and head.

   a) The two types of dished heads

   b) A conical head

   c) A flat head

   d) An ellipsoidal head **30**

6. A 20000 m^3 capacity fixed conical roof cylindrical tank is to be designed for storing an organic liquid. The tank has a superimposed load of 80 kg/m^2 and is to be made of structural carbon steel. Provide the complete mechanical design of the storage tank for the storage of the liquid as to the number and plate size of the various shell courses, bottom and top plates, annular plate requirement, roof curb angles and use of wind girders.

   The permissible stresses of the material are given below.

   Tension = 142 MN/m^2

   Compression = 125 MN/m^2

   Poisson ratio is 0.3

   Modulus of elasticity of both the shell and support may be taken as 2×10^5 MN/m^2. **30**

(Pages : 3) **2768**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.803 : ENVIRONMENTAL POLLUTION, MONITORING AND CONTROL (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions **each** carries **4** marks. **(10×4=40 Marks)**

1. Write down the standard adopted by CPCB and SPCB for any four pollutants discharged into rivers.
2. Brief about the water pollution laws.
3. Brief about microbial growth and their kinetics for substrate removal.
4. What do you mean by effluent recycle and disposal ? Explain.
5. Define the following :
   i) Adiabatic lapse rate
   ii) Plume behaviour.
6. Write the application of fabric filters. Explain the different types.
7. Differentiate primary and secondary air pollutants with examples.
8. Briefly explain phytoremediation.
9. Differentiate between aerobic and anaerobic composting.
10. What is biooxidation ? Explain. **(10×4= 40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module. **(3×20 = 60 Marks)**

Module – I

11. a) Discuss the physical, chemical and biological characteristics of wastewater. **10**

    b) Discuss the following methods of operation in wastewater treatment

    i) Coagulation

    ii) Reverse osmosis. **10**

OR

12. a) Describe by means of a sketch the activated sludge process for the removal of BOD of industrial wastewater. Develop a mathematical word for the process. **10**

    b) List out the merits and demerits of activated sludge and trickling filter operation. **10**

Module – II

13. Explain briefly :

    a) Air quality criteria and standards

    b) Air pollution from automobiles

    c) Air cyclones

    d) Electrostatic precipitators. **20**

OR

14. a) Write in detail about principle, working and use of noise meter.

    b) Explain "Decibels" and "Adsorptive materials" with reference to noise pollution.

Module – III

15. a) What is bioremediation ? Explain about bioremediation of petroleum based wastes. **10**

    b) What is meant by desulphurization of coal ? Explain about the pollution control in a coal fired thermal power station. **10**

OR

16. Write short notes on :

    a) Solar radiation in industrial wastewater treatment.

    b) Vermiculture.

    c) Microbes involved in petroleum extraction.

    d) Application of nanotechnology for bioremediation of heavy metals. **20**

(Pages : 2) **2767**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.802 : BIOMATERIALS AND TISSUE ENGINEERING (B)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What biomolecules in the Extracellular Matrix (ECM) are responsible for tissue's compressive and tensile strength respectively of human cartilage and what is the chemical nature of its important constituent contributing to its functionality ?
2. What are the chemical/physico-chemical properties of natural/synthetic hydrogels that can be/have been used in tissue engineering ?
3. Conventionally, absorbable sutures and screws (fixation of fractured bones) are made of synthetic homopolymers. Elaborate upon their salient properties for biomedical applications.
4. What are the chemical properties (strengths and limitations) of alumina, synthetic hydroxyapatite and β-tricalcium phosphate (β-TCP) and what is the rationale of them being used in scaffold construction ?
5. What are bioactive glasses and how can they be made ? Elaborate upon the need for them to be incorporated in porous polymer composite constructs ?
6. What is the fundamental principle of X-ray diffraction and what information can be obtained from an XRD spectra for biomaterial characterization ?
7. Draw the freezing curve and its relevance in cryopreservation of stem cells.
8. What are growth factor-like polymers and how will you evaluate them in cultured cells ?
9. Outline the 3 stages of normal wound healing in humans.
10. An abundant multi-adhesive Extracellular Matrix (ECM) protein is found in all vertebrates. How is its structure organized and how is it related to its major functions in vivo/tissue engineered constructs ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) What is fibrin and silk fibroin ? Differentiate them in terms of their properties of relevance to tissue engineering. **8**

    b) Differentiate collagen from gelatin in terms of their properties of relevance to tissue engineering. **12**

OR

12. a) What is dextran and how can it be produced and subsequently characterized ? **10**

    b) What is hydration and visco-elasticity and how are they evaluated for biopolymers in the industrial setting ? **10**

Module – II

13. Elaborate upon the following 4 different methods of characterizing biomaterials : **20**

    a) Differential Thermal Analyser

    b) Thermogravimetric Analyser

    c) Differential Scanning Calorimetry

    d) Dynamic Mechanical Analysis.

OR

14. Illustrate the important mechanical, thermal, tribiological and electrical behavior of composites as well as the degradation/corrosion resistance properties of biocomposites. **20**

Module – III

15. With suitable diagrams, explain the need for and the fundamental principle as well as the methods for the dynamic culture techniques for optimal gas and nutrient mass transfer. **20**

OR

16. An oral surgeon has expressed a need for a lower jaw bone reconstruction. Systematically, outline the steps that you would take to provide him with this construct. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.803 : ENVIRONMENTAL POLLUTION, MONITORING AND CONTROL (B)

Time: 3 Hours Max. Marks : 100

PART – A

Answer **all** questions; **each** carries **4** marks.

1. Write a short note on water quality standards for streams.
2. What is eutrophication ? How does it happen ?
3. What is meant by break point chlorination ? How can aeration improve drinking water quality ?
4. List the merits and demerits of trickling filters.
5. Differentiate between primary pollutants and secondary pollutants with the help of examples.
6. Explain the function of a catalytic converters in vehicular pollution control.
7. Which type of centrifuge will you recommend for sludge dewatering ? Justify.
8. Explain the application of biosorption in the removal of heavy metals from waste water.
9. What are the relative merits and demerits of aerobic composting and vermi-culture ?
10. Explain the concept of a common ETP. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain the importance of bacteriological tests in determining the quality of drinking water. Briefly describe any one bacteriological test. **10**

    b) Draw a neat schematic flow diagram showing various unit operations and processes for the treatment of domestic sewage from a large city. **10**

12. a) Explain the mechanism of working of a waste stabilization pond. **6**

    b) Explain the various stages in the anaerobic breakdown of organic waste water to biomass and biogas. **6**

    c) Discuss the salient features of the biological processes for the removal of nitrogen containing compounds from waste water. **8**

Module – II

13. a) Identify the various types of plumes. Explain the mechanics of dispersion of gaseous pollutants emerging in the form of a plume from the mouth of a stack. **6**

    b) Describe an inertial separator employed for removing particulate matter from power plant emissions with the aid of a neat sketch. **6**

    c) Discuss the factors to be considered while selecting suitable control equipment for particulate removal. **8**

14. a) Mention common methods of control of gaseous pollutants and describe absorption method in detail. **10**

    b) Write notes on :

    i) National Ambient Air Quality Standards

    ii) Electrostatic Precipitator. **(5+5=10)**

Module – III

15. a) Briefly describe the various biotechnological methods for the removal of metals and other inorganic substances from industrial wastes. **10**

    b) Discuss the application of adsorption media filters in the tertiary treatment of waste water. **10**

16. a) Discuss the process and pathways for the biological removal of sulphur from coal and oil. **10**

    b) Write notes on :

        i) Membrane bioreactor for waste water treatment.

        ii) Bioremediation of petroleum sludge. **(5+5=10)**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
BIOTECHNOLOGY AND BIOCHEMICAL ENGINEERING BRANCH
08.801 : Bioprocess Plant and Equipment Design (B)

Time : 4 Hours Max. Marks : 100

Instructions** : The following are **permitted** in the **examination hall.

1. *Steam tables and Psychrometric Charts.*
2. *Process Engineer's Equipment Design by M.V. Joshi, McMillan and Co., India, Delhi.*
3. *Perry's Hand Book of Chemical Engineering, McGraw Hill (Various Editions).*
4. *Introduction to Chemical Equipment Design-Mechanical Aspects by B.C. Bhattacharya.*
5. *IS Code for Unfired Pressure Vessels IS 4503, BIS, New Delhi, 1969.*
6. *The certified copies or originals of the Codes IS 2825 : 1969; IS 803:1976; IS 1730 : 1989.*
7. *Certified copies of the handouts of complex equations and tables required for the design.*

Answer **any one** question from **each** Module. **Each full** question in Module **I** and **II** carries **35** marks and that in Module **III** carries **30** marks. Logical assumption of data is **acceptable**.

MODULE – I

1. Ammonia vapour at a flow rate of 1080 kg/h at 1500 kN/m^2 is to be condensed in a shell and tube heat exchanger. Saturation temperature of ammonia vapors is 42°C. Specific volume of ammonia at 55 kN/m^2 is 0.08m^3/kg. Cooling water at 28°C is available. The following property values are available for liquid ammonia.

   Thermal conductivity = 0.502 W/m.K; Viscosity = 0.085 × 10^{-3} kg/m.s; Density = 600 kg/m^3; Latent heat of vaporization of ammonia = 1092 kJ/kg. Provide the thermal design for the shell and tube heat exchanger. **35**

P.T.O.

2. A triple effect evaporator is used to concentrate a 10% by NaOH to 50% and produce 2268 kg/h of NaOH. The feed solution enters at 38°C. Steam is available at 184 kN/m^2 gauge in the steam chest of the first effect. The last effect is operated under a pressure of 13.4 kN/m^2 absolute. Cooling water is available at 30°C and leaves at 44°C. Assume that the condensate leaves each effect at its saturation temperature. The overall heat transfer coefficient in the effects 1, 2 and 3 are respectively 3407, 1420 and 710 W/m^2°C. Mean specific heat of the solution may be assumed as 4.18 kJ/kg K. The boiling point elevation may also be neglected.

   i) Propose the thermal design of the triple effect evaporator unit.

   ii) Evaluate the cooling water requirement. **35**

MODULE – II

3. A continuous perforated tray fractionating column is to be designed to separate 14000 kg/h of a mixture of 40% benzene and 60% toluene at 1 atm into an overhead product containing 97% benzene and a bottom product containing 98% toluene. The percentages are by weight. The feed is available at 20°C and 1 atm. A reflex ratio of 3 times the minimum is used. Benzene and toluene is assumed to form an ideal system with a relative volatility of 2.5. The molal latent heats of benzene and toluene are 30800 and 3300 kJ/kmol respectively. The bubble point of the feed at 1 atm is 95°C and its specific heat is 1.85 kJ/kg.K. Overall efficiency of 60% may be assumed. Provide the process design of the fractionating tower by deciding on its diameter, height, tray details and perform the required checks for the tray hydraulics. **35**

4. A packed tower absorber operating at 1 atm and 300 K is to be designed to absorb 90% acetone from an acetone-air mixture containing 2 mole % acetone. The gas inflow rate is 3.5 kmol/h. Water containing 0.1 mole % acetone at a rate of 100 kmol/h is used for the absorption. The equilibrium relationship between the moles of solute per mole of inert in the gas (Y) and the moles of solute per mole of solvent in the liquid phase (X) is given by Y= 1.8 X. Propose the process design of the tower by providing the diameter, height, type of packing and use of liquid distributors and redistributors. **35**

MODULE – III

5. A horizontal vessel has 2m tangent to tangent length. The vessel has torrispherical heads. The operating pressure in the vessel is 1.5 atm and the operating temperature is 300°C. Weight of the vessel with its contents is 21500 kg. The material of construction of the equipment and the support is IS 2002 Gr 2B steel. Provide the mechanical design of the shell, heads and an appropriate support.

   The permissible stresses for structural steel for the support :

   Tension = 140 MN/m^2

   Compression = 122 MN/m^2

   Poisson ratio is 0.3

   Modulus of elasticity of both the shell and support may be taken as 2×105 MN/m^2.

   Use logical assumptions wherever found necessary. **30**

6. Design a bracket support for the column having the following specifications.

Diameter	=	2.0 m
Height	=	2.5 m
Clearance from the bottom of the foundation	=	0.9 m
Weight of the vessel and its contents	=	4000 kg
Wind velocity	=	150 km/h
Number of brackets	=	4
Diameter of anchor bolts	=	1.60 m
Permissible stresses for structural steel :		
Tension	=	140.1 MN/m^2
Compression	=	122.5 MN/m^2
Bending	=	154.8 MN/m^2 **30**

(Pages : 2) **2589**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806.4 : Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part – **A** and **one** question from **each** Module in Part – **B**. **Use** of **Brom's** chart and **Meyerhof's** bearing capacity, tables are **permitted**.*

PART – A

I. a) Write down the expression for ultimate bearing capacity given by Meyerhof with explanation of the terms and the modification in the expression for fluctuation of water table position.

b) Evaluate the bearing capacity of eccentrically loaded footings using Meyerhof's theory.

c) Compare Rankine's theory and Coulomb's wedge theory of lateral earth pressure. State the assumptions.

d) State the advantages of Culmann's graphical method compared to other methods.

e) What are the design criteria to be satisfied for the stability of a gravity retaining wall ? Indicate briefly how you will ensure the same.

f) Distinguish between free-earth support method and fixed-earth support method.

g) Sketch the deflected shape of cantilever sheet pile wall in sandy soil. Also give the simplified pressure diagram.

h) Write the equation for evaluating the lateral load capacity of a vertical pile as given by Brom's method in cohesionless soil. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

II. A rectangular footing 2m × 3.5 m is placed at a depth of 1.5^m below ground surface. Determine by Meyerhof's recommendations, the net safe load that can be supported by the footing with a factor of safety of 3 with respect to shear failure. The soil properties are $c^1 = 20\ kN/m^2$, $\phi' = 23°$. **20**

OR

III. An eccentrically loaded square footing $1.5^m \times 1.5^m$ is placed at a depth of 1^m on astiff saturated clay. The eccentricity is 0.15^m in each direction. The soil properties are $c = 80\ kN/m^2$, $\gamma = 20\ kN/m^3$. Compute the net allowable load on the footing if the F.S is 2.5. **20**

Module – II

IV. A retaining wall with its face inclined at 75° with horizontal is 10^m high and retains soil inclined at a uniform surcharge angle of 10°. If the angle of internal friction of the soil is 36°, wall friction angle 18°, unit weight of soil is 15 kN/m^3 and a line load intensity 90 kN/metre run of the wall acts at a horizontal distance of 5^m from the crest, determine the active thrust on the wall by Culmann's method. **20**

OR

V. A retaining wall with a vertical back 5 m high supports a cohesionless backfill of unit weight 19 kN/m^3. The upper surface of the backfill rises at an angle of 10° with the horizontal from the crest of the wall. The angle of internal friction for the soil is 30° and the angle of wall friction is 20°. Determine the total active pressure per linear metre of the wall and mark the direction of point of application. Use Rebhann's graphical method. **20**

Module – III

VI. A cantilever sheet pile is to be constructed to retain sandy soil to a depth of 6 m. The dry unit weight of sand is 16 kN/m^3 and the saturated unit weight is 20 kN/m^3 the angle of shearing resistance of sand is 32°. The water level is 3 m above the dredge line. Compute the depth of embedment of the sheet pile. **20**

OR

VII. a) A concrete pile 800 mm diameter and 5 m long is installed in a cohesive soil (cohesion = 120 kPa, N value 12). Estimate the ultimate lateral resistance if the load is applied at a point situated at 3.5 m above the ground level. Use Brom's Approach. **10**

b) Compare the behaviour of short piles and long piles in cohesive soil with sketches. **10**

(Pages : 2) **2601**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.807.4 – Elective – V : DESIGN OF BRIDGES (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions.*
*2) Missing date, if any, may be **suitably** assumed.*
*3) **Use** of **IRC** codes, Railway loading standards, **IS 456-2000**, **IS 800-2007**, design charts and steel tables are **permitted**.*

PART – A

I. a) Write brief note on classification of bridges.

b) What are the factors influencing choice of bridge type ?

c) What are the loads to be considered for the design of abutments ?

d) State the factors to be considered in the selection of bridge bearings.

e) Explain Courbon's method of load distribution on longitudinal girders for bending moment.

f) Explain the components of a cable stayed bridge with the help of a neat sketch.

g) What are the advantages of a PSC bridge ?

h) Explain composite construction. **(8×5=40 Marks)**

PART – B

II. a) Discuss the different types of bridge founation. **10**

b) What are the forces to be considered for the design of bridge piers ? Explain. **10**

OR

III. a) With the help of neat sketch explain the objectives and requirements of bed block. **10**

b) Explain longitudinal forces acting on bridge super structure. **10**

P.T.O.

IV Design an elastomeric unreinforced bearing for the following data :

Vertical load (sustained) = 240 kN

Vertical load (dynamic) = 38 kN

Horizontal force = 72 kN

Modulus of rigidity of elastomer = 1.2 N/mm^2

Friction coefficient = 0.30. **20**

OR

V. Design the deck slab of a RCC slab bridge for a national highway of two lane carriage way (= 7.5 m wide). The effective span of bridge is 6 m consider IRC class AA tracked vehicle loading and use M 25 concrete and Fe 415 steel. **20**

VI Design the mid span section of a 25 m span plate girder bridge for a BG line. Take EUDL for BM = 2356 kN, EUDL for SF = 2586 kN and CDA = 0.408. **20**

OR

VII. a) Discuss the design principles of a truss bridge. **10**

b) With the aid of neat sketches explain the joints in bridge construction. **10**

(Pages : 4) **2584**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.804 : QUANTITY SURVEYING AND VALUATION (C)

Time : 3 Hours Max. Marks : 100

***Instructions** : Answer **all** questions. **Assume** any **missing** data suitably.*

PART – A

I. a) Differentiate between supplementary estimate and revised estimate.

b) What are the different factors affecting rate of a particular item ?

c) Discuss straight line method of calculating depreciation.

d) Discuss different methods of building estimation. **(4×5=20 Marks)**

PART – B

II. a) Write down detailed specification for Brickwork in cement mortar 1 : 6 for superstructure. **5**

b) Workout unit rate for cement concrete 1 : 4 : 8 using 40 mm aggregate for foundation. **10**

(For 1 m^3 : 40 mm aggt – 0.95 m^3 @ Rs. 1,250/m^3, Sand – 0.48 m^3 @ Rs. 1,650/m^3, Cement – 171 kg @ Rs. 7,000/t, 0.1 mason @ Rs. 650/E, 1-00 Man @ Rs. 450/E and 1.40 woman @ Rs. 400/E)

OR

III. a) Write down detailed specification for plastering using cement mortar 1 : 3 for ceiling. **5**

b) Workout unit rate for roofing with first class MP tiles 320 mm or nearest size. **10**

(For 10 m^2 : 160 Nos MP tiles @ Rs. 20,000/1000 Nos, 0.35 mason @ Rs. 650/E and 0.35 Man @ Rs. 450/E)

P.T.O.

IV. Estimate the quantities of the following items for the building shown in Fig. 1 :

a) Earthwork in excavation for foundation

b) PCC for foundation

c) Brick work for walls

d) RCC for roof slab

e) Wood work for frames of doors and windows. **50**

OR

V. Prepare a bar bending schedule and calculate quantity of concrete and steel required for the beam shown in Fig. 2. **50**

VI. a) List different methods of valuation. Discuss any two in detail. **7**

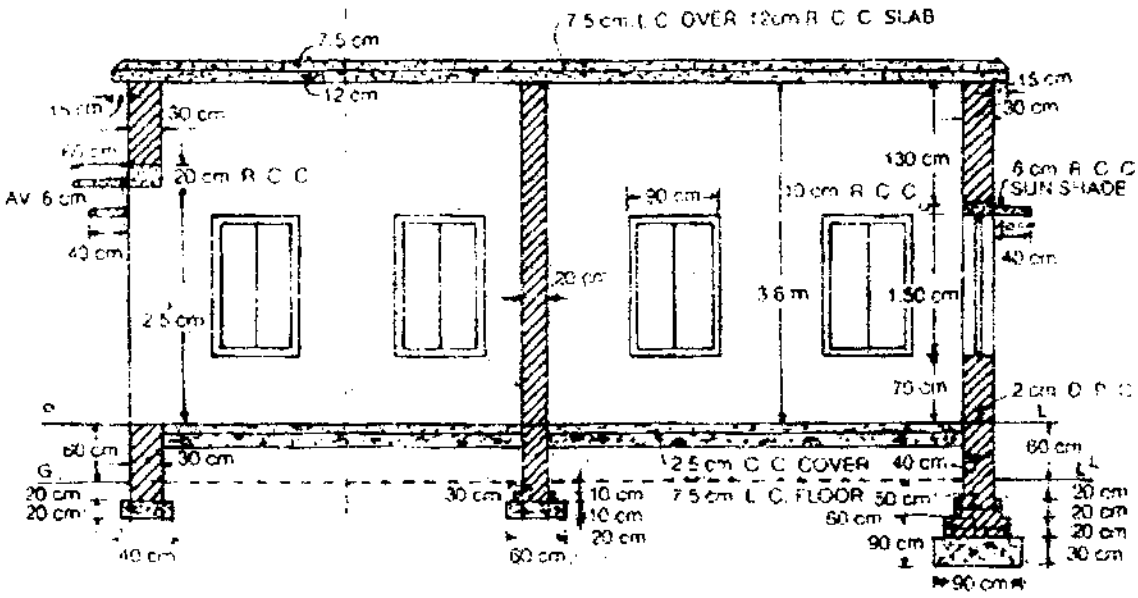
b) Write short notes on :

i) Scrap value

ii) Salvage value. **8**

OR

VII. Calculate the percentage of depreciation based on sinking fund method for a building having a total life of 60 years and with present age of 15 years; take interest for sinking fund as 3.5%. If the estimated cost of building at prevailing rate is 18 lakhs, calculate the depreciated cost of the building. **15**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12 cm
15 cm
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20 cm R C C
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40 cm
90 cm
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130 cm
6 cm R C C SUN SHADE
40 cm
20 cm
3.6 m
1.50 cm
2.5 cm
70 cm
2 cm D P C
60 cm
30 cm
12.5 cm C C COVER
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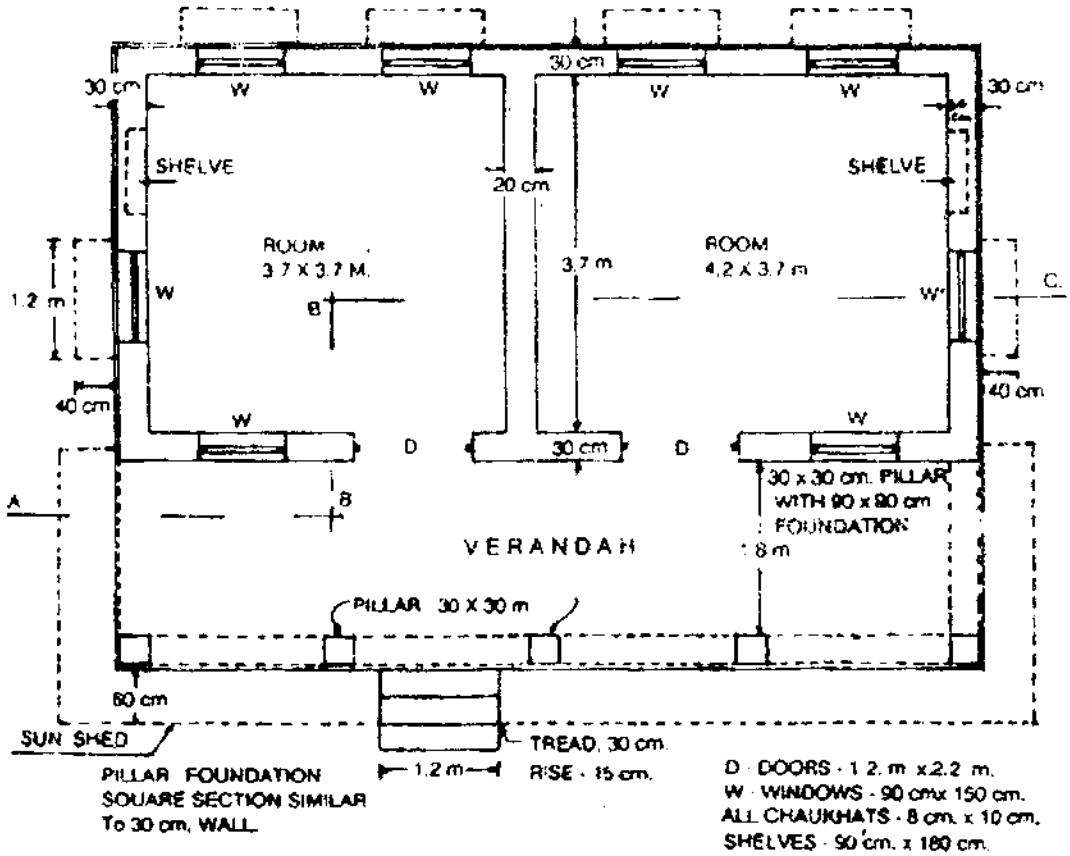
SECTION ON A.B.C.


30 cm
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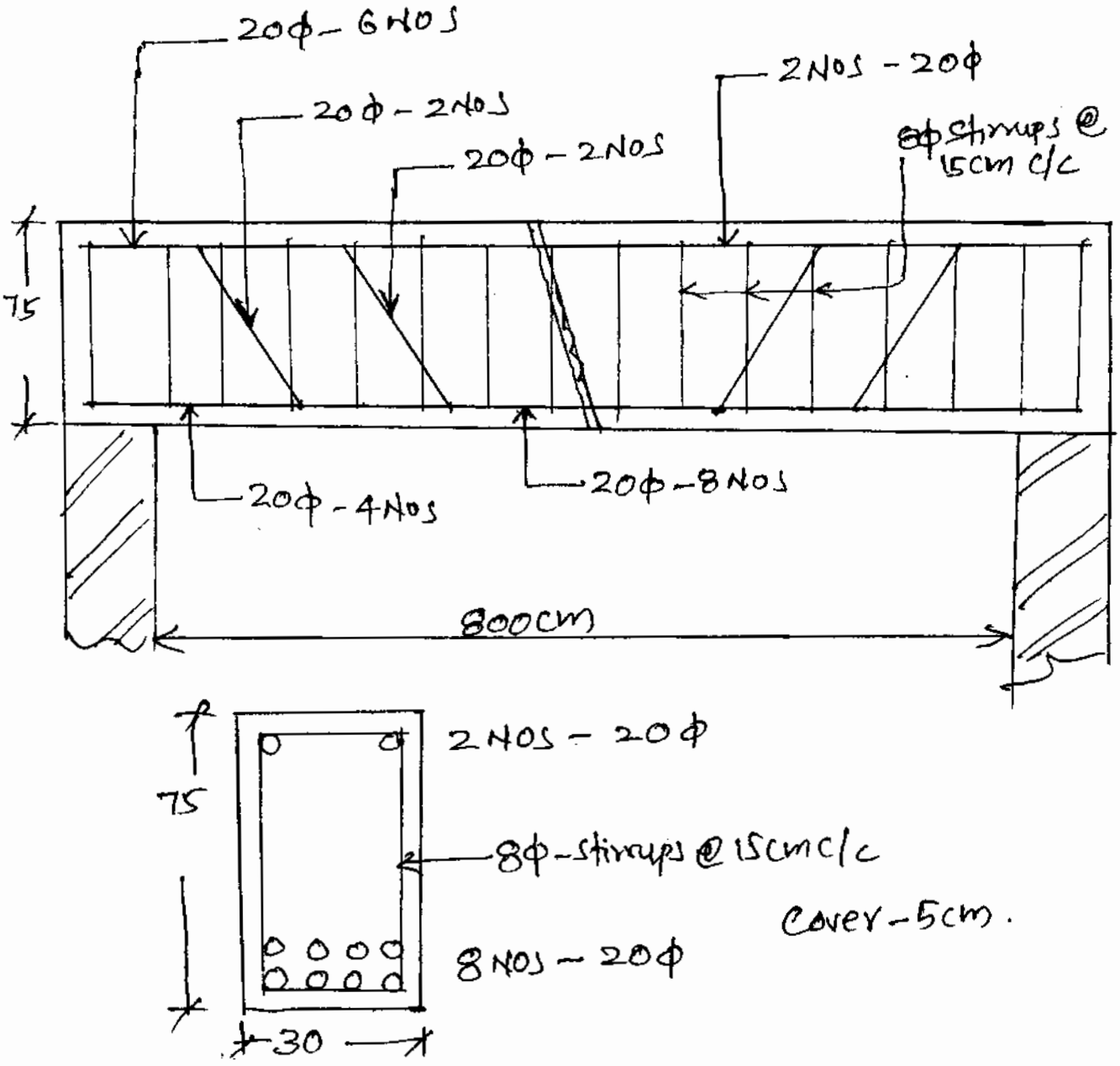
SHELVE
20 cm
ROOM
3.7 X 3.7 M.
ROOM
4.2 X 3.7 m
3.7 m
1.2 m
B
C
40 cm
D
30 cm
30 x 30 cm. PILLAR
WITH 90 x 90 cm
FOUNDATION
A
VERANDAH
3.8 m
PILLAR 30 X 30 m
60 cm
SUN SHED
TREAD, 30 cm.
1.2 m
RISE - 15 cm.
PILLAR FOUNDATION
SQUARE SECTION SIMILAR
To 30 cm. WALL.
D - DOORS - 1.2 m x 2.2 m.
W - WINDOWS - 90 cm x 150 cm.
ALL CHAUKHATS - 8 cm. x 10 cm.
SHELVES - 90 cm. x 180 cm.

PLAN

Fig. 1


20ϕ - 6 NOS
20ϕ - 2NOS
20ϕ - 2NOS
2NOS - 20ϕ
8ϕ stirrups @ 15cm c/c
75
20ϕ - 4NOS
20ϕ - 8 NOS
800cm

75
2NOS - 20ϕ
8ϕ - stirrups @ 15cm c/c
Cover - 5cm.
8 NOS - 20ϕ
30

Fig. 2

Module – II

11. Briefly explain the procedure for inviting tenders for High way maintenance work. Discuss the pre-qualifications of contractor for the above work also state how works are awarded.

OR

12. Discuss the procedure for recording progress of work and preparing bills for payment. Briefly explain the details of completion report of work. **20**

Module – III

13. Distinguish between PERT & CPM network. Explain the term activity, event, dummy activity, and looping in network. List the merits and demerits of different types of network.

OR

14. Explain the necessity of crashing the network. Discuss the crashing procedure. Define optimistic time estimate, most likely time estimate, and excepted time in PERT technique. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806.3 : Elective – IV : DESIGN AND CONSTRUCTION OF PAVEMENTS (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.*
*2) Assume suitable data if **necessary**.*

PART – A

I. 1) Enumerate the difference between the flexible and rigid pavements.

2) Describe the IRC method of design of thickness of rigid pavements.

3) Explain expansion joints in rigid pavements.

4) Explain how ESWL for dual wheel Assembly is arrived at.

5) Discuss the importance of various types of joints in rigid pavements.

6) Explain the concept PSI (Present Serviceability Index).

7) Draw dimensioned sketch of the cross section of a roadway including drainage facility.

8) Explain IRC method of design of rigid pavement thickness. **(8×5=40 Marks)**

PART – B

Module – I

II. A) Explain in detail how overlay design can be done using Benkelman beam test. **5**

B) Benkelman beam deflection studies were carried out on 15 selected points on a stretch of flexible pavement during summer season using a dual wheel load of 4085 kg. 5.6 kg/cm^2 pressure. The deflection values obtained in millimeters after making necessary leg corrections are given below. If the present traffic consists of 750 commercial vehicles/day, determine the thickness of bituminous overlay required, if the pavement temperature during test was 39°C and correction factor for subsequent subgrade moisture content is 1.3. Assume the rate of growth of traffic as 7.5%. Deflection data 1.4, 1.32, 1.25, 1.35, 1.48, 1.6, 1.65, 1.55, 1.45, 1.4, 1.36, 1.46, 1.5, 1.52, 1.45. **15**

OR

III. A) Explain limitations of Group Index method of pavement design. **4**

B) The plate bearing test conducted with 300 mm plate diameter on soil subgrade and over 150 mm base course. The pressure yielded at 0.5 cm deflection are 0.125 N.mm^2 and 0.44 N/mm^2 respectively. Design the pavement section for 41 kN and wheel load with type pressure of 0.5 N/mm^2 for an allowable deflection of 0.5 cm using Burmister's approach. **12**

C) Explain Mc Leod method of pavement design. **4**

Module – II

IV. A) Explain different types of stresses developed in concrete pavements. **8**

B) Calculate the stresses at interior, edge and corner of a cement concrete pavement by Westergaard's stress equations.

Modulus of elasticity – 3.3×10^5 kg/cm^2

Poisson's ratio – 0.15

Thickness of pavement – 18 cm

Modulus of subgrade reaction – 2.5 kg/cm^3

Wheel load – 4100 kg

Radius of loaded area – 12 cm. **12**

OR

V. A) Discuss the importance of dowel bars in rigid pavements. And explain in detail the design procedure of dowel bars. **6**

B) A cement concrete pavement has a thickness of 18 cm and two lanes of 7.2 m width, with a longitudinal joint along the centre. Design the dimensions and spacing of the tie bars. **14**

Working stress in steel in tension	1400 kg/cm^2
Unit weight of concrete	2400 kg/cm^3
Coefficient of friction	1.5
Bond stress	24.6 kg/cm^2

Module – III

VI. A) Explain the construction procedure of wet mix macadam, bituminous concrete and bituminous macadam. **20**

B) Briefly explain various flexible and rigid pavement failures.

OR

VII. A) Explain various pavement evaluation methods.

B) What are the components of pavement management system ? **20**

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.807.3 Elective – V
INDUSTRIAL WASTE WATER MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

*Instruction : Answer **all** questions.*

PART – A

1. Explain the process of equalization in industrial waste management.
2. Distinguish between BOD and COD.
3. The 5 day BOD at 20°C for a waste water sample is 250 mg/l. Assuming the deoxygenation rate constant at 20°C as 0.1 per day. Determine the 3 day BOD at 25°C.
4. Explain the theory of coagulation.
5. Discuss the process of dissolved air flotation.
6. Explain the factors affecting reoxygenation of streams.
7. What are adsorption isotherms ?
8. List out the pollutants present in distillery wastes. **(8×5=40 Marks)**

PART – B

Module – I

a) Determine the carbonaceous and nitrogenous oxygen demand in mg/l for a waste water solution of volume 1 litre containing 300 mg of acetic acid (CH_3 COOH) and 300 mg of glycerine (CH_2 (NH_2) COOH). **12**

b) Explain in detail relative stability. **8**

OR

10. a) Distinguish between first stage BOD and second stage BOD. 10

    b) A dairy processing 113000 kg of milk daily produces an average of 246 m^3/day of waste water with a BOD of 1400 mg/L. The principal operations in the plant are bottling of milk and making icecream with limited production of cheese. Compute the waste water flow and BOD per 1000 kg of milk received and the equivalent of population of the daily waste discharge. 10

Module – II

11. Explain the process of self purification of streams and the different pollution zones with the help of a sketch . 20

OR

12. A city discharges 1500 litres per second of sewage into a stream whose minimum rate of flow is 500 l/s, the temperature of both being 20°C, the 5 day BOD at 20°C of sewage is 180 mg/l and that of river water is 2 mg/l. The DO content of sewage is zero, and that of river water is 90% of the saturation DO. If the minimum DO. to be maintained in the river water is 4.5 mg/l, find out the degree of sewage treatment required. Assume deoxygenation coefficient as 0.1/day, reoxygenation coefficient as 0.3/day and saturation DO at 20°C as 9.17 mg/l. 20

Module – III

13. Discuss the different manufacturing processes in a paper and pulp industry and describe the treatment methods for the same.

OR

14. a) Explain the membrane processes used for waste water treatment.

    b) Explain the process of adsorption is detail.

9

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
CIVIL ENGINEERING
08.805 : Construction Management

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part **A** and **one** question from **each** Module of Part **B**.*

PART – A

1. Who constitutes the construction team ? What are the responsibilities of the members in the team ?
2. List the various applications of computers in the construction industry.
3. Explain the concept of rate of return.
4. What are the different types of tenders ?
5. Explain the importance of liquidated damages in construction contracts.
6. What is an M-Book ? What is its importance ?
7. What is the significance of three time estimates used in PERT analysis ?
8. Discuss the relevance of time-cost trade-off in scheduling operations. **(8×5=40 Marks)**

PART – B

Module – 1

9. Discuss the life cycle of a construction project, in detail, with the help of an example. **20**

OR

10. Discuss the principles of scientific management advocated by Henri Fayol. **20**

P.T.O.

Module – 2

11. Explain the process of tendering a civil engineering project starting from inviting tenders to signing the contract document. **20**

OR

12. Write a note on any five popular types of contracts used in civil engineering works. **20**

Module – 3

13. a) How do Bar charts differ from milestone charts ? **5**

    b) Develop a network diagram for a job with the following activities and logical sequence.
    A is the first operation
    B follows A
    C, D, E and F follow B
    G follows E
    H follows D but cannot start until E is over
    I and J succeed G
    F and J precede K
    H and I precede L
    M succeeds L and K
    The last operation N succeeds M and C **10**

    Also number the events according to Fulkerson's rule. **5**

OR

14. a) Define activity and event. What is the significance of dummy activity in a network ? **(4+3=7)**

    b) A small maintenance project consists of the following ten jobs whose procedure relationships are identified by their node numbers.

Job	a	b	c	d	e	f	g	h	i	j
(Initial Node, Final Node)	1, 2	2, 3	2, 4	3, 5	3, 6	4, 6	4, 7	5, 8	6, 8	7, 8
Estimated duration	2	3	5	4	1	6	2	8	7	4

5

    i) Draw the network diagram representing the project.

    ii) Calculate the total float of the activities and thus the critical path of the network. **(5+3=8)**

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Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.805 : CONSTRUCTION MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

1. What situations led to the genesis of scientific management ?
2. Who constitutes the construction team ? What are their duties and responsibilities ?
3. What is the need of a techno-economic feasibility study for projects ?
4. What are the details to be given in a notice inviting tenders ?
5. List the contract documents.
6. Differentiate between CPM and PERT ?
7. What are the limitations of Bar Charts ?
8. What is total float of an activity ? (8×5=40 Marks)

PART – B

Module – 1

9. What are the scientific management principles advocated by Henri Fayol ?

OR

10. Explain the life cycle of a construction project. 20

Module – 2

11. Explain the process of tendering starting from invitation of tenders to drawing up of contract documents.

OR

12. Explain any four important clauses included in contract documents. 20

P.T.O.

Module – 3

13. The following table shows the operations and time for installing a universal testing machine in the materials Testing Laboratory.

Particulars	Duration (days)
Machine foundation	12
Electric fitting	10
Erecting machine	12
Repairing the floor	8
Fixing the location	4
Clearance from electrical wiring	5
Sanction from authorities	6
Painting and whitewashing	10
Testing	5
Handing over the machine to operators	4

Arrange the operations in a logical order.

a) Prepare a Bar Chart b) Determine the expected completion time.

OR

14. Draw the network and determine the critical path. Also find the total and free floats of activities.

Activity	A	B	C	D	E	F	G	H	I	J	K
Precedence	–	–	–	A	C	D	A,B,C	A,B,C	E	F, G	H, I, J
Duration (days)	4	5	6	4	4	4	8	3	3	6	5

2.

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time: 4 Hours Max. Marks: 100

Instructions : *Answer **all** questions from Part – **A** and **two** questions from Part – **B**. Assume suitable data **wherever** necessary. **Use** of steel tables, IS 800, IS 875 (1, 2 and 3), IS 801, IS 804, IS 806, IS 1161, IS 6533(2) are **permitted**.*

PART – A **(2×10)**

1. Design a purlin for a truss of effective span 6m. Given live load – 3 kN/m^2, dead load – 1.5 kN/m^2, wind load – 1.5 kN/m^2 acting away from the truss. Spacing of the truss – 4m. **10**

2. Explain different types of bearings with neat sketch. **10**

PART – B **(2×40)**

3. a) Design a square pressed steel tank for a capacity of 1,30,000 litres. It is supported on 4 columns of height 10 m. Design the supporting beams also. SBC is 200 kN/m^2. **20**

   b) Draw to a suitable scale : **20**

      i) The elevation and plan of the above designed tank

      ii) The connection details of the plates.

OR

4. a) Design a tubular truss for a span of 10m using GI sheets. Trusses are provided at 4 m spacing. Wind pressure as per IS 875, place – Kerala. **20**

   b) Prepare suitable sketch for the above designed truss with details at the joints. **20**

P.T.O.

5. a) Design a bolted plate girder for a BG main railway track for an effective span of 20 m. Design the curtailment of flange plate and also stiffeners. **20**

   b) Draw to a suitable scale the longitudinal section, cross section and plan of the above designed bridge. **20**

OR

6. a) Design a self supporting steel stack for a height of 80 m and diameter 4 m. The thickness of brick lining – 100 mm and wind pressure – 1.5 kN/m^2. **20**

   b) Draw to suitable scale : **20**

      i) The sectional elevation

      ii) The foundation details.

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Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806.3 Elective – IV : DESIGN AND CONSTRUCTION OF PAVEMENTS (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part – **A** and **one** full question from **each** Module in Part – **B**.*
*2) Assume suitable data if **necessary**.*

PART – A

I. a) What are composite pavements ? How is it differ from conventional Flexible and Rigid pavements ?

b) Why and how prime coat and tact coat is applying to construction of pavements ?

c) Compare Highway and Airport pavements.

d) Discuss group index method for design of flexible pavements.

e) Explain the Westergaards stress equation for wheel loads for typical locations.

f) Discuss the necessity and requirements of joints in rigid pavements.

g) Explain the combination of stresses in cement concrete pavements.

h) Explain the controls for seepage flow and capillary rise for highway drainage.

(5×8=40 Marks)

PART – B

Module – I

II. a) Explain the term Equivalent Single Wheel Load.

b) Plate bearing tests were conducted with 30 cm plate diameter on soil subgrade and over 15 cm base course. The pressure yielded at 0.5 cm deflection are 1.25 kg/cm^2 and 4.0 kg/cm^2 respectively. Design the pavement section for 4100 kg wheel load with tyre pressure of 5 kg/cm^2 for an allowable deflection of 0.5 cm using Burmister approach. **20**

OR

c) Explain the procedure of overlay design using Benkelman Beam.

d) Discuss in detail the AASHTO flexible pavement design method. **20**

P.T.O.

Module – II

III. a) Explain in detail Westergaard's concept for temperature stresses.

b) Design the spacing and size of dowel bars at the expansion joints of a cement concrete pavement of thickness 25 cm with radius of relative stiffness 80 cm, for a design wheel load of 5000 kg. Assume load capacity of the dowel system as 40% of the design wheel load. Joint width is 2.0 cm, permissible shear and flexural stresses in dowel bar are 1000 and 1400 kg/cm^2 respectively and permissible bearing stress in CC is 100 kg/cm^2. **20**

OR

c) Explain the requirements of airport pavements and design methodology adopted.

d) Calculate the stresses at interior, edge and corner of a cement concrete pavement. Modulus of elasticity of concrete 3.0×10^5 kg/cm^2, Poissons ratio of concrete = 0.15, Thickness of concrete pavement = 18 cm, Modulus of subgrade reaction = 8.5 kg/cm^2, Wheel load = 5100 kg and Radius of loaded area = 15 cm. **20**

Module – III

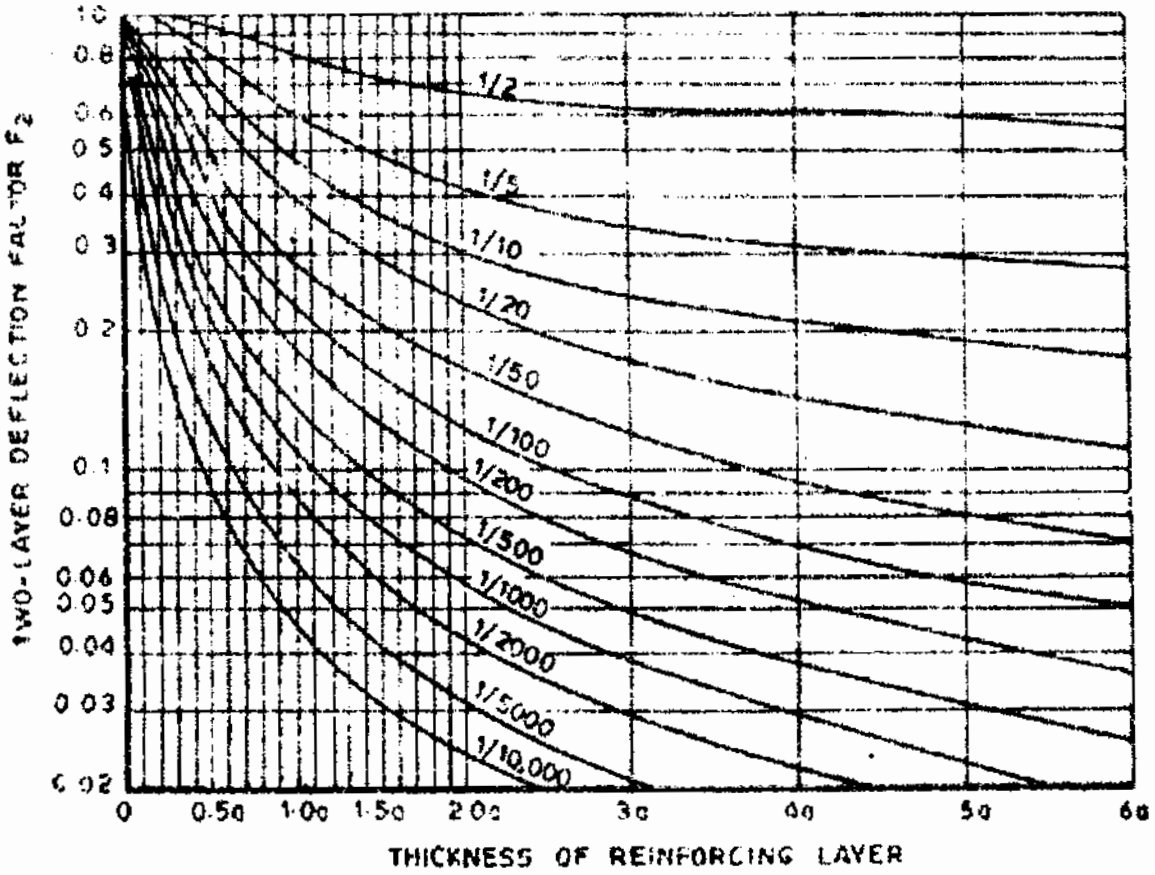
IV. a) Explain the construction procedure for Wet Mix Macadam with specifications.

b) Explain the hydrology and hydraulic analysis for the design of surface drainage system. **20**

OR

c) Explain the functional and structural evaluation of pavements.

d) Discuss the various distresses in flexible pavements with help of sketches. **20**


TWO-LAYER DEFLECTION FACTOR F_2
1.0
0.8
0.6
0.5
0.4
0.3
0.2
0.1
0.08
0.06
0.05
0.04
0.03
0.02
1/2
1/5
1/10
1/20
1/50
1/100
1/200
1/500
1/1000
1/2000
1/5000
1/10,000
0
0.5a
1.0a
1.5a
2.0a
3a
4a
5a
6a
THICKNESS OF REINFORCING LAYER

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.807.9 (Elective – V) : TRANSPORTATION SYSTEM MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the objectives of Transportation System Management.
2. Write notes on :
   a) Auto restricted zones and
   b) Traffic diverters.
3. Describe exclusive bus lanes strategy adopted for the management of traffic operations.
4. What is meant by flexible work hours ? Explain its benefits.
5. Describe high peak period toll policy.
6. Describe different types of off-street parking facilities.
7. List down the different types of pedestrian facilities.
8. What is meant by Dial a ride policy ? Explain its benefits. **(8×5=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

Module – I

9. a) What is traffic calming ? Explain different types. 10
   b) Explain the advantages and disadvantages of one way street system. 10

OR

P.T.O.

10. a) Explain how the restrictions on turning movements will improve the traffic operation at an intersection. **10**

    b) What is meant by Reversible lanes ? Explain the methods and favourable conditions for the implementation of it. **10**

Module – II

11. a) What is meant by ride sharing ? Explain the benefits and travel impacts of it. **10**

    b) Explain different HOV priority schemes and their benefits. **10**

OR

12. a) Describe the methods to improve public transportation service and the ways to encourage the ridership . **10**

    b) Explain Park and Ride, transportation system management strategy. Write down the travel impact summary of it. **10**

Module – III

13. a) Explain non motorized Transport Planning Strategy and the different ways to improve that facility. **10**

    b) Explain the benefits of good parking management. **10**

OR

14. a) Explain various local area traffic management techniques. **10**

    b) Explain various solutions that can be applied to parking problems. **10**

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806.11 Elective – IV : ENVIRONMENTAL IMPACT ASSESSMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions fully.*

PART – A

1. Explain screening process in EIA.
2. Enumerate the projects exempted from public consultation.
3. What do you mean by terms of reference ?
4. List out different impact assessment methodologies.
5. Discuss the role of an environmental engineer in EIA studies.
6. Name latest softwares in air quality modelling.
7. Enumerate standards of noise quality.
8. Discuss impact of development on wild life. **(5×8=40)**

PART – B

Module – I

9. a) Define EIA. Discuss the purpose of conducting EIA. What are the elements of EIA ? Explain.
   b) Explain the features of National Environmental Policy Act. **(10+10)**

OR

10. a) Write a short note on public consultation in EIA.
    b) Discuss environmental clearance process in India. **(10+10)**

P.T.O.

Module – II

11. a) Discuss event tree analysis. Bring out its merits and demerits.

    b) Explain the conceptual approach for addressing socio economic impacts. **(10+10)**

OR

12. a) Discuss the criteria for choosing socio economic impact prediction approaches.

    b) Explain the basic steps for performing socio economic impact assessment. **(10+10)**

Module – III

13. a) Discuss a case study of EIA related to a hydroelectric project.

    b) List out standards of water quality. **(10+10)**

OR

14. a) Discuss the impact of development on vegetation.

    b) Explain conceptual approach for addressing noise environment impacts.

    c) Explain an environment management plan. **(6+8+6)**

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Eighth Semester B.Tech. Degree Examination, November 2015

(2008 Scheme)

08.806.4 Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part – **A** and **one** question from **each** Module in Part – **B**. Use of Brom's chart and Meyerhof's bearing capacity tables are **permitted**.*

PART – A

1. a) What is the effect of eccentricity in the bearing capacity of shallow footings ? Explain effective width concept given by Meyerhof.

   b) Sketch the failure zone given by Meyerhof, below footings subjected to vertical load.

   c) Explain Coulomb's wedge theory of earth pressure.

   d) How is surcharge and layered backfill considered in Rebhann's construction ?

   e) What is the method given by Culmann for incorporating earthquake effect ?

   f) List different types of sheetpile walls with sketches. What are its uses ?

   g) What are the situations under which vertical piles are subjected to lateral loads ?

   h) Differentiate between long piles (flexible) and short (rigid) piles. **(8×5=40 marks)**

PART – B

Module – I

II. A chimney, with a rigid base 2.5 m square, is placed at a depth of 1 m below the ground surface. The soil is clay with an unconfined compressive strength of 60 kN/m^2 and unit weight of 20 kN/m^3. The weight of the chimney is 60 kN. The chimney has a resultant wind load of 19.5 kN acting parallel to one of the sides of the chimney base at a height of 1.5 m above the ground surface. Determine the factor of safety with respect to bearing capacity. Use Meyerhof's recommendations.

OR

P.T.O.

III. An eccentrically loaded rectangular footing of size 2.8 m × 3.8 m is placed at a depth of 1.2 m on a stiff saturated clay. The eccentricity is 0.2 m in each direction. The soil properties are C = 50 kN/m^2 and unit weight 18 kN/m^3. Compute the net allowable load on the footing if the F.S = 3.0. **20**

Module – II

IV. The retaining wall shown in Fig. 1 retains a soil with the following properties :

$C' = 0, \phi' = 34°, \gamma = 19 kN/m^3, \delta = 20°$

The backfill surface is sloping at an angle of 10° to the horizontal.

a) Determine the total active thrust by Culmann's graphical construction.

b) A vertical line load of 60 kN/m is acting at a horizontal distance of 3.5 m from the wall parallel to the crest of the wall. What is the magnitude of total active thrust ?

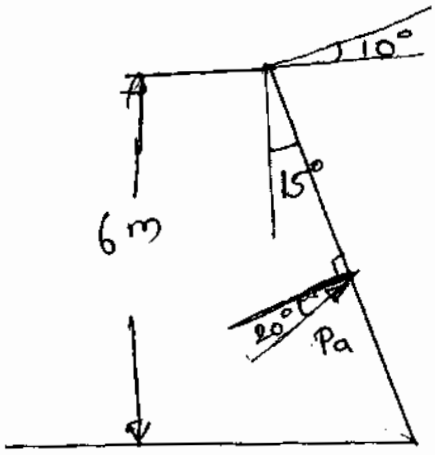

Fig. 1

OR

V. Design a gravity retaining wall 6.5 m high with vertical back to retain a dry cohesionless backfill of unit weight 20 kN/m^3 and $\phi = 31°$. The wall is to be 1m wide at the top and 3 m wide at the bottom. The wall is to be constructed of rubble masonry having unit weight of 22 kN/m^3. Use Rankine's theory. **20**

Module – III

VI. A steel pipe pile of 61 cm outside diameter with 2.5 cm wall thickness is driven into saturated cohesive soil to a depth of 20 m. The undrained cohesive strength of the soil is 85 kPa. Calculate the ultimate lateral resistance of the pile by Brom's method with the load applied at ground level. The yield strength of pile material is 280 N/mm^2.

OR

VII. The height of a cantilever sheet pile from the top of the dredge level is 9 m. The water level in the backfill is at 2 m from top. Find the depth of penetration required for a factor of safety equal to 1. Assume that above the water table, the soil is dry. The other properties of soil are : $\gamma_{sat} = 20\,kN/m^3$, $K_A = 0.33$, $K_P = 3.0$, $G_S = 2.6$. **20**

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.807.3 Elective – V : INDUSTRIAL WASTE WATER MANAGEMENT (C)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions :

I. a) Explain the term steam standard and how it is monitored.

b) Distinguish equalization and proportioning of wastes.

c) The 3 day BOD at 25°C of a sample is 100 mg/l. Reaction rate K at 20°C (base e) is 0.2 per day. What is the 5 day BOD at 20°C ?

d) Define self purification phenomenon.

e) Differentiate between dissolved air floatation and dispersed air floatation.

f) Explain the process of coagulation and list the different coagulants used.

g) List the pollutants present in tannery wastes.

h) What are the characteristics of distillery waste ? **(8×5=40 Marks)**

PART – B

Module – I

II. a) Discuss the effect of industrial wastes on streams. **20**

OR

b) Describe how strength reduction of waste can be achieved in industries. **20**

P.T.O.

Module – II

III. a) Explain the different zones of settling with neat sketches. **20**

OR

b) A waste water treatment plant disposes its effluents into a stream, flow is 0.2 m^3/sec with DO 2 mg/l at 26°C and is having BOD_5 at 20°C as 40 mg/l. The stream is having a flow of only 0.5 m^3/sec with DO 8 mg/l at 22°C and BOD_5 at 20°C as 3 mg/li. K_1 at 20°C is 0.2/day (base e) and K_2 at 20°C = 0.4/day. Velocity of stream is 0.2 m/ sec. Determine the critical oxygen deficit and its location. Temp. coefficient is 1.04 for K_1 and 1.02 for K_2. **20**

Module – III

IV. a) Explain the different parameters affecting the rate of adsorption of a pollutant. **10**

b) Explain break through curve of adsorption. **10**

OR

c) Explain the different wastewater sources in a paper and pulp industry and describe the possible treatment methods for them. **20**

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part **A** and **two** questions from Part **B**. **Assume** suitable data **wherever** necessary. **Use** of steel section tables, **IS 800, IS 1161, IS 804, IS 806, IS 875(3), IS 6533(2)** and Bridge Rules are **permitted**.*

PART – A **(2×10=20 Marks)**

1. Design the stays for a pressed steel tank of dimensions 7.50 × 6.25 × 2.50 m.
2. Discuss the IS code method for wind pressure calculation.

PART – B **(2×40=80 Marks)**

3. a) Design the staging of a rectangular water tank 6 m × 5 m × 2.5 m. Assume 16 mm thickplates for the tank. Five longitudinal beams (ISMB 350 × 52.4 kg/m) and two cross beams (ISMB 400 × 61.6 kg/m). Height of staging 15 m and design wind pressure is 1.5 kN/m^2 for the entire height of the tank. (Design columns, braces and foundation). **20**

   b) Draw to suitable scale
      i) Elevation of the staging structure
      ii) Connection details of braces with column
      iii) Details of foundation. **20**

OR

4. a) Design a tubular truss for a span of 9 m. Assume AC sheet root covering. Trusses are provided at 3.5 m spacing. Assume design wind speed 40 m/s. **20**

   b) Prepare a drawing of the truss designed with details of joint at ridge and at the support. **20**

P.T.O.

5. a) Design the flue opening, base plates, anchor bolts and concrete pedestal for a lined steel chimney 70 m height and 3 m diameter. Assume intensity of wind pressure 1.6 kN/m^2. **20**

   b) Draw to suitable scale :

      i) Details of flue opening

      ii) Details of foundation. **20**

OR

6. a) Two plate girders are supporting a railway bridge 20 m span for broad gauge (25t loading - 2008). Design the plate girders and stiffeners for the same. Assume following loading data :

   EuDL for BM = 2066 kN

   EuDL for SF = 2273 kN

   CDA = 0.458. **20**

   b) Draw to suitable scale

      i) Elevation

      ii) Details of stiffeners and connections. **20**

(Pages : 2) **2594**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806.9 : Elective – IV : GROUND IMPROVEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Discuss the practical situations which necessitate the ground modification and write the objectives of ground modification.
2. What are the quality control tests in shallow compaction ? Explain the Proctor needle method.
3. Write short note on densification of cohesive soils by lime piles.
4. Explain any three engineering application of grouting which proves to be effective ?
5. State the conditions under which mechanical stabilization is effective in soils.
6. Briefly explain drainage systems available in India.
7. Name the different types of geotextiles known based on the method of manufacture.
8. Write notes on biodegradable geotextiles. **(8×5 = 40 Marks)**

PART – B

9. a) Explain the principle of blasting in soil improvement. **10**

   b) Write the salient points in the selection criteria of fill material around drains. **10**

   OR

10. What is a stone column ? What are the different construction techniques of stone columns ? Explain how load carrying capacity is calculated ? **20**

P.T.O.

11. Explain the chemistry of lime stabilization. How is the optimum lime content decided ? Write the applications of lime stabilization. **20**

OR

12. a) What design criteria are normally followed for soil-cement mixes ? Discuss in detail. **10**

    b) What is the cement content needed for different types of soils ? Explain. **10**

13. Explain the basic principles in the design of reinforced earth wall. Write the applications and advantages of reinforced earth with neat sketches. **20**

OR

14. a) Explain separation and filtration functions of geotextile. Mention the applications based on these functions. **10**

    b) What are the different methods adopted for ground water lowering ? **10**

(Pages : 2) **7566**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806.9 : Elective – IV : GROUND IMPROVEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. What are the factors affecting ground improvement ?
2. Explain the blasting method used for ground improvement.
3. What is Pre loading ?
4. Write note on Column techniques for ground improvement.
5. Explain the chemical aspects of Stabilisation.
6. How electro osmotic method is applied for ground improvement ?
7. Write note on Geo-synthetics.
8. Write note on well point system. **(8x5=40 Marks)**

PART – B

Answer **any one full** question from **each** Module :

Module – I

9. a) Explain the dynamic compaction for ground improvement. **15**

   b) A low lying area was filled with building and tile waste upto height of 3 m the soil below 3 m is medium hard laterite. It is proposed to construct a three storeyed building. Suggest suitable foundation/ground improvement to be adopted. **5**

10. a) Explain the application of vertical drain. **8**

    b) What is stone column ? Explain its method of construction. **12**

P.T.O.

Module – II

11. Explain Grouting technique used for ground improvement. **20**

12. Describe in brief the lime stabilisation. What are the effects of lime on adjacent soil ? Discuss the construction methods. **20**

Module – III

13. What is principle of reinforced earth ? Explain with sketch the engineering application of reinforced earth. **20**

14. Explain with neat sketch the use and application of geo-textile :

    a) Filtration

    b) Drainage

    c) Erosion control. **20**

(Pages : 2) **2583**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.803 : Environmental Engineering – II (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Explain the different types of traps.
2. What is the importance of Streeter Phelp's equation and mention its application ?
3. Differentiate grit chamber and detritus tank.
4. What is recirculation ratio and recirculation factor ?
5. What is self cleansing velocity ? Write down the Shield's expression for self cleansing velocity.
6. What are the different methods of disposal of effluent from a septic tank ?
7. What is meant by sewage sickness.
8. Explain the principles of house drainage. **(8×5=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

9. Explain with sketches the following :
   a) Manholes
   b) Catch basin
   c) Inverted Siphon. **20**

OR

10. a) Explain the different methods of land treatment of sewage. **10**
    b) one million litres of sewage from a city is to be disposed on land. The BOD of the sewage is 50 mg/L. The BOD loading on the land can be 15 Kg/hectare/day. The maximum quantity of sewage that can be applied on land is 100,000 litres/hectare/day. Calculate the area of land required for sewage disposal. **10**

P.T.O.

Module – II

11. Determine the size of a high rate trickling filter for the following data. Flow – 4 MLD, Recirculation ratio. 1.4 BOD of raw sewage – 250 mg/litre, BOD removal in primary clarifier – 30%. Final effluent BOD desired – 50 mg/litre. Calculate also the size of conventional trickling filter to accomplish the above requirement (with sketches). **20**

OR

12. a) Give the flow diagram of a conventional municipal waste water treatment unit. **5**

    b) With the help of a neat sketch explain the working of a conventional activated sludge process. **15**

Module – III

13. a) What are the different methods of thickening sludge ? **10**

    b) Explain with a neat sketch, the working of an oxidation pond. **10**

OR

14. a) What are the different types of sewers ? **10**

    b) Design a sewer to serve a population of 36,000, the daily percapita water supply allowance being 135 litres of which 80% finds its way into the sewer. The slope available for the sewer to be laid is 1 in 625 and the sewer should be designed to carry four times the dry weather flow when running full. What would be the velocity of flow in the sewer when running full. **10**

(Pages : 2) **7553**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.801 : DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *Answer **all** questions, use of relevant codes IS.456-2000, IS-3370 (Part I – IV), IRC 6 and 21 and design charts are **permitted**.*

PART – A

1. Explain the design procedure of a counter fort retaining wall.

2. List the various types of concrete bridges and explain the difference between slab of bridge and T-beam and slab bridge. **(2×10=20 Marks)**

PART – B

3. a) Design a cantilever retaining wall to retain earth embankment 4 m high above ground level. The unit weight of soil 18 kN/m^3 and its angle of repose 30°. The embankment is horizontal at its top. The safe bearing capacity of soil 150 kN/m^2 and coefficient of friction between soil and concrete as 0.5. Use M_{20} concrete and Fe 415 grade steel. **20**

   b) Draw to suitable scale the following views (i) vertical cross section of retaining wall (ii) Longitudinal section through stem. **20**

OR

4. a) Design a circular water tank at a height of 9m resting on six columns. The capacity of the tank – 1.0 lakh litters. Use M_{25} concrete and Fe 415 grade steel. **20**

   b) Draw to a suitable scale the following views (i) vertical section showing reinforcement details (ii) Plan showing reinforcement in the base slab. **20**

P.T.O.

PART – C

5. a) Design a slab bridge for the following requirements. Clear span 4.5m, clear width of roadway – 7m, live load – class a loading, grade of cannot – M_{20} grade of steel – Fe-415. Average thickness of wearing coat-80 mm. **20**

   b) Draw to a suitable scale the following views (i) longitudinal section showing reinforcement details (ii) plan showing reinforcement details in the slab. **20**

OR

6. a) Design the interior panet of a flat slab 5.75 x 6.75 m in size for a super imposed line load of 7 kN/m^2. Use M_{20} concrete and Fe 415 grade steel. **20**

   b) Draw to suitable scale the following views (i) cross section through column strip (ii) plan showing top reinforcement in the slab. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.801 : DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (C)

Time: 4 Hours Max. Marks: 100

Instructions : *Answer **all** questions in Part – **A** and **two full** questions in Part – **B**.*
*Assume **suitable** data **wherever** necessary.*
***Use** of IS 456, 3370 (I-IV), IRC 6 and 21 are **permitted**.*

PART – A **(10×2=20 Marks)**

1. Explain the design procedure of counter forts of retaining walls.

2. Discuss the analysis procedure of two-way bridge deck slabs subjected to IRC loading.

PART – B **(40×2=80 Marks)**

3. a) Design a cantilever retaining wall for the following data :

   Height of wall – 4m, Surcharge – 5kN/m^2

   Angle of repose of soil – 31°

   Unit wt. of soil – 18 kN/m^3, SBC of soil – 200 kN/m^2

   Coefficient of friction μ – 0.6

   M25 concrete and Fe415 grade steel. **20**

   b) Prepare drawings of the retaining wall showing reinforcements in **20**

      i) Cross section of retaining wall

      ii) Plan of base slab.

OR

4. a) Design an over head rectangular water tank for a capacity of 70000 lit. Height of staging 6 m. Staging need not be designed. Use M25 concrete and Fe415 grade steel. **20**

P.T.O.

b) Prepare drawing of the water tank showing the reinforcements in **20**

i) side walls and base slab

ii) half sectional plan of wall and slab.

5. a) Design a slab bridge of clear span of 7m supported on bearings 600 mm wide. Width of carriage way 7.5 m and kerbs 600 mm. Assume IRC class – A loading. Use M25 concrete and Fe415 grade steel. **20**

b) Prepare drawings of the bridge showing reinforcements in **20**

i) plan of bridge

ii) cross sections of bridge in two perpendicular directions.

OR

6. a) Design the interior panel of a flat slab 6m × 6m with drops and column heads to support a live load of 4kN/m^2 and finishes 1kN/m^2. The slab is supported on columns of 500 mm × 500 mm. Use M25 concrete and Fe415 grade steel. **20**

b) Prepare drawings of the flat slab showing reinforcements in **20**

i) plan of slab

ii) cross sections of slab in two perpendicular directions.

(Pages : 2) **2581**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.801 : DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (C)

Time: 4 Hours Max. Marks : 100

Instruction : *Answer **all** questions. **Use** of I.S. Code 456-2000, 3370 (Part **I – IV**), **IRC 6** and **21** and design chart are **permitted**. **Assume** any missing data **suitably**.*

PART – A

1. Explain the design procedure of a cantilever retaining wall with surcharge.
2. Explain the various load classification as per IRC. **(2×10=20 Marks)**

PART – B

3. a) Design a counter fort retaining wall to retain 5 m high embankment above ground level. The foundation is to be taken 1 m deep and SBC 200 kN/m^2. The top of earth retained is horizontal and soil weights 18 kN/m^3 with angle of internal friction – 30°. Coefficient of friction between concrete and soil may be taken as 0.5. Use M20 concrete and Fe415 grade steel. Spacing of counter fort 3.5 m c/c. **20**

   b) Draw to suitable scale,
      i) Cross section through counter fort.
      ii) Longitudinal section through stem. **20**

OR

4. a) Design a circular over head water tank at 4.5 m height from ground level to store 60 m^3 water supported on 6 columns. Use M30 concrete and Fe415 grade steel. **20**

   b) Draw to suitable scale
      i) Cross Section showing reinforcement on side
      ii) Plan showing reinforcement at base slab. **20**

P.T.O.

PART – C

5. a) Design a slab bridge for the following data :

   Clear span 6 m, carriage way 6.8 m, thickness of wearing coat – 8 cm. Line load class A. Use M25 concrete and Fe415 steel. **20**

   b) Draw to suitable scale :

   i) Plan showing reinforcement details.

   ii) Cross section showing reinforcement details. **20**

OR

6. a) Design the interior panel of a flat slab 6.5 m × 7.5 m in size for a line load of 5 kN/m^2. Use M20 concrete and Fe415 grade steel. **20**

   b) Draw to suitable scale :

   i) Cross section through column strip.

   ii) Plan showing bottom reinforcement in the slab. **20**

(Pages : 2) **5684**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.801 : DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions *: 1)* ***Assume*** *suitable data* ***wherever*** *necessary.*
2) ***IS 456-2000, IRC 6 & 21, IS 3370****, Part* ***I - IV*** *are* ***permitted*** *in the examination hall.*

PART – A

Answer **all** questions.

I. a) Explain the "impact effect" on bridges. How is it taken into account in the design of RCC bridges. **5**

b) What is the purpose of providing "Drops" and "Capitals" in flat slab construction. **5**

II. Describe the different types of retaining walls indicating the function and behaviour of each component. **10**

PART – B

MODULE – I

III. a) A comfort retaining wall has the following data.
i) Height of dry backfill to be retained = 6m.
ii) Angle of internal friction of soil = 30°.
iii) Unit weight of soil = 17 kN/m^3.
iv) Safe bearing capacity of soil = 250 kN/m^2.
v) Coefficient of friction = 0.5.
vi) Concrete M - 20 grade, steel - Fe 415 grade.

Design the vertical wall, heel slab and counter fort. **20**

b) Draw the following views of the above counter fort retaining wall.
i) Half vertical section through Stem slab showing reinforcement on both faces.
ii) Cross section of the retaining wall through counter fort. **20**

OR

P.T.O.

IV a) Design a circular water tank of height 4 m for a capacity of 5 lakhs liters. The tank is open at the top and is supported on six equally spaced column. Use M-20 concrete and HYSD bars of yield strength 415 MPa. Design the ring beam also. **20**

b) Draw to suitable scale :

i) The cross section of the tank showing the reinforcement in the ring beam, side wall and bottom slab, and

ii) The plan showing the base slab reinforcement details. **20**

MODULE – II

V. a) Design a simple slab bridge to the following requirements

i) Clear span = 5.5 m

ii) Clear width of carriage way = 6.8 m

iii) Live load = class A loading

iv) Concrete mix, M-20, steel Fe 415 grade. **20**

b) Draw to suitable scale the following views.

i) Longitudinal section

ii) Cross section

iii) Plan showing slab reinforcement. **20**

OR

VI. a) Design the exterior corner panel of a flat slab of size 6m × 6m supported on column of 750 mm diameter storey height is 3.3 m Live load on the slab is 4 kN/m^2. Use M-20 concrete and Fe 415 grade steel. **20**

b) Draw to scale :

i) The plan showing the top and bottom reinforcement and

ii) The cross section through the centre of the slab. **20**

(Pages : 3) **5687**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.804 : QUANTITY SURVEYING AND VALUATION (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions. Assume **any** missing data.*

PART – A

I. a) Explain the use of data book and schedule of rates.

b) What is depreciation ? List the methods of calculating depreciation.

c) Calculate the quantities of materials for 10 cu.m PCC 1 : 3 : 6.

d) What are the purposes of conducting valuation ? **(4×5=20 Marks)**

PART – B

II. a) Give the detailed specification for plastering for wall with CM 1 : 3 mix 9 mm thick. 7

b) Work out the unit rate for P C C 1 : 3 : 6 using 40 mm broken stone (For 1 m^3, 0.95 m^3 broken stone @ Rs. 1,100/m^3, 0.48 m^3 sand @ Rs. 1,200/m^3, 228 kg cement @ Rs. 5,000/t, 0.1 mason @ Rs. 450/E, 1.0 man @ Rs. 350/E and 1.4 woman @ Rs. 325/E). 8

OR

III. a) Give a detailed specification for 2.5 cm cement concrete floor of 1 : 2 : 4 proportion. 7

b) Work out the unit rate for Random Rubble masonry in super structure in 1 : 6 Cement Sand Mortar (For 10 m^3, stone 12.5 m^3 @ Rs. 600/m^3, river sand 4.2 m^3 @ 1,200/m^3, cement 1000 kg Rs. 5,000/t, 12.5 mason @ Rs. 450/E, 10.5 man @ Rs. 350/E and 10.4 woman @ Rs. 325/E). 8

P.T.O.

IV. Prepare a detailed estimate of 25 user septic tank and soak pit from the given drawings. (Fig. 1) (Use existing rate : Earth work – Rs. 885/10 m^3; plain cement concrete for foundation – Rs. 6,000/m^3; 1st class brick work – Rs. 5,000/m^3 ; 2nd class brick work – Rs. 4,500/m^3; Precast RCC work – Rs. 12,000/m^3; plastering 12 mm thick – Rs. 4,300/10 m^2; plastering – 20 mm thick Rs. 5,000/m^2; brick aggregate – Rs. 3,000/m^3 ; coarse sand – Rs. 1,100/m^3 ; 100 mm PVC pipe – Rs. 50 m ; 50 mm PVC pipe – Rs. 45/m and 50 mm cowl – Rs. 100/no). **50**

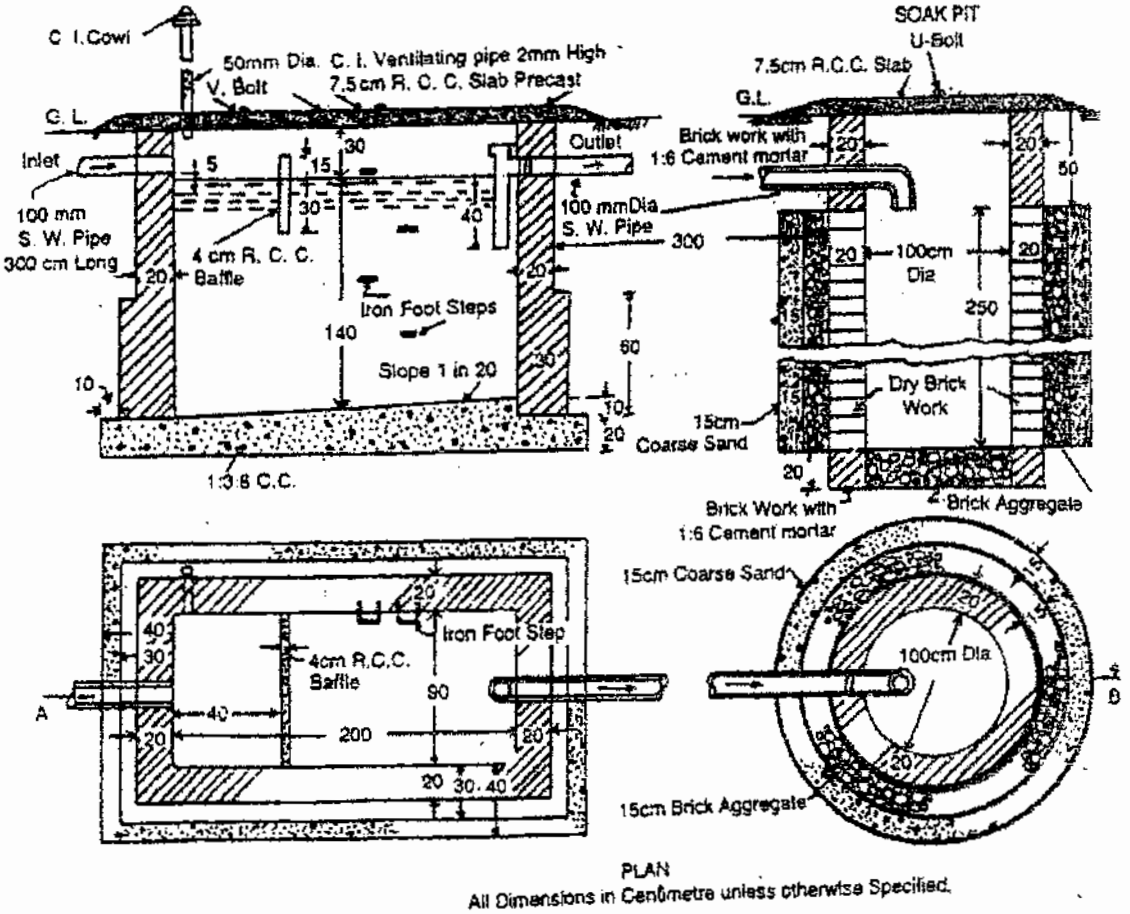

Fig. 1

OR

V. a) Prepare a bar bending schedule and quantities of RCC and reinforcement of a simply supported beam of length 6.5 m, depth 50 cm and width 30 cm reinforced with 3 No.s of 20 mm diameter at bottom as straight bar, 2 No.'s of 20 mm diameter, cranked at 45°, 2 No.s 16 mm diameter at top of the beam and 8 mm diameter 2 legged stirrups @ 15 cm c/c. **30**

b) Calculate the quantity of earth work in road embankment from drainage 0 to 90 m with the following data :

Chainage	0	30	60	90
Height of embankment	2.41	2.91	1.01	1.09

Formation width = 10 m and slope of banking = 2 : 1. **20**

VI. a) Explain in detail the method of fixation of standard rent of building. **7**

b) A three storied building has been constructed on a plot of land measuring 800 sq. m the plinth area of each story 400 sq. m. The life of the building structure may be taken as 70 years. The building fetches a gross rent of Rs. 1,500 per month. Calculate the capitalized value of the property on the basis of 10% net yield. For sinking fund 3% compound interest may be assumed. Cost of land may be taken as Rs. 40 sq. m. other data required may be assumed suitably. **8**

OR

VII. a) What is outgoing's ? What are the various types of outgoing's. **5**

b) A building is constructed at a cost of Rs. 2,50,000 on a land purchased at Rs. 50,000. The owner of the property expects a return of 9% on the cost of construction and 8% on cost of land. The building estimated to have a future life of 60 years at the end of which it requires Rs. 3,25,000 for constructing a new building in its place. Determine the standard rent of the property, given

i) Rate of interest for sinking fund at 6%.

ii) Annual repairs at 1.5% of the cost of construction.

iii) All other outgoings 28% of the net income of the property.

iv) Scrap value at the end of the useful life of the building as 10%. **10**

(Pages : 2) **5699**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806.11 (Elective – IV) : ENVIRONMENTAL IMPACT ASSESSMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions **fully**.*

PART – A

1. What are the objectives of EIA ?
2. Write a short note about terms of reference.
3. List out the projects requiring prior environmental clearance process in India.
4. What are different types of environmental impacts ?
5. Discuss matrix method of impact analysis.
6. Enlist some of the latest softwares in water quality modelling.
7. Enumerate standards of noise quality.
8. What do you know about an Environment Management Plan ? **(5×8=40 Marks)**

PART – B

Module – I

9. a) Explain the procedure of conduct of public hearing.
   b) Discuss key elements in 2006 EIA (Govt. of India) notification.

OR

10. a) Explain briefly the evolution of EIA in India.
    b) Briefly discuss the environmental clearance processes in India. **(10+10)**

P.T.O.

Module – II

11. a) Discuss the basic steps for performing socio economic impact assessment.
    b) Bring out the role of an environmental engineer in EIA. **(12+8)**

OR

12. a) Briefly explain fault tree analysis in EIA.
    b) Discuss the significance of public participation in EIA. **(10+10)**

Module – III

13. a) Discuss preparation of an EMP for a hydroelectric project.
    b) Write a short note on water quality analysis. **(10+10)**

OR

14. a) Explain the impact of development on vegetation.
    b) Enumerate standards of noise quality and air quality. **(10+10)**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

08.806.4 : Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instruction : ***Use*** *of Brom's charts and Meyerhof's bearing capacity factor table are permitted.*

PART – A

Answer **all** questions.

1. a) Discuss Meyerhof's bearing capacity theory. How does it differ from Terzaghis theory ?

   b) Discuss the effect of water table on bearing capacity.

   c) What are the assumptions in Coulomb's theory ? Compare Rankin's theory and Coulomb's theory.

   d) Describe Rebhann's construction. What is its use ?

   e) Discuss the general classification of sheet pile walls.

   f) Explain the necessity of sheet pile walls with examples.

   g) Briefly explain the design principles of sheet pile retaining walls.

   h) Differentiate between flexible piles and short piles. **(8×5=40 Marks)**

PART – B

Module – I

II. Determine the ultimate bearing capacity of a strip footing 2 m width at its base at a depth of 1.5 m below ground surface and resting on a saturated clay soil with the following properties :

$\gamma_{sat} = 20\,kN/m^3$; $C_u = 40\,kN/m^2$; $\phi_u = 0$; $C' = 10\,kN/m^2$; $\phi' = 20°$

The natural water table is at 1 m depth below ground level. Ignore the depth factors. Use Meyerhof's method. **20**

OR

III. Determine the safe load which can be imposed normal to the base of a strip footing which is 1.2 m wide and has its base inclined at 12° from the horizontal. One corner of the footing is located at 1.2 m from the ground surface. The footing rests on a saturated cohesive soil with a cohesion of 75 kN/m^2 and unit weight of 18.2 kN/m^3. **20**

Module – II

IV. A Vertical retaining wall 10 m high, supports a cohesionless soil r = 1.8 t/m^3. The upper surface of the backfill rises from the crest of the wall at angle 15° with the horizontal. Determine the total active pressure by Culmann's method.

Take $\phi = 30°$ and $\delta = 20°$. **20**

OR

V. Explain how you would make use of Coulomb's theory for the analysis of retaining walls subjected to earthquake forces for active and passive conditions. **20**

Module – III

VI. The height of cantilever sheet pile from the top of the dredge level is 9 m. The water level in the backfill is at 2.0 m from top. Find the depth of penetration required for a factor of safety = 1. Assume that above the water table the soil is dry. The other properties of the soil are $\gamma_{sat} = 2t/m^3$; $k_a = 0.33$; $k_p = 3$; $G_s = 2.6$. **20**

OR

VII. A concrete pile 900 mm diameter and 6 m long is installed in a clay soil with cohesion 1.5 kg/cm^2 (N value = 15). Estimate the ultimate lateral resistance if the load is applied at a point situated at 4 m above the ground level. Assume $k_1 = 25$ MN/m^3 and $E_c = 26$ kN/mm^2. If the allowable deflection at the ground level is only 25 mm estimate the load it can take. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806.11 (Elective – IV) : ENVIRONMENTAL IMPACT ASSESSMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions **fully**.*

PART – A

1. What are the objectives of EIA ?
2. Write a short note about terms of reference.
3. List out the projects requiring prior environmental clearance process in India.
4. What are different types of environmental impacts ?
5. Discuss matrix method of impact analysis.
6. Enlist some of the latest softwares in water quality modelling.
7. Enumerate standards of noise quality.
8. What do you know about an Environment Management Plan ? **(5×8=40 Marks)**

PART – B

Module – I

9. a) Explain the procedure of conduct of public hearing.
   b) Discuss key elements in 2006 EIA (Govt. of India) notification.

OR

10. a) Explain briefly the evolution of EIA in India.
    b) Briefly discuss the environmental clearance processes in India. **(10+10)**

P.T.O.

Module – II

11. a) Discuss the basic steps for performing socio economic impact assessment.
    b) Bring out the role of an environmental engineer in EIA. **(12+8)**

OR

12. a) Briefly explain fault tree analysis in EIA.
    b) Discuss the significance of public participation in EIA. **(10+10)**

Module – III

13. a) Discuss preparation of an EMP for a hydroelectric project.
    b) Write a short note on water quality analysis. **(10+10)**

OR

14. a) Explain the impact of development on vegetation.
    b) Enumerate standards of noise quality and air quality. **(10+10)**

(Pages : 2) **5688**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.805 : CONSTRUCTION MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Mention the contributions of a few pioneers in scientific management.
2. What are the advantages of scientific management to society ?
3. Mention any four important types of contracts.
4. What is pre-qualification of contractors ?
5. What is liquidated damages ?
6. What is resoruce allocation ?
7. What are milestone charts ?
8. Briefly explain a labour schedule. **(8×5=40 Marks)**

PART – B

Module – 1

9. Discuss the applications of scientific management in construction industry.

OR

10. Explain in detail the phases involved in the life cycle of a construction project. **20**

Module – 2

11. What are the common types of contracts in civil engineering works ? Explain any four.

OR

12. a) What are the causes of delays in projects ?
    b) What are the causes of disputes in civil engineering works ? How are they settled ? **20**

P.T.O.

Module – 3

13. The following table lists the activities and duration of a maintenance project.

Activity	1 – 2	1 –3	1 – 4	2 – 5	3 - 6	3 – 7	4 – 7	5 – 8	6 – 8	7 – 9	8 – 9
Duration (months)	2	2	1	4	5	8	3	1	4	5	3

a) Draw the project network

b) Find the critical path and duration of the project

c) Find the total float and free float of all activities.

OR

14. Find the optimum time and the corresponding cost for the data given below. Take the direct cost per day as Rs. 60/- **20**

Activity	Precedence	Duration (days)		Cost (Rs.)	
		Normal	Crash	Normal	Crash
A	-	6	3	300	360
B	-	6	4	450	500
C	-	4	2	360	420
D	-	6	3	600	675
E	C	3	2	325	350
F	B, E	2	1	250	285
G	D, F	2	1	310	350

(Pages : 3) **5687**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.804 : QUANTITY SURVEYING AND VALUATION (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions. Assume **any** missing data.*

PART – A

I. a) Explain the use of data book and schedule of rates.

b) What is depreciation ? List the methods of calculating depreciation.

c) Calculate the quantities of materials for 10 cu.m PCC 1 : 3 : 6.

d) What are the purposes of conducting valuation ? **(4×5=20 Marks)**

PART – B

II. a) Give the detailed specification for plastering for wall with CM 1 : 3 mix 9 mm thick. 7

b) Work out the unit rate for P C C 1 : 3 : 6 using 40 mm broken stone (For 1 m^3, 0.95 m^3 broken stone @ Rs. 1,100/m^3, 0.48 m^3 sand @ Rs. 1,200/m^3, 228 kg cement @ Rs. 5,000/t, 0.1 mason @ Rs. 450/E, 1.0 man @ Rs. 350/E and 1.4 woman @ Rs. 325/E). 8

OR

III. a) Give a detailed specification for 2.5 cm cement concrete floor of 1 : 2 : 4 proportion. 7

b) Work out the unit rate for Random Rubble masonry in super structure in 1 : 6 Cement Sand Mortar (For 10 m^3, stone 12.5 m^3 @ Rs. 600/m^3, river sand 4.2 m^3 @ 1,200/m^3, cement 1000 kg Rs. 5,000/t, 12.5 mason @ Rs. 450/E, 10.5 man @ Rs. 350/E and 10.4 woman @ Rs. 325/E). 8

P.T.O.

IV. Prepare a detailed estimate of 25 user septic tank and soak pit from the given drawings. (Fig. 1) (Use existing rate : Earth work – Rs. 885/10 m^3; plain cement concrete for foundation – Rs. 6,000/m^3; 1st class brick work – Rs. 5,000/m^3 ; 2nd class brick work – Rs. 4,500/m^3; Precast RCC work – Rs. 12,000/m^3; plastering 12 mm thick – Rs. 4,300/10 m^2; plastering – 20 mm thick Rs. 5,000/m^2; brick aggregate – Rs. 3,000/m^3 ; coarse sand – Rs. 1,100/m^3 ; 100 mm PVC pipe – Rs. 50 m ; 50 mm PVC pipe – Rs. 45/m and 50 mm cowl – Rs. 100/no). **50**

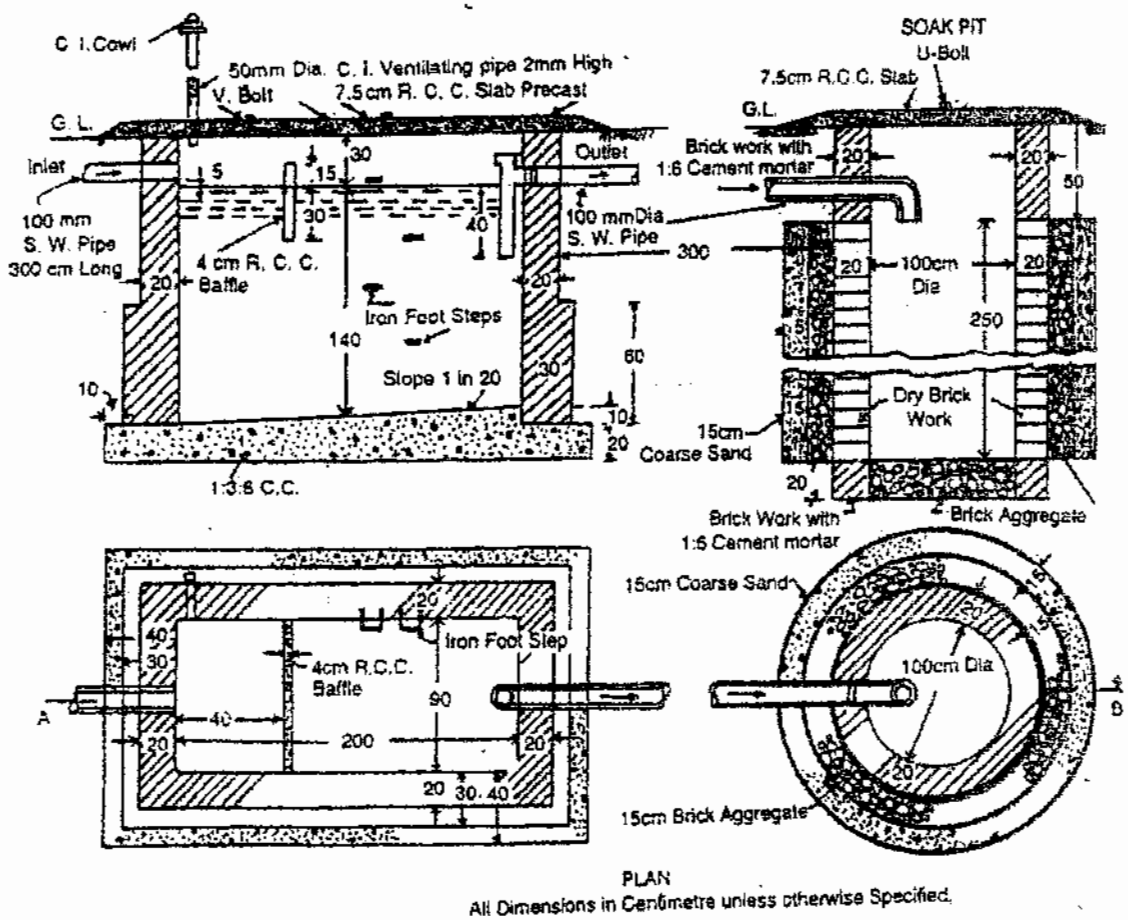


Fig. 1

OR

V. a) Prepare a bar bending schedule and quantities of RCC and reinforcement of a simply supported beam of length 6.5 m, depth 50 cm and width 30 cm reinforced with 3 No.s of 20 mm diameter at bottom as straight bar, 2 No.'s of 20 mm diameter, cranked at 45°, 2 No.s 16 mm diameter at top of the beam and 8 mm diameter 2 legged stirrups @ 15 cm c/c. **30**

b) Calculate the quantity of earth work in road embankment from drainage 0 to 90 m with the following data :

Chainage	0	30	60	90
Height of embankment	2.41	2.91	1.01	1.09

Formation width = 10 m and slope of banking = 2 : 1. **20**

VI. a) Explain in detail the method of fixation of standard rent of building. **7**

b) A three storied building has been constructed on a plot of land measuring 800 sq. m the plinth area of each story 400 sq. m. The life of the building structure may be taken as 70 years. The building fetches a gross rent of Rs. 1,500 per month. Calculate the capitalized value of the property on the basis of 10% net yield. For sinking fund 3% compound interest may be assumed. Cost of land may be taken as Rs. 40 sq. m. other data required may be assumed suitably. **8**

OR

VII. a) What is outgoing's ? What are the various types of outgoing's. **5**

b) A building is constructed at a cost of Rs. 2,50,000 on a land purchased at Rs. 50,000. The owner of the property expects a return of 9% on the cost of construction and 8% on cost of land. The building estimated to have a future life of 60 years at the end of which it requires Rs. 3,25,000 for constructing a new building in its place. Determine the standard rent of the property, given

i) Rate of interest for sinking fund at 6%.

ii) Annual repairs at 1.5% of the cost of construction.

iii) All other outgoings 28% of the net income of the property.

iv) Scrap value at the end of the useful life of the building as 10%. **10**

(Pages : 2) **5703**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.807.3 : Elective – V : INDUSTRIAL WASTE WATER MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

I. a) Discuss the stream quality required for maintaining aquatic life.

b) List out the pretreatment given to an industrial waste and explain.

c) Differentiate deoxygenation and reoxygenation taking place in stream purification process and write down the mathematical model for the phenomenon.

d) Explain the principles used for the removal of suspended solids.

e) Explain the theory of filtration used for waste treatment.

f) How will you remove organic solids from industrial waste ?

g) Explain absorption isotherms used for quantifying the adsorbate.

h) Define Kraft process is pulp making process in pulp and paper industry. **(8×5=40 Marks)**

PART – B

Module – I

II. Discuss the effects of the following parameters of wastes reaching sewers and treatment plants.

a) BOD b) Suspended solids

c) Volume d) Floating and colored materials.

OR

Explain the waste strength reduction of an industrial waste in detail. **20**

P.T.O.

Module – II

III. The waste from a small industry is discharged continuously into a nearby river using the following data, find :

a) The D.O. deficit at a point 60 km d/s.

b) Locate the time of critical deficit and the minimum D.O. in the river at that point.

c) The 5 day BOD at a point 20 km d/s. Assume that 5 day B.O.D. in the river u/s of the point of waste discharge is equal to zero. Also assume standard datas if required.

OR

d) How suspended and colloidal solids are removed in a waste water treatmen' plant ?

e) What are the principal variables to be considered while designing a filter and explain how the same affects the design ?

Module – III

IV. Explain the origin of pulp and paper mill waste with the help of a flow diagram.

OR

Describe the vegetable tanning process with the help of a process diagram.

(Pages : 2) **5703**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.807.3 : Elective – V : INDUSTRIAL WASTE WATER MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

I. a) Discuss the stream quality required for maintaining aquatic life.

b) List out the pretreatment given to an industrial waste and explain.

c) Differentiate deoxygenation and reoxygenation taking place in stream purification process and write down the mathematical model for the phenomenon.

d) Explain the principles used for the removal of suspended solids.

e) Explain the theory of filtration used for waste treatment.

f) How will you remove organic solids from industrial waste ?

g) Explain absorption isotherms used for quantifying the adsorbate.

h) Define Kraft process is pulp making process in pulp and paper industry. **(8×5=40 Marks)**

PART – B

Module – I

II. Discuss the effects of the following parameters of wastes reaching sewers and treatment plants.

a) BOD b) Suspended solids

c) Volume d) Floating and colored materials.

OR

Explain the waste strength reduction of an industrial waste in detail. 20

P.T.O.

(Pages : 2) **5686**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions **fully**.*
*2) **Assume** any suitable data **wherever** necessary.*

PART – A

1. Distinguish sewage, sullage and sewerage.
2. Write a short note about manholes.
3. Define relative stability. Evaluate it for a sewage sample whose period of incubation was 6 days when kept at 20° C.
4. Discuss the purpose of providing screens in a waste water treatment unit. Explain their classification also.
5. Describe stages of sludge digestion process.
6. Differentiate recirculation ratio and recirculation factor.
7. Bringout the significance of self cleansing velocity and scouring velocity of flow in a sewer.
8. Determine the discharge in a circular sewer running half full, laid in a gradient 1 in 500. The diameter of sewer is 1 m and in Mannings formula, N = 0.012.

(8×5=40 Marks)

PART – B

Module – I

9. a) Derive an expression for determining ultimate BOD in a given sample of waste water.

   b) In a BOD test using 3% dilution of the sample, DO values for the sample and dilution water after 5 days incubation at 20° C were 3.6 and 8.6 mg/L respectively. Dissolved oxygen originally present in the undiluted sample was 0.7 mg/L. Determine the 5 day BOD at 20° C.

   c) Distinguish BOD and COD. **(6+8+6)**

OR

10. A town discharges 120 cumecs of sewage into a river having a rate of flow 1600 cumecs during lean period with a velocity 0.1 m/s. The 5 day BOD at the given temperature is 250 mg/L. Find the amount of critical oxygen deficit and when and where will it occur in the downstream portion of the river. Assume K_D as 0.1 per day and coefficient of self purification 3.5. The saturation DO at the given temperature is 9.2 mg/L. **20**

Module – II

11. a) Sketch the flow chart of a conventional activated sludge process and explain F/M ratio, mean cell residence time and sludge volume index.

    b) Design a rectangular sedimentation tank provided with mechanical cleaning equipment for a city having peak sewage flow of 9 MLd. **(10+10)**

OR

12. a) Explain the design consideration of imhoff tank.

    b) Design a septic tank for a community of 300 persons. **(10+10)**

Module – III

13. a) Explain working principle of an oxidation pond.

    b) Determine the size of an oxidation pond and the detention time for a population of 5000 with 150 Lpcd of water is supplied and 5 day BOD of the sewage is 200 ppm. If 80% BOD removal is achieved in the pond, check whether the effluent is suitable for irrigation ? **(12+8,**

OR

14. a) The moisture content of a sludge is reduced from 95% to 90% in a sludge digestion tank. Find the percentage decrease in the volume of sludge. **8**

    b) Design a digestion tank for the primary sludge with an average flow 20 MLd and total suspended solids in raw sewage is 300 mg/L. The sludge has a moisture content of 95% which after digestion becomes 85%. Specific gravity of wet sludge is 1.02 and digestion period 30 days. **12**

(Pages : 4) **983**

Reg. No. : 10H1402S

Name : Sujith Suman

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.804 : QUANTITY SURVEYING AND VALUATION (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the difference between detailed estimate and abstract of estimate.
2. Explain the procedure for working out the quantities by using Centre Line Method.
3. Estimate the quantity of soiling stone 15 cm size for a road of carriage way width 4.20 m, and for a length of 1.20 Km and for CC above soiling for 12 cm thick.
4. Differentiate between :
   a) Scrap value and salvage value
   b) Market value and book value. **(4×5=20 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

5. a) Give detailed specification for flooring with PCC 1:3:6, mix 100 mm thick. **5**
   b) Work out unit rate for the following work.
   Cement concrete work, mix 1:5:10, using 40 mm brokenstone.

Material	**Quantity**	**Rate**
Brokenstone	0.95 Cu.m	Rs. 450/ Cu.m
Sand	0.48 Cu.m	Rs. 500/ Cu.m
Cement	137 kg	Rs. 3,300/Tn
Mason	0.10 No.	Rs. 450/no.
Men/Women	1.00 No.	Rs. 350/no.

   Quantity one cubic meter (1 Cu.m) **10**

OR

6. a) Give detailed specification for RCC covering slab for road drain. 5

b) Work out unit rate for the following work.

Brickwork in CM 1:6 using country burnt bricks for foundation and basement.

Material	Quantity	Rate
Brick	500 nos	Rs. 730/1000 nos
Sand	0.24 Cu.m	Rs. 750/Cu.m
Cement	58 kg	Rs. 4,000/Tn
Mason	0.70 no.	Rs. 550/no.
Men/women	1.05 no.	Rs. 475/no.

10

Module – II

7. Estimate the quantities and prepare the abstract of estimate (based on existing rates) of the following : 50

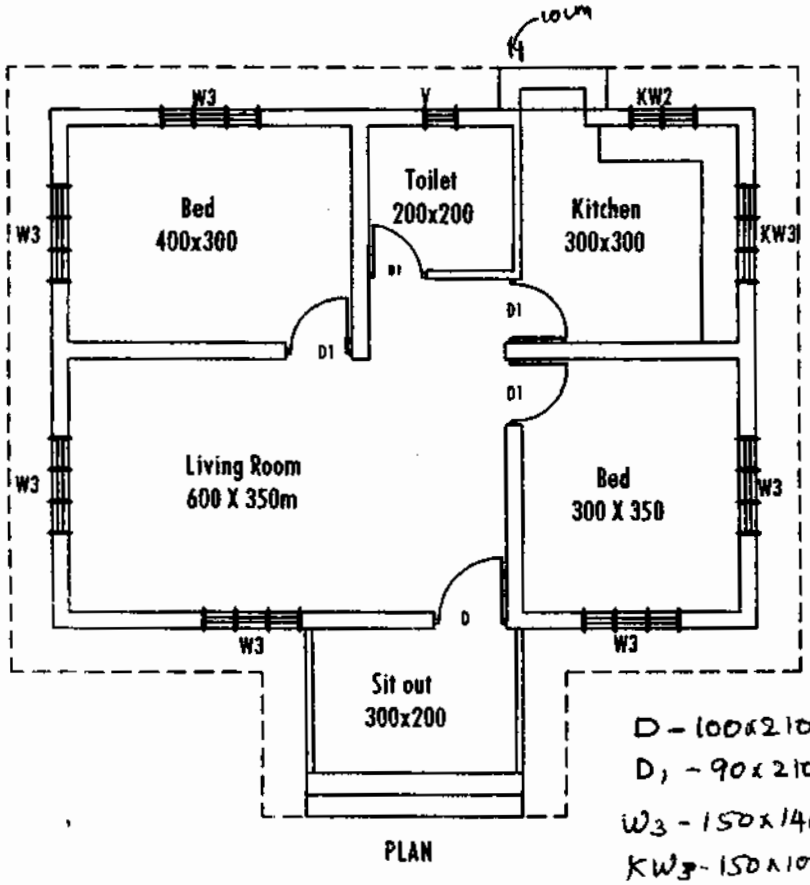
a) Earthwork in foundation

b) Plain cement concrete in foundation

c) 2.50 cm thick damp proof course at plinth level

d) Brickwork in Superstructure in Cement mortor 1:6

e) Wood work for doors and windows.



D – 100x210

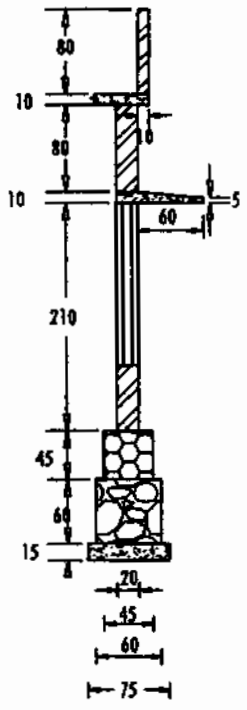
D_1 – 90x210

W_3 – 150x140

KW_3 – 150x100

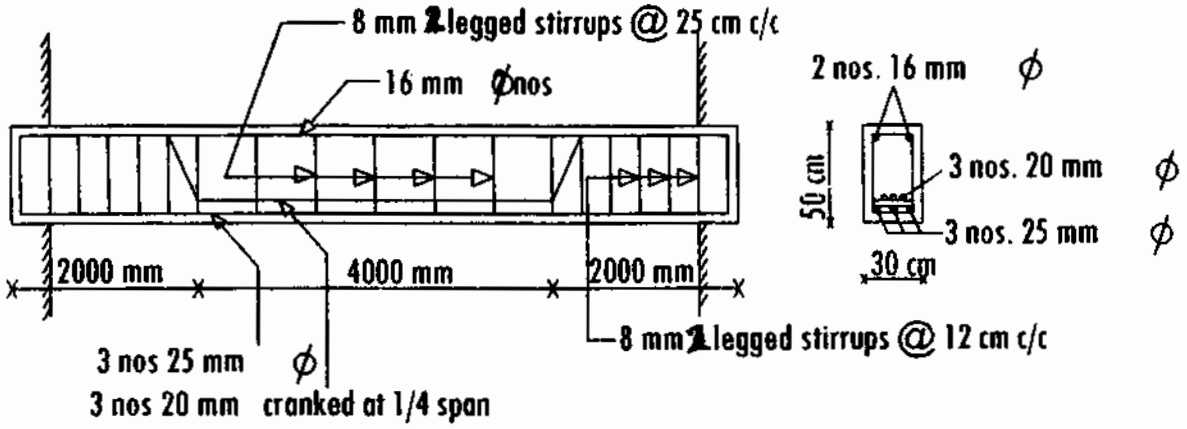
KW_2 – 100x100

V – 60x45



OR

8. a) Prepare schedule of bars for a beam shown in fig. 1 and calculate the materials required for the same. Use MS bar and 1:2:4 concrete. **25**



b) Prepare a detailed estimate of quantities and abstract of estimate of a compound wall of length 45 m. asper the following data. Foundation R.R in C.M 1:8, 45 cm. wide and 70 cm deep. Depth of foundation 60 cm. below ground level. Superstructure 10 cm thick brick wall using wire cut bricks in C.M 1:5, 1.5 m. high and brick pillars of size 20 cm x 20 cm at 3 m c/c. with offset at one side. Plastering the wall with C.M 1:4, 12 mm thick. one coat and painted with cement paint 2 coats. Assume suitable prevailing market rate. **25**

Module – III

9. a) What are the different types of Annuity ? Explain. **5**

b) A builder intend to purchase a land of 1000 areas of land and desire to develop into plots of 7 are each after providing necessary roads and open space (30%) the current sale prize at the neighbourhood is Rs. 300/m^2. The builder wants a net profit of 20% work out the maximum price of land for purchase. **10**

OR

10. a) Explain the procedure for Rental method of valuation for buildings. **5**

b) A building is constructed at a cost of Rs. 2,50,000 on a land purchased at Rs. 50,000. The owner of the property expects a return of 9% on the cost of construction and 8% on the cost of land. The building is estimated to have a future life 60 years at the end of which it requires Rs. 3,25,000 for constructing of a new building in its place.

Determine the standard rent of the property, given :

i) Rate of interest for sinking fund at 6%

ii) Annual repairs at 1.50% of the cost of construction

iii) All other outgoings 28% of the net income of the property

iv) Scrap value at the end of the useful life of the building as 10%. **10**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions **fully**.*
*2) Assume **any suitable** data **if** necessary.*

PART – A

1. Distinguish between BOD and COD.
2. Explain how self purification is achieved in streams.
3. If the catchment served by a sewerage system is 40 hectares and the duration of storm is 12 minutes, what is the run off from catchment determined by rational method ? Take impermeability coefficient as 0.5.
4. Compare a standard rate trickling filter with a high rate one.
5. With a neat sketch explain a contact bed used in waste water treatment.
6. Derive an expression for self cleansing velocity in a sewer.
7. Write a short note on aerated lagoons.
8. Discuss methods of disposal of sludge. **(8×5=40 Marks)**

PART – B

Module – I

9. a) Explain the significance of BOD determination of a waste water sample ?

What are the limitations of this test ?

b) If 2 day BOD at 25°C of a sewage sample is 200 mg/L. What is its 5 day BOD at 30°C. IC=0.23/day at 20°C.

c) What do you mean by relative stability of sewage sample ? **(5+10+5)**

OR

10. The sewage discharge of a city is 80 L/S in a river having a minimum discharge of 950 L/S with a velocity of 0.12 m/s. The BOD_5 of sewage at 20°C is 325 mg/L and initial DO deficit is zero. Determine the quantity of critical oxygen deficit and find where it occurs in the stream.

Take K_D=0.1/day and K_R=0.3/day. **20**

Module – II

11. Design an imhoff tank to treat 4.5 MLd of waste water. **20**

OR

12. a) Explain design considerations of a grit chamber used in waste water treatment.

b) Determine the size of a high rate trickling filter for the following data :

Sewage flow = 4.5 MLd

Recirculation ratio = 1.5

BOD of raw sewage = 300 mg/L

BOD removal in primary sedimentation tank = 30%

Final effluent BOD desired = 25 mg/L

Determine the size of a standard rate trickling filter for treating the same sewage. **(6+14)**

Module – III

13. a) Explain sludge drying beds.

b) Write a short note about disposal of sludge by incineration.

c) A sedimentation tank treats 7 MLd of sewage per day containing 400 mg/L of suspended solids. The tank removes 60% suspended matter. If the moisture content of the sludge formed is 97%, calculate the quantity of sludge per day in bulk and weight. Assume specific gravity of sludge as 1.03. If moisture content is reduced to 95%, what about the volume of sludge to be disposed off ? **(5+5+10)**

OR

14. a) Explain different systems of plumbing.

b) Determine the size of a circular sewer for a combined system of sewerage. Given area to be served 100 hectares, population of one lakh and rate of water supplied is 150 Lpcd. Time of entry is 3 minutes, Time of flow 15 minutes. Take impermeability coefficient 0.5 and maximum permissible velocity in the sewer is 2 m/s. Assume 80% of water supplied come as sewerage. **(10+10)**

(Pages : 2) **994**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.806.9 (Elective – IV) GROUND IMPROVEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the method of dynamic compaction.
2. What is pre-loading of soils and how it is done ?
3. Write short notes on stone columns.
4. What is meant by electro chemical stabilization.
5. What are the different functions involved in grouting ?
6. What are the chemicals used in stabilisation of soil ?
7. Describe the mechanism of multi-stage well point system.
8. Explain the advantages of reinforced earth structures. **(8×5=40 Marks)**

PART – B

Module – I

9. a) What are the factors which affect field compaction ? **10**

   b) Explain the principle of blasting in soil improvement. **10**

OR

10. a) Explain the different techniques of insitu densification. **10**

    b) Explain the principle and advantages of lime piles. **10**

Module – II

11. a) Explain the principle of mechanical stabilization. **10**

    b) Describe the method of electro-osmotic stabilization. **10**

OR

12. a) Describe the physical and chemical aspects of stabilization. **10**

    b) Explain the method of stabilization with cement and lime. **10**

Module – III

13. a) Explain the principle and advantages of vaccum dewatering system. **10**

    b) Write short notes on blanket drains. **10**

OR

14. a) Explain with the help of diagrams various applications of soil reinforcement. **10**

    b) Write short notes on various functions of geotextiles. **10**

(Pages : 2) **5692**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806.4 : Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instruction : ***Use*** *of Brom's charts and Meyerhof's bearing capacity factor table are permitted.*

PART – A

Answer **all** questions.

1. a) Discuss Meyerhof's bearing capacity theory. How does it differ from Terzaghis theory ?

   b) Discuss the effect of water table on bearing capacity.

   c) What are the assumptions in Coulomb's theory ? Compare Rankin's theory and Coulomb's theory.

   d) Describe Rebhann's construction. What is its use ?

   e) Discuss the general classification of sheet pile walls.

   f) Explain the necessity of sheet pile walls with examples.

   g) Briefly explain the design principles of sheet pile retaining walls.

   h) Differentiate between flexible piles and short piles. **(8×5=40 Marks)**

PART – B

Module – I

II. Determine the ultimate bearing capacity of a strip footing 2 m width at its base at a depth of 1.5 m below ground surface and resting on a saturated clay soil with the following properties :

$\gamma_{sat} = 20\ kN/m^3$; $C_u = 40\ kN/m^2$; $\phi_u = 0$; $C' = 10\ kN/m^2$; $\phi' = 20^o$

The natural water table is at 1 m depth below ground level. Ignore the depth factors. Use Meyerhof's method. **20**

OR

P.T.O.

III. Determine the safe load which can be imposed normal to the base of a strip footing which is 1.2 m wide and has its base inclined at 12° from the horizontal. One corner of the footing is located at 1.2 m from the ground surface. The footing rests on a saturated cohesive soil with a cohesion of 75 kN/m^2 and unit weight of 18.2 kN/m^3. **20**

Module – II

IV. A Vertical retaining wall 10 m high, supports a cohesionless soil r = 1.8 t/m^3. The upper surface of the backfill rises from the crest of the wall at angle 15° with the horizontal. Determine the total active pressure by Culmann's method.

Take $\phi = 30°$ and $\delta = 20°$. **20**

OR

V. Explain how you would make use of Coulomb's theory for the analysis of retaining walls subjected to earthquake forces for active and passive conditions. **20**

Module – III

VI. The height of cantilever sheet pile from the top of the dredge level is 9 m. The water level in the backfill is at 2.0 m from top. Find the depth of penetration required for a factor of safety = 1. Assume that above the water table the soil is dry. The other properties of the soil are $\gamma_{sat} = 2t/m^3$; $k_a = 0.33$; $k_p = 3$; $G_s = 2.6$. **20**

OR

VII. A concrete pile 900 mm diameter and 6 m long is installed in a clay soil with cohesion 1.5 kg/cm^2 (N value = 15). Estimate the ultimate lateral resistance if the load is applied at a point situated at 4 m above the ground level. Assume $k_1 = 25$ MN/m^3 and $E_c = 26$ kN/mm^2. If the allowable deflection at the ground level is only 25 mm estimate the load it can take. **20**

(Pages : 2) **6720**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.801 – DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (C)

Time: 4 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions.* ***Use*** *of relevant I.S. codes 456 – 2000, 3370 (Part* ***I*** *–* ***IV****), IRC 6 and* ***21*** *and design charts are permitted.*

PART – A

1. Explain the design steps of dome over circular water tank.
2. Compare the merits and demerits of Flat slab over ordinary slab. **(2×10=20 Marks)**

PART – B

3. a) Design a catilever retaining wall to retain earth of 6 m height. The back fill is horizontal. The unit weight of soil is 17.5 kN/m^3. Coefficient of friction between soil and concrete is 0.5. Safe bearing capacity is 250 kN/m^2. The angle of repose 30°. Use M_{25} concrete and Fe 415 grade steel. **20**

   b) Draw to suitable scale the following views :
      i) Vertical cross section of retaining wall
      ii) Longitudinal section through stem. **20**

OR

4. a) Design a circular tank with flexible base for capacity 2 lakhs litres. The depth of water is to be 3 m, including free board of 0.25 m. Use M_{25} concrete and 154 grade steel. **20**

   b) Draw to suitable scale the following views :
      i) Section showing reinforcement details of side wall and base
      ii) Plan showing reinforcement of base slab. **20**

P.T.O.

PART – C

5. a) Design the interior panel of a flat slab 4.5 m × 5.5 m subjected to a live load of 5 kN/m^2. Use M_{20} concrete and Fe 415 grade steel. **20**

   b) Draw to suitable scale the following views :

      i) Plan showing bottom reinforcement

      ii) Cross section through column strip. **20**

OR

6. a) Design a slab bridge for the following data. Clear span 7 m carriage way 7 m. Thickness of wearing coat – 8 cm. Live load - class AA tracked. Use M_{25} concrete and 415 grade steel. **20**

   b) Draw to suitable scale :

      i) Plan showing reinforcement details

      i) Cross section showing reinforcement details. **20**

(Pages : 2) **6721**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : 1) *Answer **all** questions from Part **A** and **two** questions from Part **B**.*
2) *Assume suitable data **wherever** necessary.*
3) ***Use** of Steel Section tables, IS 800, IS 875(3), IS 6533(2) and Bridge Rules are **permitted**.*

PART – A **(2×10=20 Marks)**

1. With the aid of a neat sketch label the following elements in a steel roofed building : Purlins, rafters, wind braces and girt.

2. Compare the different types of bearings used in steel railway bridges.

PART – B **(2×40=80 Marks)**

3. a) A rectangular pressed steel tank is required to store 0.15 million litres of water at a height 15 m above ground level. Steel plates of 1.25 m × 1.25 m is available. Design i) tank plates ii) stays iii) longitudinal beams iv) cross beams. **20**

   b) Draw to suitable scale

      i) General elevation of tank showing dimensions and arrangement of structural elements including staging.

      ii) Plan showing the arrangement of stays. **20**

OR

4. a) Design a welded steel roof truss for the following data :

   span = 15 m, spacing = 3.5 m, roofing : AC sheet, design wind speed 45 m/s. **20**

   b) Draw to suitable scale :

      i) Half elevation of the truss

      ii) Connection details at support and at any intermediate joint. **20**

P.T.O.

5. a) Design a lined self supporting steel chimney 3 m diameter and 65 m high. Assume design wind pressure 1.5 KN/m^2. **20**

   b) Draw to suitable scale :

      i) Details at flue opening

      ii) Details at foundation **20**

OR

6. a) Design a welded plate girder for a deck type railway bridge of span 22 m for modified broad gauge loading. **20**

   b) Draw plan, elevation and section of the bridge. **20**

(Pages : 2) **6724**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.805 : CONSTRUCTION MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction**: Answer **all** questions from Part **A** and **one full** question from **each** Module in Part **B**.*

PART – A

1. Define and describe the importance of scientific management.
2. Write a brief note on cost benefit analysis of a project.
3. Discuss the functions and duties of site office and site engineer in a construction site.
4. Distinguish between quotation and tender in awarding civil works for execution.
5. Write a brief note on M-book.
6. Explain the necessity of check measurement and state the minimum qualifications required for a check measuring officer in work recording.
7. Briefly explain the preparation of bar chart and its limitations.
8. Describe the basic concepts of resource planning. **(8×5=40 Marks)**

PART – B

Module – I

9. Discuss the contributions of Henry Fayor in modern scientific management and its application in construction industry.

OR

10. Define a project. Discuss the importance of scientific management in construction industry. Explain computer applications in construction management. **20**

P.T.O.

Module – II

11. Briefly explain the tender procedure for awarding execution work of a water supply project to a contractor. List the pre-requirements and conditions of contract.

OR

12. Define contract. List and discuss various types of contracts and its merits and demerits. **20**

Module – III

13. Briefly explain the principle and necessity of network technique. List the rules for network construction in activity on arrow system. Explain the use of dummy activity. Give an example for preparation of network.

OR

14. Briefly explain PERT and CPM. How they are distinguished ? Assuming duration and activity prepare a PERT chart for construction of a ground water tank in hard soil 6 m length, 3 m wide and 3 m depth with embankment 3 m at bottom, at GL, 1 m at top, side slopes equal, height 1 m and with inner bam 1.2 m. **20**

(Pages : 2) **6722**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define waste water and discuss the sources of waste water.

2. Discuss the factors effecting and characteristics of waste water.

3. Write brief note on working of flushing devices.

4. Define and explain recirculation ratio.

5. Briefly explain what is sewage sickness.

6. Write a brief note on intermittent sand filter.

7. Define self cleaning velocity and Shields expression.

8. Discuss the principles of housing drainage. **(8×5=40 Marks)**

P.T.O.

PART – B

Answer **any one** full question from **each** Module.

Module – I

9. Briefly explain with neat sketches, the necessity, minimum dimensions, structural details, position and connections of man hole in sewerage system.

OR

10. State and explain Streeter Phelp's equation and its application in waste water disposal. **20**

Module – II

11. Briefly explain the necessity, design principle, construction details, and working of trickling filter. Give a neat sketch showing construction and working details.

OR

12. Twenty four closets are to be connected to a septic tank. The septic tank is to be designed for 200 inmates in a hostel. The septic tank is located 300 m away from closet room and the site is 3 m below the closet level. Design the septic tank and soak pit. Give detailed sketches showing connections from closet to soak pit. Assume any data required suitably. **20**

Module – III

13. What are sewers ? Sketch different types of sewers. State the design principles of circular sewer.

OR

14. With the help of neat sketches explain sludge digestion tank. Discuss the factors affecting sludge digestion. **20**

(Pages : 4) **6723**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.804 : QUANTITY SURVEYING & VALUATION (C)

Time : 3 Hours Max. Marks : 100

Instruction : Answer **all** questions.

PART – A

1. a) Discuss the purpose of standard specification in civil engineering works with examples.
   b) Distinguish between detailed estimate and abstract of estimate.
   c) Write brief note on Data Book and its importance in rate analysis.
   d) Define valuation. Discuss the necessity for valuation of buildings.

(5×4=20 Marks)

PART – B

MODULE – I

2. a) State detailed speciation for following works.
      i) Random Rubble Masonry in cement mortar 1 : 4 for building basement.
      ii) RCC works for lintel and sunshade.
   b) Work out the unit rare for brick work in cement mortar 1 : 4 :

      Given Number of bricks required for one cubic meter of work is 500 and the rate of 4,500 bricks including loading and unloading charge at site is rupees 18,000, sand required is 0.25 cum and the rate for one cum sand is rupees 2,000 and cement required is 58 Kg at the rate of rupees six per Kg. The labour and labour charge are mason 0.7 (Rate 600), men/women 1.1 (rate 450).

OR

3. a) State detailed specification for the following works
      i) Brick work in cement mortar 1 : 3 for load bearing wall
      ii) Plastering the walls with cm 1 : 3, 9 mm thick.
   b) Work out the unit rate for RR masonry in cm 1 : 4 for basement.
      Given the requirements for one cum work.
      Rubble one cum, rate rupees 250/-. Sand 0.3 cum, cement 75 Kg
      Mason 0.7 and men/women 1.1. The rates are as in question 2(b). **15**

P.T.O.

MODULE – II

4. Prepare detailed estimate for the following items for the construction of a residential building shown in drawing attached.
   a) RR in cm 1 : 8 for foundation
   b) Brick work in cm 1 : 6 for superstructure wall
   c) RCC roof slab 10 cm thick
   d) Plastering out side only with cm 1 : 4 : 15 mm thick.

OR

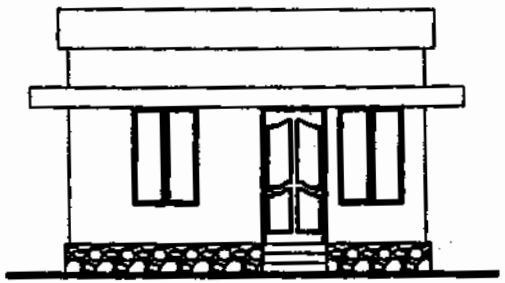
5. Prepare detailed estimate for the following items of work for a septic tank shown in drawing attached.
   a) Earth work excavation in hard soil, GL 100 cm above top slab of tank
   b) Flooring with RCC 1 : 2 : 4 mix 150 mm thick
   c) RCC side wall
   d) Plastering inside the tank except roof slab. **50**

MODULE – III

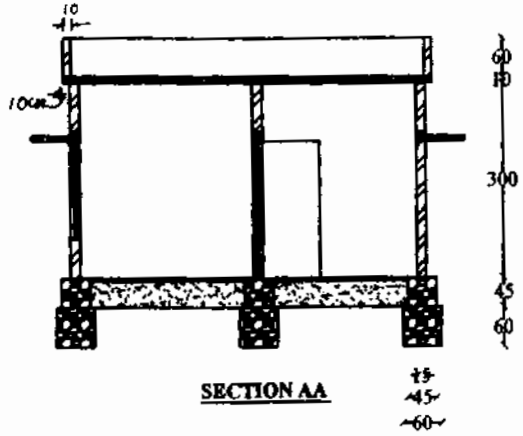
6. a) Discuss the procedure for fixing the rent for an auditorium.
   b) District panchayath constructed an auditorium in their on land utilizing a loan received from a nationalized bank. The total amount of loan utilized for construction work including furnishing is Rupees 32,00,000 and the land value assessed by bank is rupees 3,00,000 excluding construction cost. The interest to be paid to the bank is 15% for the then existing loan amount. The life period of the construction is 50 years. Yearly maintenance cost of auditorium is Rupees 1,00,000. The total loan amount is to be paid with in twenty five years. Assume the auditorium can be rented 100 days a year. Fix the daily rent for the auditorium.

OR

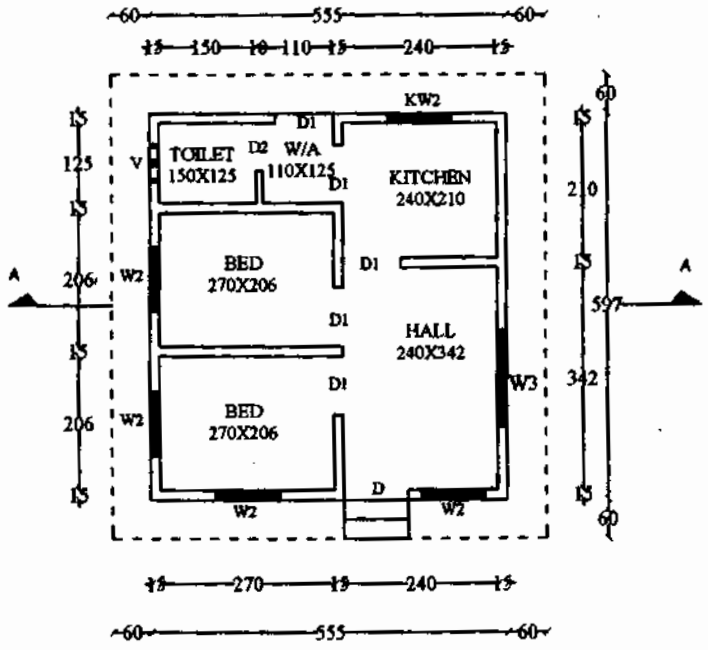
7. a) Discuss different methods of valuation of buildings.
   b) What is sinking fund ?
   c) Define depreciation and current rates of depreciation. **15**



ELEVATION



SECTION AA



PLAN

JOINERY DETAILS

D	DOOR	100cm x 210cm
D1	"	90cm x 210cm
D2	"	75cm x 210cm
W3	WINDOW	150cm x 140cm
W2	"	100cm x 140cm
KW2	"	100cmx 100cm
V	VENTILATOR	60cm x 45cm

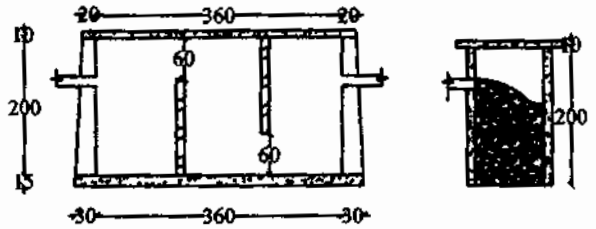
PLINTH AREA - 33.13 M2 (356.61 Sq.Feet)

SPECIFICATIONS

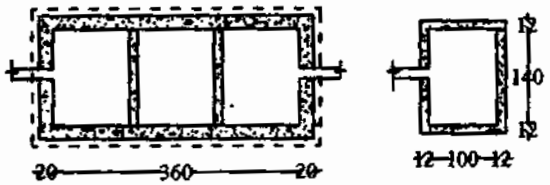
FOUNDATION & BASEMENT	:	R.R. MASONRY IN CM 1:8
SUPERSTRUCTURE	:	BRICKWORK IN CM 1:6.
LINTEL	:	R.C.C. 1:2:4. SIZE -24cm x 15cm
ROOFSLAB	:	R.C.C. 1:2:4, 10cm Thk.
PLASTERING		
WALLS	:	CM 1:4, 15mm Thk.
CEILING	:	CM 1:3, 9mm Thk.
FLOORING	:	P.C.C. 1:4:8, 10cm Thk.

6723

SEPTIC TANK AND SOAK PIT



LONGITUDINAL SECTION



PLAN

SPECIFICATIONS

R.CC 1:2;4 using 20mmbrockenstone for slab & side wall

Flooring with R.C.C. 1:2:4, 15cm Thk.

Brick work in cm 1:6 for partion wall

Plastering with cm 1:4,12 mm thick with neat cement flushing coat

(Pages : 2) **6735**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806.11 Elective – IV : ENVIRONMENTAL IMPACT ASSESSMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction**: Answer **all** questions.*

PART – A

1. List out the key features of US 1969 National Environmental Policy Act.
2. Explain on EIA.
3. List out the latest softwares in water and air quality modeling.
4. Write a short note on Scoping.
5. Explain the checklist method of impact assessment.
6. Briefly explain the various types of Socio-economic impacts.
7. Write a short note on standards for noise quality.
8. Briefly explain the impact of development on vegetation and wild life.

(8×5=40 Marks)

PART – B

Module – I

9. Explain briefly the evolution of EIA (Global and Indian Scenario).

OR

10. Explain the environmental clearance process followed in India.

P.T.O.

Module – II

11. Explain the role of public participation in EIA and also add short notes on overlay and matrix method of impact assessment.

OR

12. Explain the role of environmental engineer in EIA and also add a short note on Event tree analysis and Fault tree analysis.

Module – III

13. Write a short note on water quality analysis and explain the standards for water quality.

OR

14. Explain briefly the preparation of Environmental Management plan for a hydro electric power project. **(3×20=60 Marks)**

(Pages : 3) **6728**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806.4 Elective – IV : ADVANCED FOUNDATION ENGINEERING (C)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**. (Brom's chart and Meyerhof's bearing capacity table **permitted**.)*

PART – A

1. a) Sketch the failure zone given by Meyerhof and explain the failure mechanism.
   b) Write down the expression for ultimate bearing capacity of an isolated footing subjected to inclined loads including correction for water table.
   c) What is the effect of eccentric loading on bearing capacity of isolated footings ? How can this be taken care of ?
   d) What are the advantages of Culmann's graphical methods ?
   e) Sketch the failure wedge behind a retaining wall subjected to earthquake forces under active condition.
   f) What are the forces acting on a gravity retaining wall ? Give the safety considerations of a gravity retaining wall.
   g) What are the different types of sheet piles ? Give steps of construction of a cantilever sheet pile wall.
   h) Differentiate between (i) fixed headed pile and free headed pile (ii) short piles and long piles. **(8×5=40 Marks)**

PART – B

Module – I

2. A square footing 1.8 m × 1.8 m is loaded with an axial load of 200 kN and M_x = 80 kN-m and M_y=50 kN-m $\phi = 32°$ and c = 50 kPa. The footing depth is 1.5 m. γ = 22 kN/m^3. The water table is at the base of the foundation. What is the allowable soil pressure for a factor of safety of 3, using Meyerhof's recommendations ? **20**

OR

3. A rectangular footing of size 3 m × 6 m is founded at a depth of 2 m in medium dense sand of $\phi = 36°$. The soil is submerged up to base level and is saturated above. $\gamma_{sat} = 18$ kN/m^3. Determine the ultimate bearing capacity by Meyerhof's theory for the following cases :

   i) The loading is vertical.

   ii) The loading is inclined at an angle of 20° with vertical.

   iii) The loading is at an eccentricity of 0.5 m in both ways (use effective width concept). **20**

Module – II

4. For a retaining wall system, the following data were available i) height of wall 7 m, ii) properties of backfill. $\gamma_d = 16$ kN/m^3, $\phi = 36°$, $\delta = 20°$, back of the wall is at a positive batter of 20° to the vertical, backfill surface is sloping at 1:10. Determine the active earth pressure by Culmann's method. **20**

OR

5. Check the stability of a concrete retaining wall shown in fig. 1. The properties of backfill are $\gamma = 16$kN/m^3, $\phi = 33°$ tan $\delta = 0.48$, $\gamma_c = 25$kN/m^3. The allowable soil pressure for the foundation soil is 380 kPa. **20**

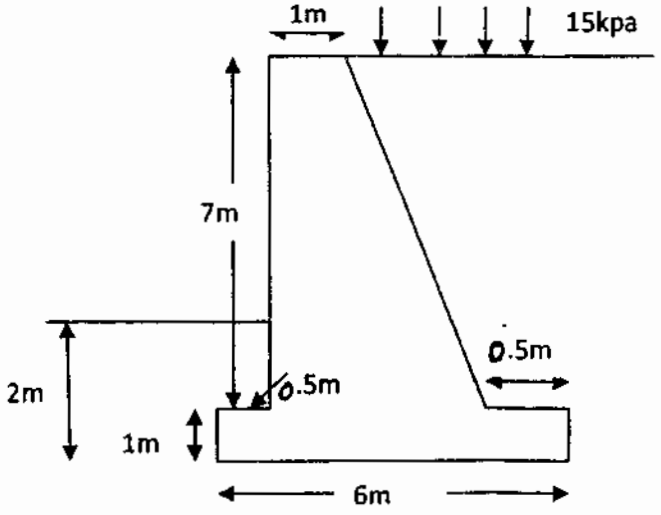


Fig. 1

Module – III

6. For the sheet pile wall system shown in Fig. 2, determine the depth of penetration considering the pile as cantilever type. **20**

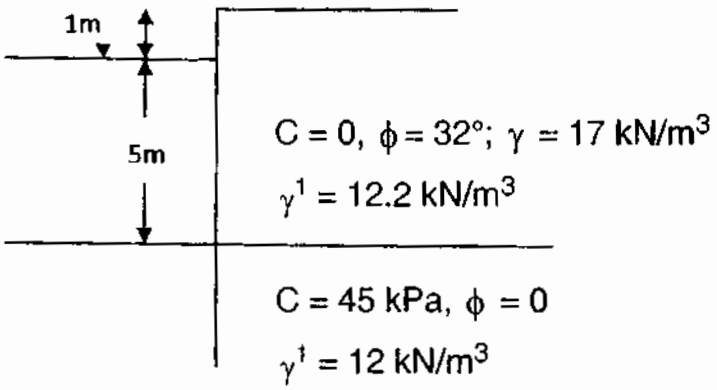


Fig. 2

OR

7. A steel pipe pile of 61 cm outside diameter with 2.5 cm wall thickness is driven into saturated cohesive soil to a depth of 20 m. The undrained cohesive strength of the soil is 85 kPa. Calculate the ultimate lateral resistance of the pile by Brom's method with (i) the load applied at ground level (ii) load applied at a height of 1 m above ground level. Take $f_y = 2800$ kg/cm^2. What is the change in load if there is fixed head condition in both the cases ? **20**

(Pages : 3) **1680**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.804 : QUANTITY SURVEYING AND VALUATION (C)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions. Assume any missing data suitably.*

PART – A

I. a) How is detailed estimate different from preliminary estimate ?

b) Explain the use of data book and schedule of rates.

c) Explain what do you mean by valuation of a property and how does it differ from the cost ?

d) What is depreciation ? List the methods of calculating depreciation. **(4x5=20 Marks)**

PART – B

II. a) Write down the detailed specification wood work for frames of doors and windows. **5**

b) Work out the unit rate for roofing with M.P. tile of 320 mm or nearest available size. [For 10m^2, M.P. tile – 145 Nos. @ Rs. 6,000/1,000 Nos., Mason – 0.35 @ Rs. 450/E, Man – 0.35 @ Rs. 350/E] **10**

OR

III. a) Write down the detailed specification for Random Rubble masonry in cement mortar 1 : 6 for foundation. **5**

b) Workout the unit rate for P.C.C. 1 : 3 : 6, using 40 mm broken stone. [For 1 m^3, 0.95 m^3 40 mm broken stone @ Rs. 1,100/m^3, 0.48 m^3 sand @ Rs. 1,200/m^3, 228 kg cement @ Rs. 5,000/t, 0.1 mason @ Rs. 450/E, 1.0 man @ Rs. 350/E and 1.4 woman @ Rs. 325/E] **10**

P.T.O.

IV. Estimate the quantities and prepare the abstract of estimate of the following item of a building shown in Fig. 1. (Assume prevailing market rates)

i) P.C.C. 1 : 4 : 8 for foundation

ii) Brick work for super structure

iii) Wood work for frames of doors and windows

iv) Plastering with C.M. 1 : 4, 12 mm thick for walls

v) Painting for doors and windows. **50**

OR

V. a) Prepare a bar bending schedule and quantities of RCC and reinforcement of a simply supported beam of length 6.5 m, depth 50 cm and width 30 cm reinforced with 3 Nos. of 20 mm dia at bottom as straight bar, 2 Nos. of 20 mm dia : cranked at 45°, 2 Nos. 16 ϕ at top of beam and 8 mm ϕ 2 legged stirrups @ 15 cmc/c. **30**

b) Calculate the quantity of earth work in road embankment from chainage 0 to 90 m with the following data :

Chainage	:	0	30	60	90
Height of embankment	:	2.41 m	2.91	1.01	1.09

Formation width = 10 m and slope in banking = 2 : 1. **20**

VI. a) What is outgoing ? Explain the various outgoings. **7**

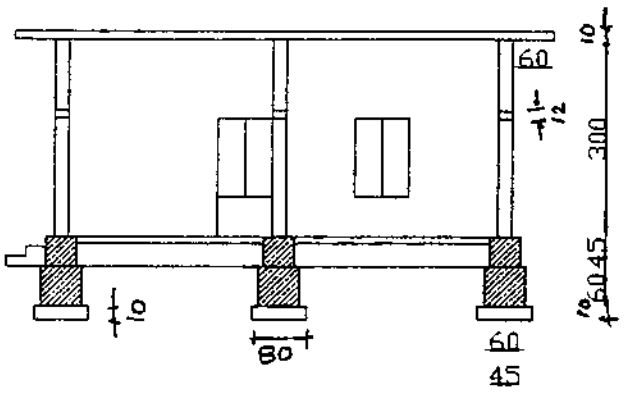
b) Write short note on :

i) Bookvalue

ii) Year's purchase **8**

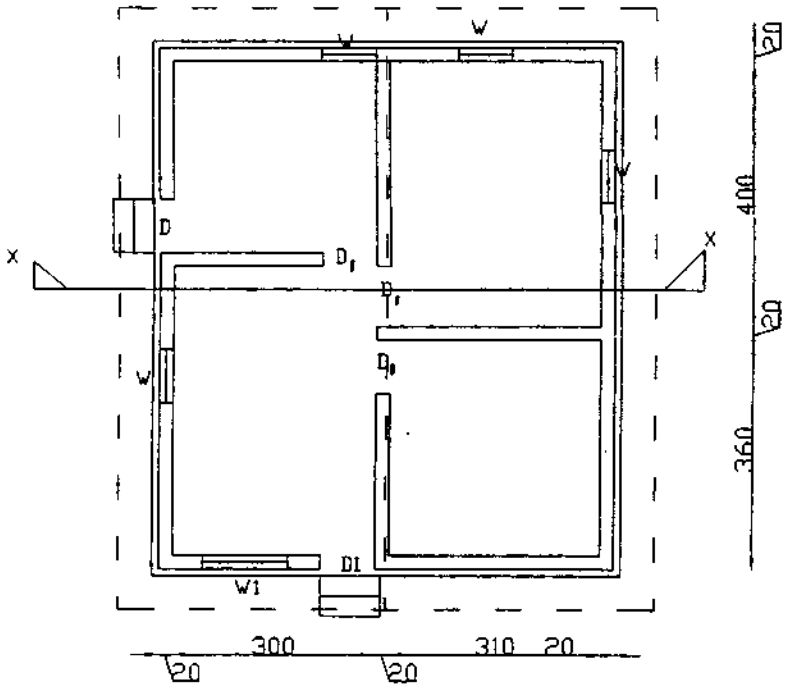
OR

VII. A Govt. accommodation is built at the cost of Rs. 6,00,000/. The water supply, sanitary and electrical installation expenditure is Rs. 1,50,000/- calculate the standard rent of the building if the following rate of return are fixed (i) 6% on construction cost (ii) 1.5% towards maintenance of building work (iii) 4.5% on installation expenditure (iv) 4% on maintenance of installation (v) Rs. 1,200/-as property tax per year (vi) cost of land is to be neglected. **15**



SECTION X-X

JOINERY DETAILS	
ITEM	SIZE
D	100 x 200
D1	90 x 200
W	120 X 140
W1	160 X 140



PLAN

Q.No. IV Fig. – I

(Pages : 4) 5937

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.804 QUANTITY SURVEYING AND VALUATION (C)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions : **(4×5=20 Marks)**

1. What is meant by Bar Bending Schedule ?
2. What is Obsolescence ?
3. Write a short notes on data book and schedule of rates.
4. Calculate the quantities of materials for 10 cu. m PCC 1 : 3 : 6.

PART – B

Answer **any one** question from **each** module :

Module – I

5. a) Give detailed specification for plastering for wall with CM 1 : 3 mix, 9 mm thick. **5**

   b) Work out unit rate for the following work. Cement concrete work, mix 1 : 2 :4, using 20 mm broken stone. **10**

Material	**Quantity**	**Rate Rs.**
Brokenstone	0.90 cu.m	450/Cu.m
Sand	0.45 cu.m	500/Cu.m
Cement	330 kg	3300/Tn
Mason	0.20 No	450/no
Men/Women	4.50 No	350/no

Quantity one cubic meter (1 Cu.m).

OR

6. a) Give detailed specification for Brick work in CM 1 : 6, for load bearing walls. **5**

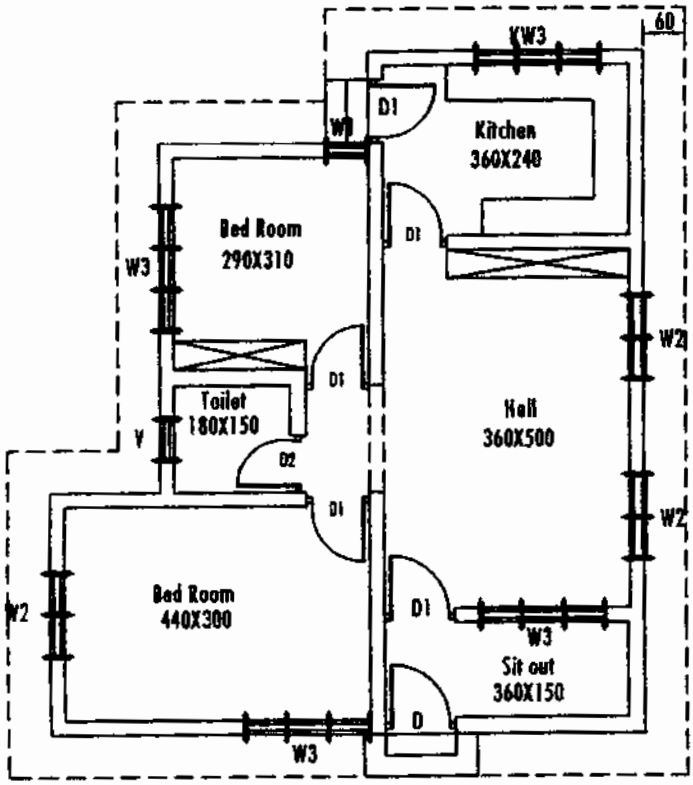
   b) Work out unit rate for the following work. RR Masonry in CM 1 : 3, 10 cu m for basement. **10**

Material	**Quantity**	**Rate Rs.**
Rubble	10.00 cu.m	200/Cu.m
Sand	3 cu.m	500/Cu.m
Cement	15 bag	270/bag
Mason	3.5 no	210/no
Men/Women	8 no	125/no

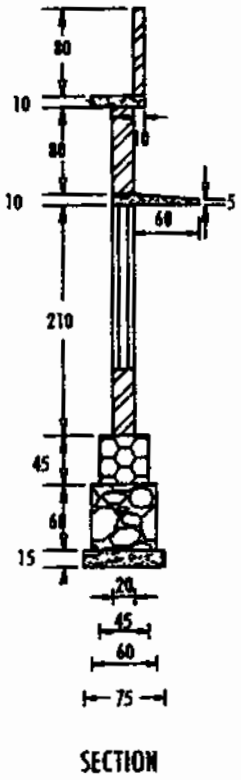
P.T.O.

Module – II

7. Estimate the quantities and prepare the abstract of estimate (based on existing rates) of the following : **50**
   a) Earthwork in foundation
   b) Plain cement concrete in foundation
   c) 2.50 cm thick Damp proof course at plinth level
   d) Brickwork in Superstructure in Cement mortor 1 : 6
   e) Supplying and fixing of doors and windows for Anjily wood frame work and glazed shutters (Mahagony).



PLAN

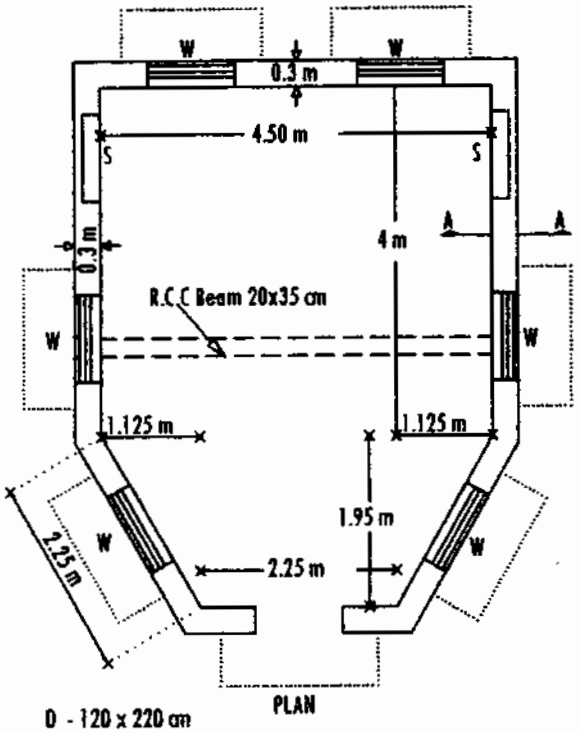


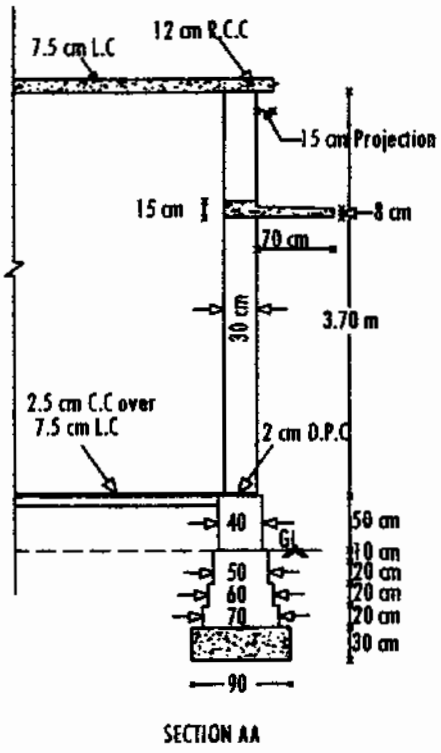
SECTION

$D - 100 \times 210$
$D_1 - 90 \times 210$
$D_2 - 75 \times 210$
$W_1 - 60 \times 140$
$W_2 - 120 \times 140$
$W_3 - 180 \times 140$
$KW_3 - 180 \times 100$
$V - 75 \times 60$

OR

8. a) Find out the quantities for the following items of building : **30**
   a) P.C.C 1 : 4 : 8 for foundation
   b) Brick work for superstructure
   c) Plastering with CM. 1 : 4 inside and outside of wall
   d) R.C.C. for lintel and sunshade.





   b) Prepare a bar bending schedule and estimate the quantity of steel for a roof slab 10 cm thick having 5.00 × 3.60 m clear inside dimensions bearing on walls 20 cm width. The main bars are 10 mm @ 15 cm C/C., alternate bars cranked up. The distribution bars are 6 mm 20 cm C/C. Extra bars provided are 8 mm where the bars are not bent up. **20**

Module – III

9. a) Explain the different methods of calculating depreciation. **5**
   b) The cost of new building is Rs. 2,50,000. Workout the depreciated cost of the building after 10 years, by straight line method and constant percentage method, if the scrap value is Rs. 25,000, assuming the life of the building is 50 years. **10**

OR

10. a) Explain the procedure for Rental method of valuation for buildings ? **5**

b) A building is constructed at a cost of Rs. 2,50,000 on a land purchased at Rs. 50,000. The owner of the property expects a return of 9% on the cost of construction and 8% on the cost of land. The building is estimated to have a future life 60 years at the end of which it requires Rs. 3,25,000 for constructing of a new building in its place. Determine the standard rent of the property, given : **10**

i) Rate of interest for sinking fund at 6%;

ii) Annual repairs at 1.50% of the cost of construction;

iii) All other outgoings 28% of the net income of the property;

iv) Scrap value at the end of the useful life of the building as 10%.

(Pages : 2) **5938**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
Branch : Civil Engineering
08.805 : CONSTRUCTION MANAGEMENT

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part – **A** and **one** question from **each** module of Part – **B**.*

PART – A

1. What is scientific management ? What are its advantages and disadvantages ?
2. What are the different types of tenders ?
3. What is the difference between financial analysis and economic analysis of a project ?
4. Differentiate the tasks of a construction manager and a general contractor.
5. What are the differences between PERT and CPM ?
6. How floats are useful for taking management decisions ?
7. Explain time-cost trade off.
8. How will you assess the feasibility of a project by internal rate of return method ?

(8×5=40 Marks)

PART – B

Module – I

9. Describe the contribution of Taylor and Fayol in the development of modern management theory.

OR

10. Explain how a feasibility study is conducted for a construction project. **20**

Module – II

11. Explain the different types of contracts. What are the important documents to be included in a contract agreement ?

OR

12. What are the important clauses to be included in a contract agreement to protect the interests of both the client and the contractor ? Explain the significance of such clauses. **20**

P.T.O.

Module – III

13. The activity and duration of a project are given. Draw the network and find out the critical path. Compute the total float, free float and independent float.

Activity	Duration (days)
1–2	4
1–3	12
1–4	10
2–4	8
2–5	6
3–6	8
4–6	10
5–7	10
6–7	0
6–8	8
7–8	10
8–9	6

OR

14. Activities of a project are given below. Calculate the probability of completing the project in 48 days. **20**

Activity	Optimistic time (days)	Most likely time (days)	Pessimistic time (days)
10–20	4	8	12
20–30	1	4	7
20–40	8	12	16
30–50	3	5	7
40–50	0	0	0
40–60	3	6	9
50–70	3	6	9
50–80	4	6	8
60–100	4	6	8
70–90	4	8	12
80–90	2	5	8
90–100	4	10	16

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.806.11 Elective – IV : ENVIRONMENTAL IMPACT ASSESSMENT (C)

Time : 3 Hours Max. Marks : 100

Instruction *: Answer* ***all*** *questions.*

PART – A

1. Define the term EIA.
2. Write a short note on scoping.
3. List out some of the latest softwares used in air quality modeling.
4. Explain the role of environmental engineer in EIA.
5. Write a short note on event tree analysis.
6. Explain the process of public consultation in the EIA process (followed in India).
7. List out the various NAAQS. (Standards for Air quality).
8. Explain briefly about the typical impacts of development on vegetation and wild life.

(8×5=40 Marks)

PART – B

Module – I

9. a) Explain the (global and Indian scenario) evolution of EIA. **20**

OR

b) List out and explain the key features of 1969 NEPA Act. Also list out the various environmental clearance processes in India. **20**

P.T.O.

Module –II

10. a) Write short notes on :

    a) Fault tree analysis

    b) Matrix method of Impact assessment

    c) Overlay method of impact assessment. **20**

    OR

    b) Explain in detail the typical socio-economic impacts with respect to a development project. Also add a short note on checklist method of impact assessment. **20**

Module – III

11. a) Explain briefly how EMP is prepared for a hydro electric power project. **20**

    OR

    b) Write a short note on water quality analysis and also list out the various standards for water and noise quality. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.806.11 Elective – IV : ENVIRONMENTAL IMPACT ASSESSMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

PART – A

1. Discuss the objectives of EIA.
2. Define the term EIA.
3. Explain the role of environmental engineer in EIA.
4. List out the key features of 1969 NEPA Act.
5. Explain the term QOL index.
6. List out the advantages of public participation in EIA.
7. Discuss the potential impacts of development on vegetation and wildlife.
8. List out the various standards for water quality. **(8×5=40 Marks)**

PART – B

9. a) Explain the process of public consultation in the EIA process (followed in India). Also add a short note on ToR and EIA. **20**

OR

b) Explain the (global and Indian scenario) evolution of EIA. **20**

P.T.O.

10. a) List out the latest softwares in water and air quality modeling. Also differentiate between fault tree analysis and event tree analysis. **20**

OR

b) Write short notes on :

a) Socio-economic impacts.

b) Matrix method of impact assessment.

c) Overlay method of impact assessment. **20**

11. a) Explain how EMP is prepared for a hydro electric power project. **20**

OR

b) Write a short note on water quality analysis. Also list out the various standards for air and noise quality. **20**

(Pages : 2) **5935**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time: 4 Hours Max. Marks: 100

Instructions : *Answer **all** questions from Part – **A** and **two** questions from Part – **B**.*

*Assume suitable data **wherever** necessary.*

***Use** of steel tables, IS 800, IS 875 (1, 2, and 3) IS 801, IS 804, IS 806, IS 1161, IS 6533 (2) are **permitted**.*

PART – A **(2×10=20 Marks)**

1. Discuss IS code method for calculating wind pressure with example. **10**

2. What are the different loads to be taken for the design of railway bridges ? Explain briefly. **10**

PART – B **(2×40=80 Marks)**

3. a) Design an overhead rectangular steel water tank for a capacity of 1,20,000 litres supported at 12 m above ground level. Staying design is not required. **20**

   b) Draw to a suitable scale the elevation (assume suitable sections for staging) and plan of the above tank. **20**

OR

4. a) Design a suitable roof truss for a span of 18 m with spacing 4 m c/c. Wind pressure can be taken as 1 kN/m^2. **20**

   b) Prepare a drawing of the truss designed above with connection details. **20**

P.T.O.

5. a) Design a self supporting steel stack for a height of 38 m and top diameter 3 m ; Intensity of wind pressure is changing uniformly from 1.2 kN/m^2 at base to 2 kN/m^2 at top, and the thinkness of brick lining is 100 mm . **20**

   b) Draw to a suitable scale the elevation, plan and details of flue opening. **20**

OR

6. a) Design a plate girder for a broad gauge track of 10 m span. **20**

   b) Draw to a suitable scale the elevation and plan of the above designed bridge. **20**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part – **A** and **two** questions from Part – **B**. Assume **any** missing data suitably. **Use** of steel tables, IS 800-1984, IS 800-2007, IS 875 (Part 1, 2 and 3) IS 6533, IS 1161, IS 804, IS 806 are **permitted**.*

PART – A **(2×10=20 Marks)**

I. Briefly explain the design procedure steps for the T cover joint in a rectangular water tank. Draw a rough sketch for the joint.

II. Draw the cross section of a deck type plate girder bridge and mark all the parts.

PART – B **(2×40=80 Marks)**

III. a) Design a circular water tank with hemispherical bottom to carry a capacity of 100 m^3 of water. Staging design NOT required. **20**

b) Draw to a suitable scale the elevation and plan of the tank. **20**

OR

IV. a) Design a tubular roof truss for a span of 12 m. spacing is 3m. Wind pressure 1 kN/m^2 GI sheet roofing. **20**

b) Draw to a suitable scale elevation and support joint details of the above truss. **20**

V. a) Design a self supporting steel chimney for a height of 75 m with top diameter 4m. Location of site is Trivandrum. **20**

b) Draw to a suitable scale elevation, plan and foundation details of above chimney. **20**

OR

VI. a) Design a plate girder for a BG track for a span of 25 m. **20**

b) Draw to a suitable scale the elevation and plan of above bridge. **20**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.807.3 Elective – V : INDUSTRIAL WASTE WATER MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Distinguish between ThOD and TOD.
2. List out the desirable waste water characteristics.
3. Explain proportioning of wastes.
4. A sewage effluent of 800 l/s with a BOD of 70 mg/l, DO content = 3 mg/l, temperature = 25° C enters a river where the flow is 30 m^3/s and BOD = 3 mg/l, DO content = 8.8 mg/l and temperature = 18° C. Determine the following for the mixture of sewage and river water.
   i) Combined discharge ii) BOD iii) DO
5. Explain zone settling.
6. Explain the zones of pollution in a stream.
7. What are adsorption isotherms ?
8. Explain the process of electrodialysis. **(5×8=40 Marks)**

PART – B

Module – I

9. Describe with examples the significance as well as methods adopted for 'waste volume reduction' in industries. **20**

OR

10. Explain the different methods for neutralization of wastes. **20**

Module – II

11. a) Explain the self purification in streams. **12**

    b) Differentiate between deoxygenation and reoxygenation. **8**

OR

12. A town discharges 120 m^3/s of sewage into a river having a rate of flow of 1600 cumecs during lean period with a velocity of 0.1 m/s. The 5 day BOD of sewage at the given temperature is 250 mg/l. Find the amount of critical DO deficit and when and where it will occur in the downstream portion of the river. Assume deoxygenation coefficient as 0.1/day and co-efficient of self purification as 3.5. Saturation D.O. at given temperature is 9.2 mg/l. **20**

Module – III

13. Explain the different treatment methods that can be adopted for tannery wastes. **20**

OR

14. a) Explain the break through curve of adsorption. **10**

    b) Explain the membrane processes adopted for removal of inorganic dissolved solids. **10**

(Pages : 2) **5935**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time: 4 Hours Max. Marks: 100

Instructions : *Answer **all** questions from Part – **A** and **two** questions from Part – **B**.*
*Assume suitable data **wherever** necessary.*
***Use** of steel tables, IS 800, IS 875 (1, 2, and 3) IS 801, IS 804, IS 806, IS 1161, IS 6533 (2) are **permitted**.*

PART – A **(2×10=20 Marks)**

1. Discuss IS code method for calculating wind pressure with example. **10**

2. What are the different loads to be taken for the design of railway bridges ? Explain briefly. **10**

PART – B **(2×40=80 Marks)**

3. a) Design an overhead rectangular steel water tank for a capacity of 1,20,000 litres supported at 12 m above ground level. Staying design is not required. **20**

   b) Draw to a suitable scale the elevation (assume suitable sections for staging) and plan of the above tank. **20**

OR

4. a) Design a suitable roof truss for a span of 18 m with spacing 4 m c/c. Wind pressure can be taken as 1 kN/m^2. **20**

   b) Prepare a drawing of the truss designed above with connection details. **20**

P.T.O.

5. a) Design a self supporting steel stack for a height of 38 m and top diameter 3 m ; Intensity of wind pressure is changing uniformly from 1.2 kN/m^2 at base to 2 kN/m^2 at top, and the thinkness of brick lining is 100 mm . **20**

   b) Draw to a suitable scale the elevation, plan and details of flue opening. **20**

OR

6. a) Design a plate girder for a broad gauge track of 10 m span. **20**

   b) Draw to a suitable scale the elevation and plan of the above designed bridge. **20**

(Pages : 2) **5936**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions :

1. Write the physical characteristics of sewage.
2. What are the different sources of waste water ?
3. Explain the working of an inverted Syphon.
4. What are the different types of screens ?
5. Differentiate high rate and low rate filters.
6. What are the factors affecting sludge digestion ?
7. Explain the different types of sewers.
8. Write short note on 'Oxidation pond'. **(8×5=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

MODULE – I

9. a) List the different Sewer appurtenances. **5**
   b) Explain any three in detail with sketches. **15**

OR

10. a) Explain self purification of natural waters. **5**
    b) Derive an expression for oxygen deficit in a stream at any time 't'. Write the formula for the oxygen balance in the river and explain how the critical deficit is determined. **15**

P.T.O.

MODULE – II

11. a) What is recirculation ? Why is it necessary ? **5**

    b) Sketch and describe the working of a standard trickling filter. **15**

OR

12. Design a septic tank for 300 users as per Bureau of Indian standard specification. Assume suitable design criterion (with sketches). **20**

MODULE – III

13. a) Explain in detail the different methods of disposal of sludge. **10**

    b) What are the different systems of plumbing. **10**

OR

14. Design a sludge digestion tank for 40,000 people. The sludge content per capita is 0.068 kg. The moisture of the sludge is 94% and the specific gravity is 1.02 and 3.5% of digestor volume is daily filled with fresh sludge which is mixed with the digested sludge. Give neat sketches. **20**

(Pages : 2) **5936**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.803 : ENVIRONMENTAL ENGINEERING – II (C)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions :

1. Write the physical characteristics of sewage.
2. What are the different sources of waste water ?
3. Explain the working of an inverted Syphon.
4. What are the different types of screens ?
5. Differentiate high rate and low rate filters.
6. What are the factors affecting sludge digestion ?
7. Explain the different types of sewers.
8. Write short note on 'Oxidation pond'. **(8×5=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

MODULE – I

9. a) List the different Sewer appurtenances. **5**
   b) Explain any three in detail with sketches. **15**

OR

10. a) Explain self purification of natural waters. **5**
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P.T.O.

MODULE – II

11. a) What is recirculation ? Why is it necessary ? **5**

    b) Sketch and describe the working of a standard trickling filter. **15**

OR

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MODULE – III

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    b) What are the different systems of plumbing. **10**

OR

14. Design a sludge digestion tank for 40,000 people. The sludge content per capita is 0.068 kg. The moisture of the sludge is 94% and the specific gravity is 1.02 and 3.5% of digestor volume is daily filled with fresh sludge which is mixed with the digested sludge. Give neat sketches. **20**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.801 : DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *1)* ***Assume*** *suitable data* ***wherever*** *necessary.*
2) IS 456-2000, IRC 6821, IS 3370 Part I to IV are permitted in the examination hall.

PART – A

Answer **all** questions :

I. Design for hoop tension, the vertical wall of a circular water tank of diameter 8m and height 4m. **10**

II. Explain the design steps for the design of a flat slab by the equivalent frame method. **10**

PART – B

Module – I

III. a) Design a cantelever retaining wall to retain a dry backfill with Q = 35° and r = 18 kN/m^2, for a height of 4.0 m. Assume the following data :
   i) Concrete grade M 20
   ii) Steel – High yield strength deformed bars Fe 415
   iii) Allowable bearing capacity of soil – 300 kN/m^2
   iv) Coefficient of friction between soil and concrete = 0.6. **20**

   b) Draw the following views of the above designed retaining wall :
   i) Vertical section through stem showing reinforcement on soil face of stem slab.
   ii) Cross section of the retaining wall. **20**

OR

P.T.O.

IV. a) A rectangular water tank 4.5 m long, 2.25m wide and 2.25m high has walls rigidly joined at the vertical edges and hinged at their horizontal edges. Design the vertical walls of the tank. Use M 20 concrete and HYSD bars of yield strength 415 MPa. **20**

b) Draw to suitable scale. The following details :

i) Horizontal section at mid height of walls

ii) Vertical section through middle of long and short walls. **20**

Module – II

V. a) A T-beam and slab road bridge consists of T-beams spaced at 2.4 m c/c and cross beams spaced at 3.4m e/c. The width of the beams is 40cm, thickness of wearing coat is 80mm. Design the deck slab for class A. A tracked vehicle loading. Use M 25 concrete and HYSD steel of grade 415. **20**

b) Draw the plan, longitudinal and cross sections of the deck showing the slab reinforcement in top and bottom layers. **20**

OR

VI. a) Design the interior panel of a flat slab of panel size 4m x 6m with drops and capitals for a live load of 4 kN/m^2. The slab is supported on circular column of 450 mm diameter. Use M 20 concrete and Fe 415 grade steel. **20**

b) Prepare the following drawings :

i) Plan showing top and bottom reinforcement of slab.

ii) Cross section through column strip. **20**

(Pages : 2) **7709**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. a) Differentiate surface sources and subsurface sources of water with respect to quality and quantity.
   b) Define percapita demand. How is it estimated ?
   c) What points should be considered in deciding the location of the pumping stations ?
   d) How will you determine the optimum coagulant quantity by Jar test ?
   e) Describe with a neat sketch the working of a pressure filter.
   f) Explain breakpoint chlorination and super chlorination.
   g) What do you understand by an "equivalent pipe" ? How do you determine its length when the pipes are :
      i) In series
      ii) In parallel.
   h) Compare lime soda process and zeolite process. **(8×5=40 Marks)**

PART – B

Module – I

2. a) What is meant by design period and population forecasts ? What are the factors affecting design period ? 6
   b) Explain the population forecasting methods. 14

OR

P.T.O.

3. a) In a pumping station, 1800 cumecs water is to be raised per day from an intake well to a sedimentation tank under the static head of 21 m. Lengths of suction pipe and rising main are 40 m and 150 m respectively. Diameter of pipes is 50 cm. There are 2 shifts of working of pumps, each of 8 hours. Take f' = 0.01 and combined efficiency of motor and pump as 80%. Recommend the number of units of pumps each having BHP of 30. **10**

   b) What is an intake structure ? Enumerate the various types of intakes and explain in detail any one of them. **10**

Module – II

4. a) With a neat sketch explain the various constituents of a coagulation sedimentation tank. **10**

   b) Define settling velocity. Derive Stoke's law for settling velocity. What are the assumptions in deriving Stoke's law ? **10**

OR

5. Design a rapid sand filter to treat 5 million litres of water per day. Assume suitable data. **20**

Module – III

6. a) Explain Hardycross method of analysis of pipe network. **10**

   b) A pipe network in the form of a triangle ABC has inflow of 5 m^3/sec and 4 m^3/sec. at A and B respectively. The outflow at C is 9 m^3/sec. Given $K_{AB} = 10$, $K_{BC} = 50$, $K_{AC} = 20$. Compute discharges in each pipeline by Hardycross method. $HL = K.Q^2$. **10**

OR

7. a) Explain the use of chlorine as a disinfecting agent with reference to :
      i) Its disinfecting action
      ii) Its doses
      iii) Its forms. **12**

   b) Explain how fluoridation and defluoridation is carried out in water treatment. **8**

(Pages : 2) **7709**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. a) Differentiate surface sources and subsurface sources of water with respect to quality and quantity.
   b) Define percapita demand. How is it estimated ?
   c) What points should be considered in deciding the location of the pumping stations ?
   d) How will you determine the optimum coagulant quantity by Jar test ?
   e) Describe with a neat sketch the working of a pressure filter.
   f) Explain breakpoint chlorination and super chlorination.
   g) What do you understand by an "equivalent pipe" ? How do you determine its length when the pipes are :
      i) In series
      ii) In parallel.
   h) Compare lime soda process and zeolite process. **(8×5=40 Marks)**

PART – B

Module – I

2. a) What is meant by design period and population forecasts ? What are the factors affecting design period ? 6
   b) Explain the population forecasting methods. 14

OR

3. a) In a pumping station,1800 cumecs water is to be raised per day from an intake well to a sedimentation tank under the static head of 21 m. Lengths of suction pipe and rising main are 40 m and 150 m respectively. Diameter of pipes is 50 cm. There are 2 shifts of working of pumps, each of 8 hours. Take f' = 0.01 and combined efficiency of motor and pump as 80%. Recommend the number of units of pumps each having BHP of 30. **10**

   b) What is an intake structure ? Enumerate the various types of intakes and explain in detail any one of them. **10**

Module – II

4. a) With a neat sketch explain the various constituents of a coagulation sedimentation tank. **10**

   b) Define settling velocity. Derive Stoke's law for settling velocity. What are the assumptions in deriving Stoke's law ? **10**

OR

5. Design a rapid sand filter to treat 5 million litres of water per day. Assume suitable data. **20**

Module – III

6. a) Explain Hardycross method of analysis of pipe network. **10**

   b) A pipe network in the form of a triangle ABC has inflow of 5 m^3/sec and 4 m^3/sec. at A and B respectively. The outflow at C is 9 m^3/sec. Given $K_{AB} = 10$, $K_{BC} = 50$, $K_{AC} = 20$. Compute discharges in each pipeline by Hardycross method. $HL = K.Q^2$. **10**

OR

7. a) Explain the use of chlorine as a disinfecting agent with reference to :
      i) Its disinfecting action
      ii) Its doses
      iii) Its forms. **12**

   b) Explain how fluoridation and defluoridation is carried out in water treatment. **8**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, Nov. 2015

(2008 Scheme)

08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

PART – A

I. 1) Define the term "pressure bulb". What is its practical significance ?

2) What is meant by coefficient of earth pressure at-rest ? What is its value when Poisson's ratio is 0.2 ?

3) Explain the differences between Coulomb's and Rankines theories of earth pressure.

4) Differentiate between ultimate bearing capacity, safe bearing capacity and allowable bearing capacity.

5) What are the objectives of site investigation ?

6) Determine the immediate settlement of a square rigid footing (2m x 2m) founded on silt at 1.5 m. The footing carries a load of 300 kN. Take Poisson's ratio as 0.3, soil modulus as 10000 kPa and influence factor as 0.80.

7) How is the safe load on a pile estimated as per IS, from pile load test results ?

8) Explain the term "floating foundations". **(8×5=40 Marks)**

PART – B

MODULE – I

II. a) A strip footing of width = 1.5 m carries a uniform pressure of 125 kPa. Determine the depth at which vertical stress would reduce to 25 kPa. **5**

b) A rectangular footing subjected to a uniform pressure of 350 kPa has co-ordinates (0, 0), (5, 0), (5, 4) and (0, 4). Using Boussinesq's theory and equivalent point load concept, determine the vertical stress at 3 m depth beneath the point P(4, 3). **15**

OR

III. A retaining wall 8 m high retains a backfill with $\phi = 30°$, C = 10 kPa, G = 2.7 and e = 0.8. Top of the backfill is horizontal and is level with the top of the wall. The backfill also carries a uniform surcharge of intensity 12 kPa. Water table is at a depth of 6 m beneath the backfill top surface. Above water table, the soil is dry. Determine the total active earth pressure and its location if tension cracks are likely to develop in the field. **20**

MODULE – II

IV. a) A 2.5 m × 2.5 m square footing carries a load intensity of 650 kPa at a depth of 1.0 m in sand. The saturated unit weight of sand is 18 kN/m^3 and the unit weight above water table is 17 kN/m^3. The shear parameters of the soil are c = 0, $\phi = 38°$ (Nc = 95, Nq = 80.4, Nr = 100.2). Compute the factor of safety with respect to shear failure if the water table is 1 m below the ground level. Use Terzaghi's theory. **15**

b) State the assumptions in Terzaghi's theory. **5**

OR

V. a) Differentiate between general and local shear failure with the help of neat sketches. **8**

b) Write a note on any two soil improvement methods. Mention the practical situation where these methods would be useful. **6**

c) How will you select the depth of borings in a soil exploration programme ? **6**

MODULE – III

VI. What are the situations where 1) rectangular combined footings and 2) trapezoidal combined footings are used ? Design the plan dimensions of a footing to support two adjacent columns at a centre to centre distance of 6 m carrying loads of 3000 kN and 4500 kN. The smaller column is 500 mm × 500 mm and is at a distance of 300 mm clear from the property line. The bigger column is of size 600 mm × 600 mm. The permissible soil pressure is 350 kPa. **20**

OR

VII. A 3 × 2 pile group installed in a clay soil (Cu = 30 kPa, γ = 17 kN/m^3, α = 0.5) experiences a downward drag. The length and diameter of each pile are 10 m and 0.3 m respectively. Determine the negative skin friction of the pile group. The centre to centre distance between piles in the group = 0.80 m. **20**

(Pages : 2) **7707**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions *: i) Assume suitable data* ***wherever*** *necessary.*
ii) ***Use*** *of Khosla's chart and Blench curve is* ***permitted****.*

PART – A

Answer **all** questions.

1. What is the limiting height of a low dam ? Differentiate between the low and high gravity dam.
2. What are the limitations of thin cylinder theory of arch dams ?
3. What are the functions of a divide wall in diversion headworks ?
4. Briefly explain the different types of cross-drainage works. **(4x5 = 20 Marks)**

PART – B

5. Following data were obtained from the stability analysis of a concrete gravity dam :
   i) Total overturning moment about toe = 1×10^6 kNm
   ii) Total resisting moment about toe = 2×10^6 kNm
   iii) Total vertical force above base = 50,000 kN
   iv) Base width of the dam = 50 m
   v) Slope of the downstream face = 0.8 H : 1V

   Calculate the maximum and minimum vertical stress to which the foundation will be subjected to. What is the maximum principal stress at toe ? Assume there is no tail water. **10**

OR

6. Discuss the various causes of failure of earth dam. **10**

7. Briefly explain the various types of canal falls. **10**

OR

8. Discuss briefly the causes of failure of weirs on permeable foundation and their remedies. **10**

PART – C

9. a) Design a suitable cross drainage work for the following hydraulic particulars :
   Canal :
   Discharge = 30 cumec
   Bed width = 20 m
   Depth of water = 1.5 m
   Full supply level = 251.5 m
   Drain :
   High flood discharge = 250 cumec
   High flood level = 247.5 m
   High flood depth = 2.5 m
   General ground level = 250 m
   Draw to a suitable scale **30**

   b) Half plan at the top and half at the foundation levels. **15**

   c) Section through the centre line of the canal. **15**

OR

10. a) Design a sarda type fall for the following data :
   i) Full supply discharge through the canal = 10 cumec
   ii) Drop = 1.0 m
   iii) Bed level upstream = 100 m
   iv) Full supply depth upstream and downstream = 1.5 m
   v) Bed width upstream and downstream = 8 m
   vi) Bligh's coefficient = 7. **30**

   Draw to a suitable scale

   b) Half plan at top and half at foundation level. **15**

   c) Section through the centre-line of the canal. **15**

(Pages : 2) **7714**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.705.6 (Elective – III) AIR QUALITY MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Discuss the components of environment.
2. What are the sources of air pollution ?
3. Explain indoor air pollution.
4. What are the limitations of Gaussian plume model ?
5. Discuss the effect of wind velocity and turbulence in the atmosphere.
6. Discuss Pasquill's stability curve.
7. Enlist the various particulate control equipment.
8. Write a short note on air pollution disasters. **(8×5=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

MODULE – I

9. Discuss in detail the general effects of air pollutants on health, vegetation, animals and materials. **20**

OR

10. a) Discuss the scale of air pollutant measurement. **10**

    b) What is photochemical smog ? How it is formed ? Explain its harmful effects. **10**

P.T.O.

MODULE – II

11. What do you understand by atmospheric dispersion ? Write down the equation for determining ground level concentration of pollutant. When does the maximum ground level concentration occurs ? **20**

OR

12. Explain with the help of a diagram the various types of plume behaviour. **20**

MODULE – III

13. a) Explain with a neat sketch the working of an electrostatic precipitator. **12**

    b) Determine the plate area required to collect a 0.6 μm particle with 92% efficiency for a gas flow of 10 m^3/sec through an electrostatic precipitator. The particle velocity was found to be 0.15 m/sec. **8**

OR

14. Explain in detail the control techniques for SOx, NOx, COx and HCS. **20**

(Pages : 4) **2791**

Reg. No. : .....

Name : .....

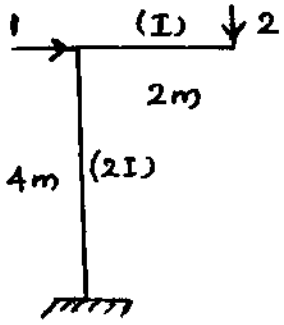
Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.701 : ADVANCED STRUCTURAL ANALYSIS (C)

Time : 3 Hours Max. Marks : 100

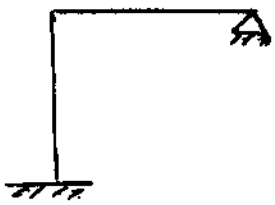
***Instruction** : Answer **all** questions from Part **A** and **one** question from **each** Module in Part **B**.*

PART – A

1. Explain external indeterminacy and internal indeterminacy using one example.
2. Develop the flexibility matrix corresponding to the co-ordinates shown on the frame given below.



3. Show that flexibility matrix is symmetric.
4. Develop the stiffness matrix of the frame given below : E, I and L in same for both elements.



P.T.O.

5. Explain direct stiffness method.

6. Write the stiffness matrix of a beam element in global co-ordinates.

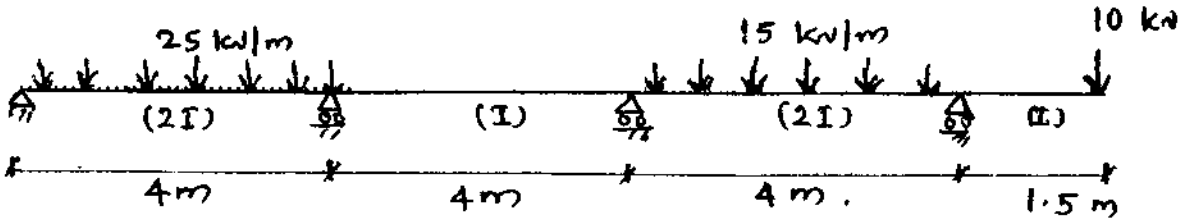
7. What are the requirements of a displacement model ?

8. Derive the shape functions of a two noded bar element. **(8×5=40 Marks)**

PART – B

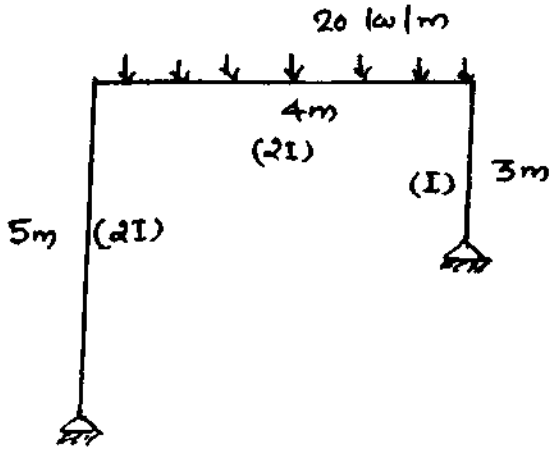
Module – I

9. Analyse the continuous beam using flexibility method and draw the BMD. **20**



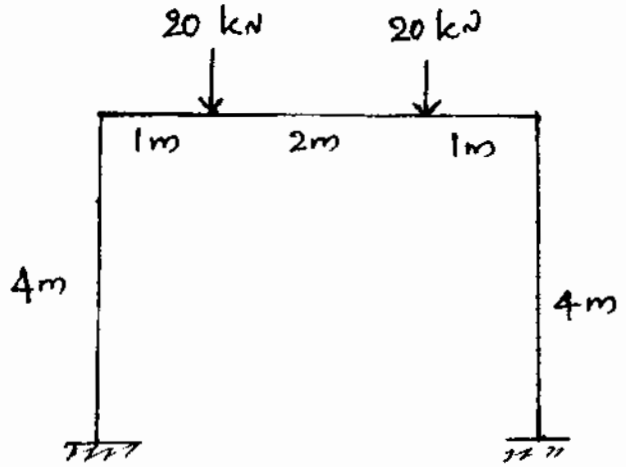
OR

10. Analyse the frame using flexibility method and draw the BMD. **20**



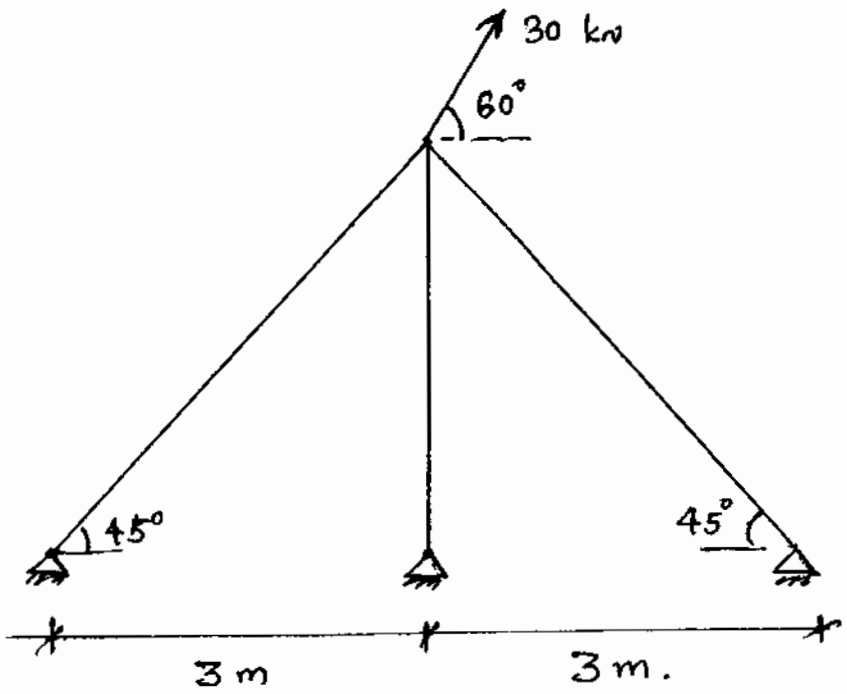
Module – II

11. Analyse the frame using stiffness method EI constant. **20**



OR

12. Find the bar forces of the frame given below. AE is constant. Use stiffness method. **20**



Module – III

13. Find the shape functions of a 3 noded bar element and hence find the displacement at a point 65 cm from the origin if the end nodes 1 and 2 are located at a distance of 30 cm and 80 cm from the origin respectively. The displacements at node 1, 2 and 3 are 0.02, –0.02 and 0 respectively. **20**

OR

14. Derive the shape functions of a beam element with two degrees of freedom per node. Using this find the displacement at a point P which is located at 1 m from the left side of a beam having length 5 m. The left end of the beam has a slope of 0.2° and deflection of 0.03 m. The corresponding values on the right end are –0.1° and 0.05 m respectively. **20**

(Pages : 2) **2797**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.705.3 (Elective – III) : DEEP FOUNDATIONS (C)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions in Part **A** and **one** from **each** Module in Part **B**.*

PART – A

1. What are the conditions where a pile foundation is more suitable than a spread foundation ?
2. Discuss different methods for the installation of piles.
3. What is negative skin function ? What is its effect on pile ?
4. Explain the uses of penetration tests for the estimation of load carrying capacity of piles.
5. Describe equivalent-raft approach for the estimation of settlement of piles in clay.
6. Write a note on lateral stability of well foundation.
7. What is the basic difference between a drilled pier and a pile ?
8. Explain the Terzaghi concept commonly used for the lateral stability of a well foundation. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

9. a) Describe pile load test with neat sketches. **12**

   b) A 30 kN drop hammer was used to drive a R.C. pile. It has a free fall of 20 m. The average penetration recorded in the last few blows is 6 mm per blow. Estimate the allowable load on the pile according to the Engineering News formula. **8**

OR

10. a) Discuss the method for the design of tension piles. **10**

    b) Comment on the reliability of dynamic formulae. **10**

Module – II

11. How do you estimate the settlement of pile groups in

    a) Sand and b) Clay **20**

OR

12. Write in detail various methods commonly used for finding the group capacity of piles. **20**

Module – III

13. Explain the procedure for the construction and sinking of wells. **20**

OR

14. a) Derive an expression for the thickness of sterning for sinking under self weight. **10**

    b) What are the problems encountered in well sinking ? **10**

(Pages : 2) **2800**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.705.6 Elective – III : AIR QUALITY MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

Instruction *: Answer* ***all*** *questions.*

PART – A

1. Give a classification of air pollutants.
2. Explain the phenomena of photochemical smog.
3. Discuss the advantages and disadvantages of scrubbers.
4. List out different industrial processes that can cause air pollution.
5. Derive an expression for the change of pressure with altitude in an isothermal atmosphere.
6. Mention the different disadvantages of Gaussian plume model.
7. What are the requirements of an air samples ?
8. Write a short note on air pollution disasters. **(8×5=40 Marks)**

PART – B

Answer **one full** question from **each** Module.

Module – I

9. Discuss the effect of air pollutants on human beings, vegetation, animals and building materials. **20**

OR

10. a) Explain the phenomena of photochemical smog. **10**

    b) Discuss the behaviour and fate of air pollutants. **10**

P.T.O.

Module – II

11. Discuss the different stability conditions of atmosphere with neat sketches. **20**

OR

12. a) Explain the Gaussian plume model for air pollutants. (Assumptions not necessary). **10**

    b) Estimate the total hydrocarbon concentration at a point 200 m downwind from a highway on a overcast night. The wind speed is perpendicular to the highway and has a speed of 5 m/s. The hydrocarbon emission rate is 0.001 g/ms. **10**

Module – III

13. Explain the different methods for sampling particulate air pollutants with neat sketches. **20**

OR

14. Explain the different methods for controlling gaseous pollutants. **20**

(Pages : 2) **2793**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions in Part **A** and **any one full** question from **each** Module in Part **B**.*

PART – A

I. a) Explain the construction of Newmark's chart with an influence value of 0.002.

b) Draw an isobar of vertical stress 'σz' = 0.25 Q, where 'Q' is the point load.

c) Compare Rankine's and Coulomb's theory of earth pressure.

d) What are the causes of foundation settlement ? Enumerate the methods of reducing differential settlement.

e) Explain briefly with sketch the wash boring technique in drilling bore boles.

f) What is the function of a foundation ? Give an explanatory note on the general types of foundations, with suitable sketches.

g) Explain the methods for determining load carrying capacity of piles in :
   a) Clayey soils and
   b) Sandy soils.

h) Explain the mass spring model for undamped free vibration. **(8x5=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

Module – I

II. a) Calculate vertical stress in a soil at a point at a depth of 2^m below the centre of a uniformly distributed circular load of radius 1.5^m with a pressure of 50 kPa and also obtain the exact depth at which the stress reduces to 10% of a applied stress ? **10**

b) The plan of a three legged tower forms an equilaterd triangle of side 5m. If the total weight of the tower is 550 kN and is equally carried by all the legs, compute the vertical stress at 4^m depth directly below one of the legs. Use Boussinesq's theory. **10**

P.T.O.

III. The height of retaining wall with smooth vertical back is 4.5^m. The backfill has a horizontal surface in level with top of the wall and carries a uniformly distributed surcharge of 200 kN/m^2, density, ϕ and cohesion are 19 kN/m^3, 30° and zero respectively. Determine the magnitude and point of application of total active pressure permetre length of wall. If water table rises behind the wall to elevation of 2.5^m from bottom, what would be the total active pressure ?

γ sat of backfill = 20.5 kN/m^3 **20**

MODULE – II

IV. a) Calculate the ultimate bearing capacity per unit areas of

1) a strip footing 1m wide
2) a square footing 3m × 3m and
3) a circular footing of 3m diameter.

Given unit weight of the soil is 17.8 kN/m^3, Depth of foundation = 3m, Cohesion = 19.62 kN/m^2 and $\phi = 20°$, Nc = 17.5, Nq = 7.5 and $N\gamma = 5$. **15**

b) What are the assumption made in Terzaghi's analysis. **5**

V. a) Explain the procedure of standard penetration test with neat sketch. **10**

b) Explain the soil improvement methods by installation of vertical drains and preloading techniques. **10**

MODULE – III

VI. a) Design a rectangular combined footing to support two adjacent columns (size 40 cm × 40 cm) at a distance of 5m and carrying loads of 3MN and 4 MN. The lighter column is near the property line. The allowable soil pressure is 400 kN/m^2. **10**

b) What is the principle of strap footing ? Describe the procedure for the design of a strap footing. **10**

VII. a) How would you estimate the group capacity of piles in :

a) Sand
b) Clay. **8**

b) A bored pile in a clayey soil failed at an ultimate load of 400 kN. If the pile is 40 cm diameter and 10 m long, determine the capacity of a group of nine piles, spaced 1 m centre to centre both ways. Take $\alpha = 0.5$. **12**

(Pages : 3) **2792**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Khosla's chart and blench curves are ***permitted*** *in the Examination Hall.*

PART – A

(Answer **all** questions)

1. Obtain an expression for base width of elementary profile of a gravity dam for no tension criteria.
2. Explain the criteria for safe design of earth dams.
3. Obtain an expression for the thickness of impervious floor as per Bligh's Creep theory.
4. Give the typical layout of a diversion headwork and mark the components.

(4×5=20 Marks)

PART – B

Module – I

5. How arch dams differs from gravity dams ? Explain different type of arch dams. **10**

OR

6. Explain the methods of estimation of different types of forces acting on gravity dams. **10**

Module – II

7. What are cross drainage works ? Explain their classification. **10**

OR

8. Explain Khoslas theory. How it overcomes the limitations of Bligh's theory. **10**

P.T.O.

PART – C

9. Design a suitable cross drainage work for the following hydraulic particulars.

Canal :

Full supply discharge = 50 cumic

Full supply level = 201.8

Full supply depth = 1.8 m

Side slope = 1.5 H : I V

Bed width = 36.0 m

Drain :

Catchment area = 160 km^2

Rvyes coefficient = 15

Bed level = 198.0

High flood depth = 2.5 m

General ground level = 200.0

A 6 m service road is to be passed over the cross drainage work. Prepare the following drawings to a suitable scale :

a) Half sectional plan at foundation level. **15**

b) Section along the centre line of the canal. **15**

OR

10. Design a cross regulator for a distributary taking off from a branch canal for the following data :

Discharge of branch canal = 105 cumic

Discharge of distributary = 15 cumic

Full supply level of branch canal u/s = 118.1

Full supply level of branch canal d/s = 117.9

Bed width of branch canal u/s = 45 m

Bed width of branch canal d/s = 41 m

Depth of water in branch canal (u/s and d/s) = 2.5 m

Full supply level of distributary	= 117.2	
Bed width of distributary	= 15 m	
Depth of water in distributary	= 1.6 m	
Khosla's exit gradient	= 1/5	**30**

Prepare the following drawings to a suitable scale :

a) Plan of the regulator. **15**

b) Sectional elevation along the centre line of the canal. **15**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

***Instructions**: Answer **all** questions. Assume suitable data **wherever** necessary.*

PART – A

1. Discuss the various factors affecting water demand.
2. Write a note on the common impurities found in water.
3. Find the settling velocity of a spherical silica particle of G = 2.65 in water at 25°C if the diameter of particles is 0.0004 cm.
4. State the factors affecting coagulation.
5. Sketch the cross section of a slow sand filter.
6. What are the requirements of an ideal water distribution system ?
7. What are the different pipe appurtenances ? Explain any one with a neat sketch.
8. Explain the mechanisms used for removal of iron and manganese from water.

(8×5=40 Marks)

PART – B

Answer **one full** question from **each** Module.

Module – I

9. The following is the population data of a city. Determine the population of the city in 2011 by (a) Arithmetical increase method (b) Geometrical increase method (c) Incremental increase method (d) Decreasing rate of growth method.

Year	1931	1941	1951	1961	1971	1981	1991
Population	12000	16500	26800	41500	57500	68000	74100

20

OR

10. a) A pump is to deliver water from an underground tank against a static head of 40 m. The suction pipe is 50 m long and is of 25 cm diameter with Darcy-Weisbach factor f = 0.02. The delivery pipe is of 20 cm diameter, 1600m long and has f = 0.022. The pump characteristics can be expressed as $H_p = 100 - 6000\ Q^2$.
Where H_p = pump head in metres and Q = discharge in m^3/s. Calculate the head and discharge of the pump. **15**

b) Mention the different factors affecting the location of pumping stations. **5**

Module – II

11. Design a clariflocculator to treat 4.5 million litres of water per day. Assume suitable design criteria. **20**

OR

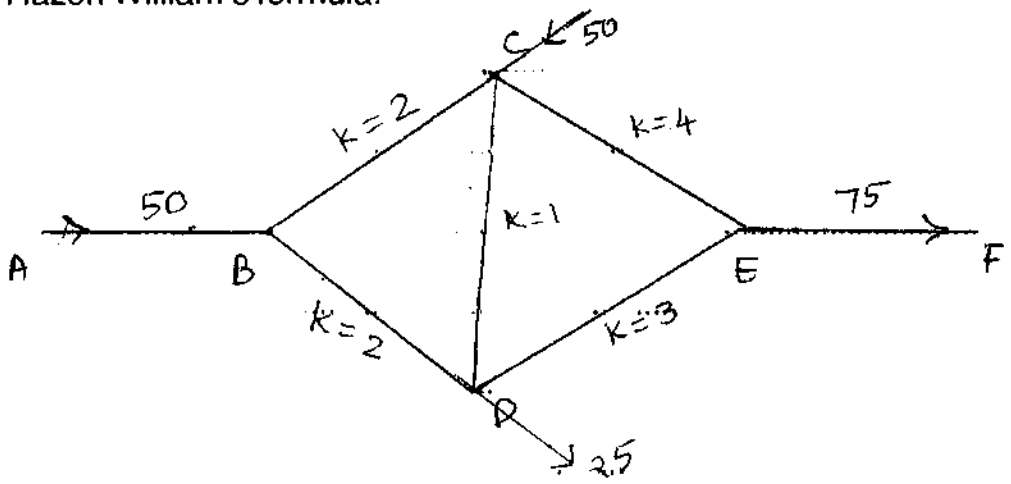
12. Design a rapid sand filter with all its components for treating water at 6 mld. Assume suitable design criteria. **20**

Module – III

13. Describe in detail each of the following :
    i) Methods of disinfection
    ii) Chlorine demand
    iii) Ion exchange process
    iv) Taste and odour removal. **20**

OR

14. Analyse the pipe network shown in figure given below. Take C = 100 in the Hazen William's formula. **20**



(Pages : 2) **5510**

Reg. No. : .....

Name : .....

Seventh Semester B. Tech. Degree Examination, October 2014
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *1) Assume suitable data **wherever** necessary.*
*2) **Use** of Khosla's charts and Blench curves are **permitted**.*

PART – A

(Answer **all** questions)

1. Distinguish between super passage and canal syphon.
2. What are the explicit site conditions appropriate for an arch dam ?
3. Distinguish between "Low gravity dam and High gravity dam".
4. What do you understand by exit gradient ? What is its significance ? **(4×5=20 Marks)**

PART – B

5. What are the different modes of failure of a gravity dam ? Discuss in detail. **(20)**

OR

6. Discuss in brief Khosla's method of independent variables. How would you apply the corrections for (a) thickness of floor (b) mutual interference of piles (c) slope of floor. **(20)**

PART – C

(Answer **any one full** question)

7. A cross drainage work is to be designed for the following data. **(20)**

Canal details	**Drain details**
Discharge = 50.0 m^3/ses	Maximum flood discharge = 400 cumecs
Full supply level = 201.800	Bed level = 198.000

P.T.O.

Bed level = 200.000 High flood level = 200.5000

Bed width = 36.0 m Natural Ground level = 200.000

Side slopes on either side = 1.5H : 1V

Top width of left bank 5 m and right bank 3 m (Assume other data, if required)

Draw to scale the following views :

i) Half plan at top and half plan at foundation. **(20)**

ii) Longitudinal section along drain. **(20)**

OR

8. Design a canal drop of 2 m width the following data : **(20)**

Hydraulic particulars of the canal above drop		**Hydraulic particulars of the canal below drop**	
Full supply discharge	4 cumecs	Full supply discharge	4 cumecs
Bed width	6.00 m	Bed width	6.00 m
Bed level	10.000	Bed level	8.000
Full supply depth	1.50 m	Full supply depth	1.50 m
Full supply level	11.500	Full supply level	9.500
Top of bank 2.00 m wide at level 12.500		Top of bank 2.00 m wide at level 10.500	
Half supply depth	1.00 m	Good soil is available for foundation at 7.50	

Draw to scale the following views :

i) Half plan at top and half plan foundation. **(20)**

ii) Longitudinal sectional elevation of the drop. **(20)**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.705.6 – Elective – III : AIR QUALITY MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions.*

PART – A

1. Distinguish between a particulate and an aerosol.
2. Discuss the effects of air pollutants on vegetation.
3. Give a note on indoor air pollution.
4. Name the different meteorological conditions affecting atmospheric stability.
5. Discuss Pasquill's stability curves.
6. Give a neat sketch of a bag house filter.
7. Explain the phenomena of adsorption.
8. Discuss air quality standards. **(5×8=40 Marks)**

PART – B

Module – I

9. a) Explain the different industrial sources of air pollutants. **12**
   b) Explain the phenomena of photo chemical smog and its effects. **8**

   OR

10. a) Give a detailed classification of the different sources of air pollutants. **10**
    b) Discuss the behaviour and fate of air pollutants. **10**

Module – II

11. a) Explain the plume behaviour with neat sketches. **12**
    b) Explain the wind velocity profile. **8**

    OR

P.T.O.

12. a) Estimate the total hydrocarbon concentration at a point 200 m down wind from a highway on a overcast night. The wind speed is perpendicular to the highway and has a speed of 5 m/s. The hydrocarbon emission rate is 0.001g/ms. **12**

    b) Discuss the advantages and disadvantages of Gaussian plumes. **8**

Module – III

13. Explain the different particulate pollutant sampling techniques with neat sketches. **20**

OR

14. a) A cylindrical electrostatic precipitator of diameter 0.3 m is used for separating pulverized coal fly ash particles from a furnace gas stream. If the volumetric gas flow rate is 0.05 m^3/s, what will be the length of the precipitator for obtaining a collection efficiency of 99.9% ? What percent change in electrode collection area is required to increase the collection efficiency from 99.9 to 99.95% ? **10**

    b) Explain the principles of air pollution control. **10**

(Pages : 3) **5511**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

PART – A

I. 1) Explain briefly how a Newmark's chart with influence coefficient 0.005 can be constructed.

2) Explain the term "active earth pressure". Give any two practical examples.

3) Determine the depth of tension crack and the critical height of an unsupported vertical cut in a backfill with cohesion c = 15 kPa, coefficient of active earth pressure = 0.25 and unit weight = 20 kN/m^3.

4) Differentiate between net safe bearing capacity and allowable bearing capacity.

5) Discuss briefly the guidelines for choosing the spacing of borings in a soil exploration programme.

6) What are the limitations of dynamic formulae ?

7) What are the elements of a well foundation ?

8) Write a note on ENR formula for pile capacity determination. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

II. a) The co-ordinates (in metres) of the corners of a rectangular footing, subjected to a uniform pressure of 300 kPa are (3, 2), (6, 2), (6, 6) and (3, 6). A point Q lying on the plane of the footing has co-ordinates (0, 0). Determine the vertical stress at 5m depth below the point Q using the following data : **15**

Value of m	Influence Coefficient				
	n = 0.4	0.6	0.8	1.0	1.2
0.4	0.0602	0.0801	0.0931	0.1035	0.1063
0.6	0.0801	0.1069	0.1247	0.1361	0.1431
0.8	0.0931	0.1247	0.1461	0.1537	0.1684
1.0	0.1035	0.1361	0.1537	0.1750	0.1761
1.2	0.1063	0.1431	0.1684	0.1761	0.1803

b) A circular footing of 2 m width carries a uniform pressure of 100 kPa. Determine the depth at which the vertical stress due to applied loading reduces to 20 kPa. **5**

OR

III. Compute the total lateral earth pressure exerted by a layered backfill of height 6 m, if the wall has a tendency to move towards backfill. The upper layer of thickness 5 m has : angle of internal friction 32°, unit weight = 18 kN/m^3, while the lower layer has : angle of internal friction = 28°, cohesion = 18 kPa, saturated unit weight = 19 kN/m^3. The backfill also supports a uniform surcharge of intensity 8 kN/m^2. Water table is at a depth of 5 m below the surface of the backfill. **20**

Module – II

IV. A load of 900 kN is to be carried by a circular footing resting at a depth of 2 m below ground level over a sandy clay having c = 6 kPa and γ = 20 kN/m^3. Using Terzaghis' analysis, determine the required size of the footing. Assume Nc = 12, Nq = 6, Nr = 3 and a factor of safety of 3. **20**

OR

V. a) Describe "Auger Boring" method of soil exploration (with a neat sketch) with particular reference to the mode of operation, applicable soil types and limitations. **14**

b) Write a note on soil improvement using preloading. **6**

Module – III

VI. a) A concrete pile 0.4 m diameter and 10 m long is driven into a 8 m thick layer of loose sand ($\phi = 30°$, Nq = 22.5, Nr = 19.7, $\gamma_{sat} = 17$ kN/m^3) overlying a dense layer of sand ($\phi = 35°$, Nq = 41.4, Nr = 42.4, $\gamma_{sat} = 19.5$ kN/m^3). If water table is at the ground surface, estimate the safe load. Take k = 1.4, $\delta = 0.6\phi$ for both layers. **14**

b) Explain the term "Negative skin friction". **6**

OR

VII. a) Discuss the various methods of rectification of tilts and shifts of well foundation. **14**

b) Write a note on mass spring model for undamped free vibrations. **6**

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(Pages : 2) **5512**

Reg. No. : 11414009

Name : GOKUL G

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions.*
*2) Assume suitable data **wherever** necessary.*

PART – A

1. a) List out the various population forecasting techniques.
   b) List out the various factors that influence the per capita water demand.
   c) Write a short note on pressure filters.
   d) What are the various processes (in order) in a water treatment plant ?
   e) Explain the theory and principle behind sedimentation.
   f) State why chlorine is most widely used for disinfection of water.
   g) Why and where are air valves located ?
   h) Explain the various methods of water distribution. **(8×5=40 Marks)**

PART – B

Module – I

2. Explain in detail the various physical, chemical and bacteriological characteristics of water. **20**

OR

3. A centrifugal pump driven by an electric motor lifts water through a total head of 60 m from the reservoir to the discharge end. The pump efficiency is 75% and the motor efficiency is 80%. The lift (water) is through 250 m length of 10 cm diameter pipe and the pumping rate is 1500 litres/minute. If the Darcy Weisbach friction factor is 0.03 and power costs 25 paisa per kilowatt hour, what is the cost of power for pumping 3.8×10^6 litres of water ? **20**

P.T.O.

Module – II

4. Design (with sketch) a clarriflocculator to treat 20 MLD of water for Water Treatment Plant. **20**

OR

5. Design (with sketch) a rapid sand filter unit for treating 6 MLD of water with all it's principal components. **20**

Module – III

6. Describe in detail the various methods of disinfection in water treatment and add a short note on Break Point Chlorination. **20**

OR

7. Explain Hardy cross method of solving the network of pipes by balancing heads by correcting flow. Also derive an expression to find the correction for the assumed flow. **20**

(Pages : 4) **5509**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

08.701 : ADVANCED STRUCTURAL ANALYSIS (C)

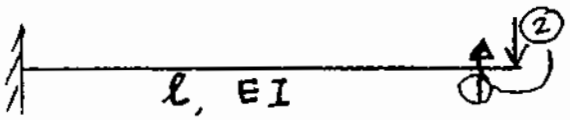
Time : 3 Hours Max. Marks : 100

PART – A

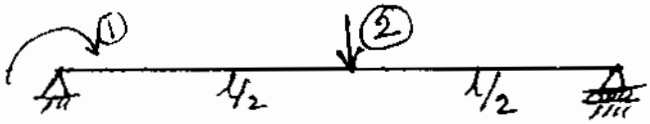
Answer **all** questions.

1. Explain the terms static and kinematic indeterminacy with examples.

2. Develop stiffness matrix for the structure with coordinates shown in Figure.

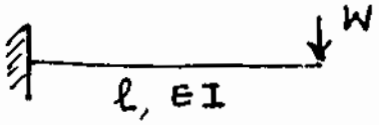


3. Develop the force transformation matrix for the co-ordinates shown in Figure.



4. What is meant by stiffness influence coefficient ? Illustrate with examples.

5. Find the deflection and rotation at the free end of the cantilever shown by flexibility approach.



6. Explain the reciprocal relation between stiffness and flexibility matrices.

P.T.O.

7. What are the different steps in Finite Element Analysis of a continuous structure.

8. Explain the difference between displacement models and shape functions in finite element analysis. **(8×5= 40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

9. Analyse the frame shown in Fig. 1 by flexibility method and draw the BMD. **20**

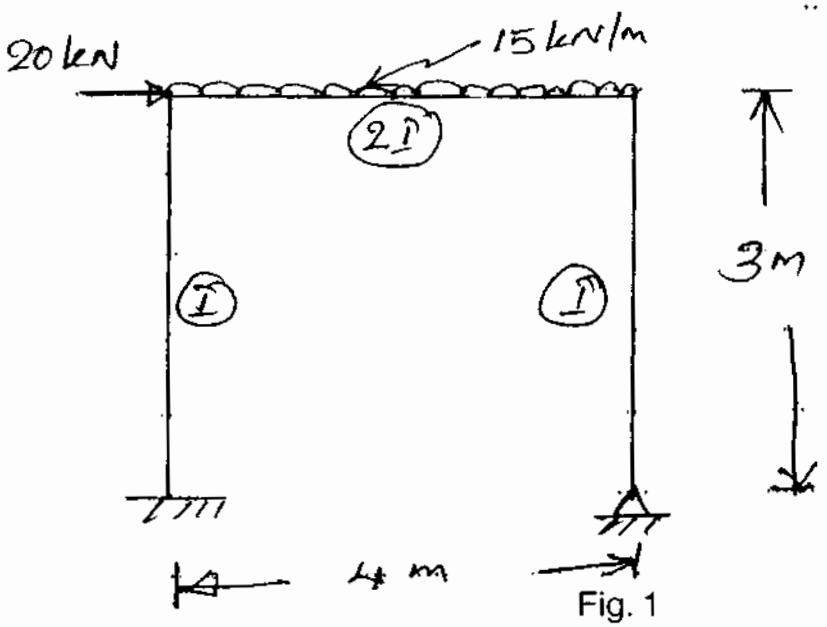


Fig. 1

10. Analyse the pin jointed truss shown in Fig. 2 by flexibility method and find the forces in the members of the truss. **20**

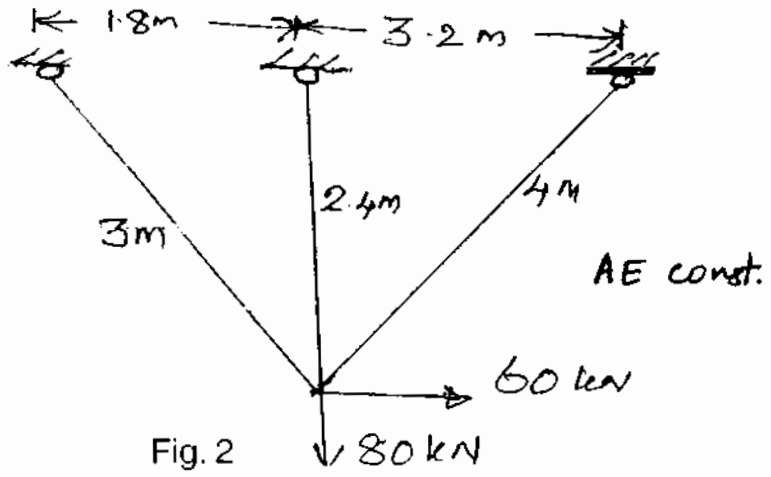


Fig. 2

Module – II

11. Analyse the continuous beam shown in Fig. 3 by stiffness method and draw BMD and SFD. **20**

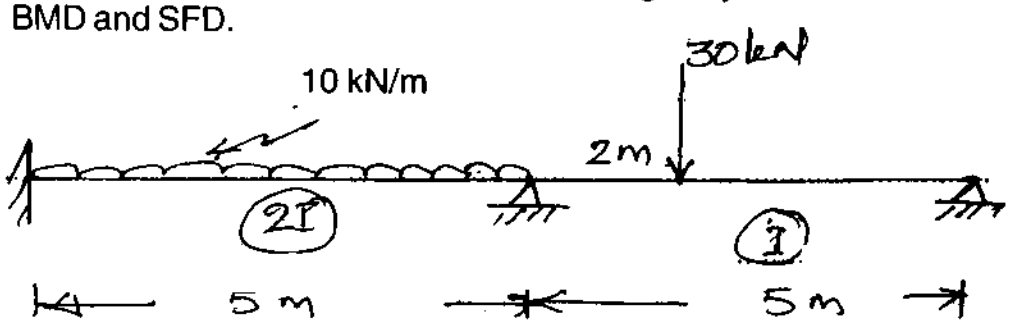


Fig. 3

12. Analyse the pin jointed frame shown in Figure 4 by stiffness method and find forces in the members of the truss. **20**

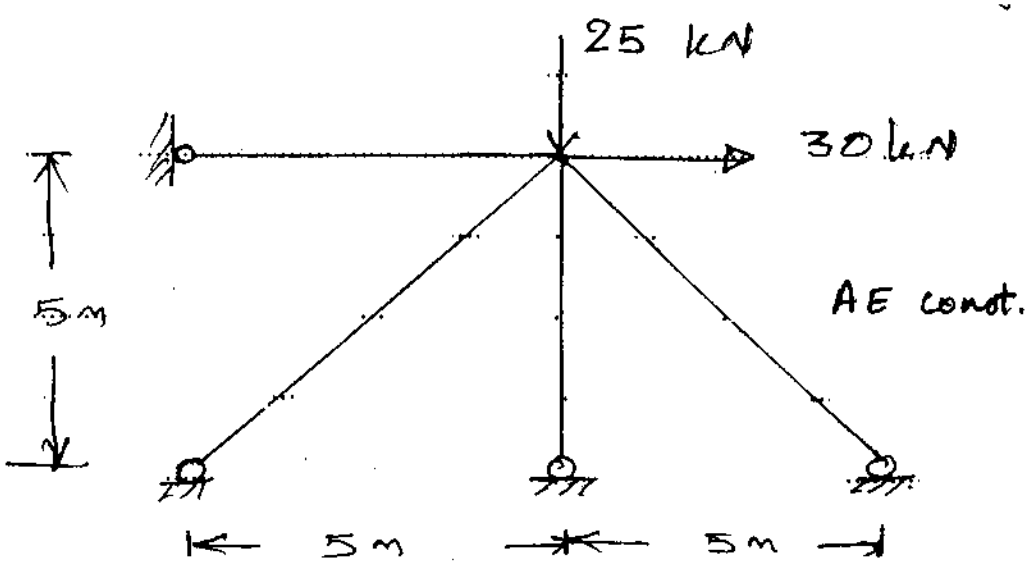


Fig. 4

Module – III

13. Develop the shape function for a constant strain triangle in natural co-ordinates and find the displacement corresponding to the point (0.4, 0.1, 0.5) given the following data. **20**

Co-ordinates	1, 0, 0	0, 1, 0	0, 0, 1
Displacement	100	300	275

14. a) What are the convergence requirements to be satisfied by a displacement model ? Explain significance of each. **15**

    b) What are the elements usually used for finite element analysis of 3-D problems. 5

(Pages : 2) **5512**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours · Max. Marks : 100

Instructions : *1) Answer **all** questions.*
*2) Assume suitable data **wherever** necessary.*

PART – A

1. a) List out the various population forecasting techniques.
   b) List out the various factors that influence the per capita water demand.
   c) Write a short note on pressure filters.
   d) What are the various processes (in order) in a water treatment plant ?
   e) Explain the theory and principle behind sedimentation.
   f) State why chlorine is most widely used for disinfection of water.
   g) Why and where are air valves located ?
   h) Explain the various methods of water distribution. **(8×5=40 Marks)**

PART – B

Module – I

2. Explain in detail the various physical, chemical and bacteriological characteristics of water. **20**

OR

3. A centrifugal pump driven by an electric motor lifts water through a total head of 60 m from the reservoir to the discharge end. The pump efficiency is 75% and the motor efficiency is 80%. The lift (water) is through 250 m length of 10 cm diameter pipe and the pumping rate is 1500 litres/minute. If the Darcy Weisbach friction factor is 0.03 and power costs 25 paisa per kilowatt hour, what is the cost of power for pumping 3.8×10^6 litres of water ? **20**

P.T.O.

Module – II

4. Design (with sketch) a clarriflocculator to treat 20 MLD of water for Water Treatment Plant. **20**

OR

5. Design (with sketch) a rapid sand filter unit for treating 6 MLD of water with all it's principal components. **20**

Module – III

6. Describe in detail the various methods of disinfection in water treatment and add a short note on Break Point Chlorination. **20**

OR

7. Explain Hardy cross method of solving the network of pipes by balancing heads by correcting flow. Also derive an expression to find the correction for the assumed flow. **20**

(Pages : 2) **1829**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. a) Define a discrete particle. Explain its significance in settling tank design,
   b) According to Indian standards for water quality for drinking purpose, what are the suggested value of total solids, iron, manganese and fluorine ?
   c) Enumerate the different types of conduits with examples, used for conveying water.
   d) Explain different methods of mixing coagulant with raw water in a water treatment plant.
   e) Why pumps are required in a water supply scheme ? Name different types of pumps commonly used.
   f) Explain disinfection action of chlorine.
   g) When is aeration included in a water treatment plant ? Explain different types of aerators commonly used.
   h) Compare different systems of supply of water. **(8×5=40 Marks)**

PART – B

Module – I

2. a) Which population forecasting techniques are suitable for a fast growing city, an old city which is growing, and for a city whose growth shows a downward trend ? Justify your answer.
   b) Explain Goodrich's formula for maximum water demand. What is its significance ? **(10+10)**

OR

3. a) What are the important physical parameters that need to be analysed for determining water quality ? Explain.

   b) From a clear water reservoir 2 m deep and maximum water level at 25 m, water is to be pumped to an elevated reservoir at 75.0 m at a constant rate of 9,00,000 litres per hour. The distance is 1,200 m. Give the economical diameter of the rising main and water horse power of the pump. Neglect minor losses and take f = 0.04. **(10+10)**

Module – II

4. a) Compute the dimensions of a rectangular sedimentation tank of continuous flow for a population of 25,000 with average water consumption 150 LPcd. Take detention period as 6 hours.

   b) What is coagulation ? Explain operations involved in sedimentation with coagulation. **(10+10)**

OR

5. Design filter dimensions, under drainage system and minimum depth of sand bed for a rapid sand gravity filter for a flow of 6 million litres per day. Assume suitable data. **20**

Module – III

6. a) Explain Hardy cross method of analysis of pipe network.

   b) Discuss public health significance of fluorine in drinking water. Explain also, how fluoridation and defluoridation is carried out in water treatment. **(10+10)**

OR

7. a) What are the requirements of a good water distribution system ? Also discuss the classification of water distribution system depending on method of distribution comparing their merits and demerits.

   b) Name the different methods of analysis of pipe network of a distribution system. Explain any one method. **(10+10)**

(Pages : 3) **5515**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

Branch : Civil Engineering

08.705.3 Elective – III : DEEP FOUNDATIONS (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part – **A** and **one full** question from **each** Module of Part – **B**.*

PART – A

1. a) What are the situations under which pile foundations are used ?

   b) List the methods by which the load carrying capacity of a single pile can be determined. Explain the principle of static formula.

   c) What are the different types of pile load tests conducted on a single pile ?

   d) Explain the procedure for determining the allowable load from pile load test data.

   e) Define and explain efficiency of pile groups in sand and clay.

   f) Give brief note on settlement of pile groups.

   g) What are the advantages and disadvantages of drilled piers ?

   h) What are the criteria for determining the grip length of well foundations ? Give Specifications. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

2. In a two layered cohesive soil, bored piles of 400 mm are installed. The top layer has a thickness of 5 m and the bottom one is of considerable depth. The undrained shear strength of top layer is 45 kPa and that of bottom is 100 kPa. Determine length of the bored pile required to carry a safe load of 380 kN, allowing a factor of safety of 2. **20**

OR

3. A 12 m long 300 mm × 300 mm precast concrete pile is driven into a sand stratum by a single acting steam hammer. The weight of the cast-iron hammer ram is 14 kN and the stroke is 750 mm. The pile showed a driving resistance of 5 blows/25 mm penetration. Estimate the safe load for a factor of safety 3 using modified Hiley formula. Take C = 0.00508 m, efficiency of hammer 90% and $e = 0.45, \gamma_c = 23.5$ KN/m^3. **20**

Module – II

4. A nine pile group is placed in a square pattern with centre to centre spacing of 0.9 m. The dia and length of pile are 300 mm and 11.5 m, resply. The piles are driven into a sand deposit having $\phi = 32°$ and $\gamma = 18.5$ kN/m^3. The sand deposit extends to a depth of 12.5 m followed by a 5 m depth of clay having $e_0 = 0.85$ and $C_c = 0.32$. Determine the pile group efficiency and the settlement of the group if it carries a safe load of 4500 kN. Allow a factor of safety 2. **20**

OR

5. a) How will you determine the allowable soil pressure for a belled pier in sand ? **10**

   b) A drilled pier of 1 m dia has a total depth of 15m. The diameter of the bell is 2 m and its height is 1 m. If the undrained cohesion of clay is 80 kPa, $\gamma = 20$ kN/m^3 and $\alpha = 0.3$ determine the allowable load. **10**

Module – III

6. a) Derive an expression for the minimum steining thickness of a well foundation for sinking with its own weight. **10**

   b) What are the forces acting on the bottom plug of a well foundation ? Derive an expression for the thickness of the same. **10**

OR

7. A Well foundation has the following particulars. Outer diameter 5 m, inner dia 3 m. Depth below scour level = 12 m, Moment = 5000 kN-m. Horizontal force acting at 8 m above the scour level = 600 kN, factor of safety 2. Assuming that the well tilts about a certain point above the base, compute the total allowable equivalent resisting force due to earth pressure. Take $\gamma_{sat} = 20\ kN/m^3$, $\phi = 32^\circ$. Use Terzagi's Analysis. **20**

(Pages : 3) **1828**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.703 : Geotechnical Engineering – II (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions in Part – **A** and **any one full** question from **each** Module from Part – **B**.*

PART – A

1. Differentiate between :

   i) Safe bearing capacity and safe bearing pressure

   ii) Pressure bulb and isobar.

2. Explain at rest, active and passive earth pressure with practical example of each.

3. Differentiate between total and differential settlement. Explain the function of vertical drains in reducing settlement.

4. What is meant by significant depth of exploration ? Give two empirical guidelines which enable the determination of the depth of exploration.

5. Explain the principle of floating foundation.

6. What is the load taken by skin friction of a pile 500 x 500 mm, 15 m long installed in uniform deposit of clay with undrained cohesion 40 kPa and adhesion factor 0.8 ?

7. What are the limitations of dynamic formula ?

8. List the different methods of vibration isolation. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

9. A rectangular raft of size 30 × 12 m founded on ground surface is subjected to a uniform pressure of 150 kPa. Assume the centre of the area is the origin of coordinates (0, 0) and the corners have coordinates (6, 15). Calculate the stress at a depth of 20 m by equivalent point load method. Use Boussinesq's theory, at the coordinates of (0, 0) and (6, 15). **20**

10. A retaining wall 6 m high, vertical back, supports a saturated clay soil with a horizontal surface. The properties of the backfill are $\phi_u = 0$, $C_u = 35$ kPa, $r = 17$ kN/m^3. Assuming the back of the wall to be smooth, determine :

    a) depth of tension cracks

    b) critical depth of vertical cut

    c) total active thrust against the wall and its point of application if cracks are formed in the tension zone.

    d) What will be the depth of tension cracks, if any, if the backfill carries a uniform surcharge of 30 kPa over the surface ? What will be the position of the total active thrust ? **20**

Module – II

11. a) What is the effect of position of water table on bearing capacity of sandy soil. **5**

    b) The total column load of a footing is 1250 kN. The subsoil is cohesionless with $\phi = 36°$, $\gamma = 19.5$ kN/m^3. The footing is to be located at a depth of 1.5 m below ground level, for a fooling 2m × 2m, determine the factor of safety against shear failure, by Terzaghi's theory. Assume general shear and water table at a depth of 4m below the base of foundation. For $\phi = 36°$, $N_q = 49$, $N_r = 54$. **15**

12. a) Explain different methods of improving bearing capacity. **5**

    b) The standard penetration resistance obtained in a course sand deposit at a depth of 6m was 24. The ground water table was at a depth of 3m below GL. The dry density was 17.6 kN/m^3 and saturated dendsity 20.8 kN/m^3. What is the corrected N-value after applying the necessary corrections ? **15**

Module – III

13. A group of nine piles, 12m long and 250 mm dia, is to be arranged in a square form in a clayey soil with an average unconfined compressive strength of 60 kPa. Workout the centre to centre spacing of piles for a group efficiency factor of 1. Neglect bearing at the tip of the piles. **20**

14. Write note on :

    i) Problems in well sinking

    ii) Negative skin friction

    iii) Floating foundation

    iv) Mass spring model for undamped free vibrations. **20**

(Pages : 3) **5874**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.705.3 Elective – III : DEEP FOUNDATIONS (C)

Time :3 Hours Max. Marks : 100

***Instruction :** Answer **all** questions in Part **A** and **one** from **each** Module in Part **B**.*

PART – A

1. What are the conditions where a pile foundation is more suitable than a shallow foundation ?
2. Explain pile driving.
3. Discuss Engineering News Formula.
4. Explain the "block failure of piles".
5. How would you estimate the group capacity of piles in clays ?
6. Explain the determination of settlement of pile groups in sands.
7. How is the allowable bearing pressure of a well foundation in sand determined ?
8. Draw a neat sketch of a well foundation and name the different parts. **(8×5=40 Marks)**

PART – B

Module – I

9. a) A 40 cm square pre-cast RCC pile is driven by 9 m into a sandy bed. The standard penetration test results, performed on this ground are given below.

Depth (m)	1.5	3	4.5	6	7.5	9	10.5	12
SPT – N Values	4	6	12	12	20	24	35	39

Compute the factor of safety available, if 1100 kN of compressive load is applied on this pile. **12**

P.T.O.

9. b) Explain how skin friction and point resistance separated using cyclic load test data on a pile. **8**

OR

10. a) A 300 mm diameter pile penetrates a deposit of soft clay 9 m deep and rests on sand. Compute the skin friction resistance. The clay has a unit cohesion of 60 kN/m^2. Assume an adhesion factor of 0.6 for the clay. **10**

10. b) A concrete pile, 30 cm diameter, is driven into a medium dense sand ($\phi = 35°$, $\gamma = 21$ kN/m^2, $K = 1.0$, $\tan \delta = 0.70$) for a depth of 8 m. Estimate the safe load taking a factor of safety of 2.50. **10**

Module – II

11. A group of 9 piles, 10 m long is used as a foundation for a bridge pier. The piles used are 30 cm diameter with centre to centre spacing of 0.9 m. The sub soil consists of clay with unconfined compressive strength of 150kN/m^2. Determine the efficiency neglecting the bearing action. Given adhesion factor = 0.9. **20**

OR

12. Design a friction pile group to carry a load of 3000 kN, including the weight of the pile cap at a site where the soil is uniform clay to a depth of 20 m underlain by rock. Average unconfined compressive strength of the clay is 70kN/m^2. The clay may be assumed to be of normal sensitivity and normally loaded with liquid limit 60%. A factor of safety of 3 is required against shear failure. **20**

Module – III

13. a) What are the limits on tilt and shift in sinking of foundation wells ? **5**

13. b) How will you design the staining and bottom seal of a foundation well ? **15**

OR

14. A circular well has an external diameter of 7.5 m and is sunk into a sandy soil to a depth of 20 m below the maximum scour level. The resultant horizontal force is 1800 kN. The well is subjected to a moment of 36,000 kN.m about the maximum scour level due to the lateral force. Determine whether the well is safe against lateral forces, assuming the well to rotate

    a) about a point above the base, and

    b) about the base, Assume $\gamma' = 10 kN/m^3$, and $\phi = 36°$. Use Terzaghi's analysis, and a factor of safety of 2 against passive resistance. **20**

(Pages : 2) **5869**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *i) Assume suitable data **wherever** necessary.*
*ii) Use of Khosla's chart and Blench curve is **permitted** in the examination hall.*

PART – A

Answer **all** questions.

1. Discuss the various purposes for which galleries are provided in dams.
2. Describe briefly the different types of spillways.
3. What are the limitations of Bligh's creep theory ?
4. What are canal falls ? What are the different types of canal falls ? **(4×5=20 Marks)**

PART – B

5. The following are the details of a straight gravity dam.
   Foundation level = + 100.65m
   Height of dam = 250 m.
   Maximum water surface elevation = + 347.65 m
   Top width = 8 m

   Upstream face is vertical and down stream face vertical upto elevation + 340.65 and has a slope of 0.8 horizontal to vertical below this elevation. Assume no tail water and no drainage galleries. Determine the factor of safety against overturning sliding and maximum principal stress at toe. Density of concrete is 24kN/m^3 and co-efficient of friction is 0.75. **10**

   OR

P.T.O.

6. What are spillways ? Explain the features of different types of spillways with sketches. **10**

7. A weir on permeable foundation has a level floor of negligible thickness and is 10m long in the direction of flow. At the two ends of the floor 2.5m deep piles are provided. Using Khosla's theory calculate the uplift pressure at the mid length of the floor. The effective head of water is 2m. **10**

OR

8. Sketch the layout of a typical diversion head work and describe briefly the functions of various components of diversion head works. **10**

PART – C

9. a) Design a suitable cross drainage work given the following particulars.

Canal	**Drainage**
Full supply discharge = 25 cumecs	High flood discharge = 320 cumecs
Full supply level = + 113.50	High flood level = + 110.00
Canal bed level = + 112.00	High flood depth = 3.20 m
Canal bed width = 18 m	General ground level = +113.10
Canal water depth = 1.50 m	
Canal side slope = 1.5 H : IV	

30

b) Draw the following views to a suitable scale.

i) Half plan at top and half at foundation. **15**

ii) Longitudinal section along the centre line of canal. **15**

OR

10. a) Design a cross regulator and a head regulator for a channel which takes off from the parent channel with the following data.
Discharge of parent channel = 140 cumecs
Discharge of distributory = 15 cumecs
FSL of parent channel, u/s = 210.00 m
FSL of parent channel, d/s = 209.8 m
Bed width of parent channel, u/s = 52 m
Bed width of parent channel, d/s = 46 m
Depth of water in the parent channel = 2.5m at u/s and d/s
FSL of distributary = 209.1 m
Silt factor = 0.8 m
Assume safe exit gradient = $\frac{1}{5}$. **30**

b) Draw the following views to a suitable scale

i) Cross section of cross regulator along the longitudinal axis of parent channel. **15**

ii) Cross section of head regulator along the longitudinal axis of distributory. **15**

(Pages : 2) **5870**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions in Part **A** and **any one full** question from **each** Module.*
*2) Assume suitable data if **necessary**.*

PART – A

I. 1) What are the assumptions made in the Boussinesq's formula for stress distribution in soil ?

2) With the help of Mohr's diagram, explain Rankine's concept of equilibrium of semi infinite soil masses with plane top surface.

3) Write down Terzagh's general equation for computing ultimate bearing capacity of soil below circular footing. Also write the assumptions made in its derivation.

4) Describe the method of determining the load carrying capacity of piles.

5) Enumerate the various forces which act on a foundation well.

6) What are the harmful effects of differential settlement ? And what are the possible remedial measures.

7) Explain any one boring method used in soil exploration.

8) Explain mass spring model for undamped free vibration. **(8×5=40 Marks)**

PART – B

Answer **any one full** question from **each** Module.

Module – I

II. a) A wall with a smooth vertical back and 9 m high retains a moist cohesionless soil with a horizontal surface. The unit weight of soil is 15 kN/m^3 and has an angle of friction 30°. Determine the total earth pressure at rest and its location. If subsequently, if the water table rises to the ground surface, determine the increase in earth pressure at rest, if γ_{sub} is 9 kN/m^3. **10**

P.T.O.

b) A retaining wall 4.5 m high, retains soil with $c = 20\ kN/m^2$, $\phi = 30°$ and $\gamma = 20\ kN/m^3$ with horizontal surface with top of the wall. The fill carries a surcharge of $20\ kN/m^2$. Compute the total passive earth pressure on the wall and its point of application. **10**

III. a) Two columns A and B are situated at 6 m apart. Column A transfers a load of 500 kN and Column B a load of 250 kN. Determine the resultant vertical stress on a horizontal plane 20 m below chi ground surface at a point vertically below point A and B. **10**

b) Describe the method of calculating the stress at a point below the corner of a rectangular load. How is this method used for points other than that below the corner. **10**

Module – II

IV. a) What are the factors affecting bearing capacity of foundations. And briefly explain the different methods for finding bearing capacity of soil. **10**

b) Compute the safe bearing capacity of a continuous footing 1.5 m wide and located at a depth of 1.2 m below ground level. The unit weight of soil is $20\ kN/m^3$, $c = 20\ kN/m^2$ and $\phi = 20°$. Assume a factor of safety of 2.5. Terzagh's bearing capacity factors for $\phi = 20°$ are Ne = 17.7, Nq = 7.4, Nr = 5.0 what is the permissible load per meter run of footing. **10**

V. a) Discuss standard penetration test. What are the various corrections ? What is the importance of the test in geotechnical engineering ? **10**

b) Describe the salient features of sub soil investigation report. **5**

c) Explain soil improvement through installation of vertical drains and pre loading. **5**

Module – III

VI. a) Design a trapezoidal combined footing for two columns 30 cm× 30 cm carrying column loads of 12 MN and 0.90 MN. If the spacing between the two columns is 4m, allowable soil pressure is $200\ kN/m^2$ and length of footing 5m. **10**

b) Discuss any two dynamic formula. What are their limitations ? **5**

c) How will you estimate the group capacity of piles in sand and clay ? **5**

VII. a) Describe the measures for rectification of tilts and shifts. **10**

b) Explain the general criteria for the design of machine foundation. **8**

c) Explain floating foundation. **2**

(Pages : 3) **5868**

Reg. No. : .....

Name : .....

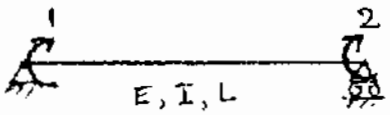
Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.701 : ADVANCED STRUCTURAL ANALYSIS (C)

Time : 3 Hours Max. Marks : 100

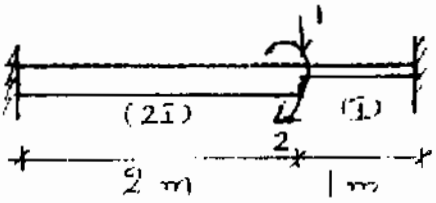
***Instruction** : Answer **all** questions from Part **A** and **one** question from **each** Module in Part **B**.*

PART – A

1. What is meant by equilibrium matrix ? Explain with example.
2. Develop the flexibility matrix for the beam with given coordinates.



3. State and prove the relationship between stiffness matrix and flexibility matrix.
4. Explain displacement transformation matrix. Write the displacement transformation matrix for the beam given below :



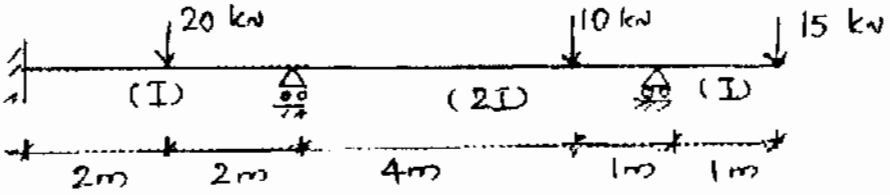
5. Develop the global stiffness matrix for a truss element.
6. What are the merits of stiffness method compared to flexibility method ?
7. Explain constitutive matrix. Write the constitutive matrix for a linear elastic isotropic material.
8. Explain plane stress problem with example. **(8x5=40 Marks)**

P.T.O.

PART – B

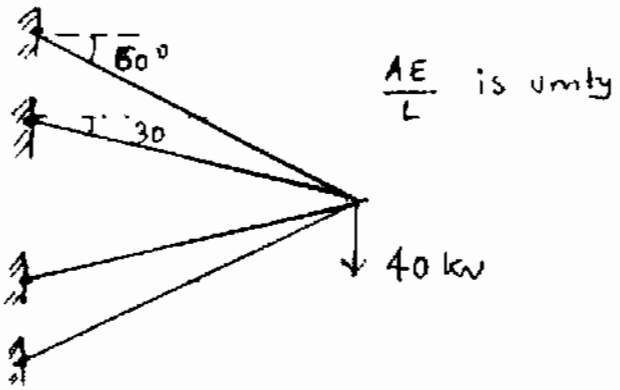
Module – I

9. Analyse the beam given below using flexibility method and draw the bending moment diagram. **20**



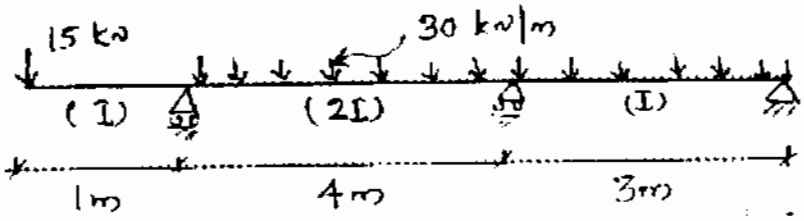
OR

10. Analyse the frame using flexibility method. **20**



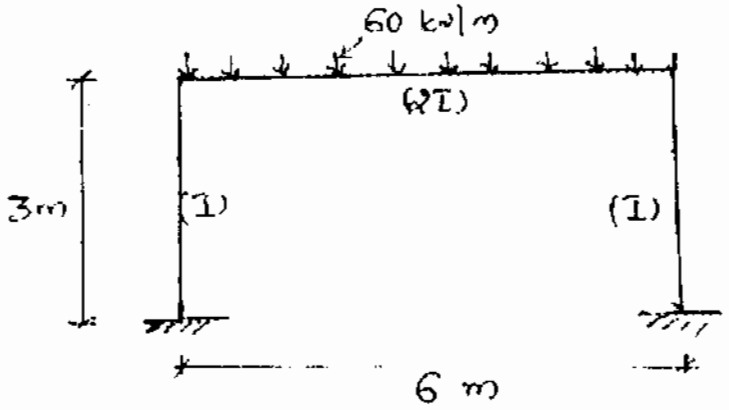
Module – II

11. Analyse the continuous beam using stiffness method and draw the BMD. **20**



OR

12. Analyse the frame by stiffness method and draw the BMD. **20**



Module – III

13. Derive the expression for finding element stiffness matrix in FEM. **20**

OR

14. Find the natural cordinates of P (3, 4) of the CST element and hence find the displacement of point P. The cordinates of the nodes and displacement are given below : **20**

Node	1	2	3
Cordinates	(1, 2)	(4, 2)	(2, 5)
Displacement	155	325	75

(Pages : 2) **5871**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions. Assume suitable data* ***wherever*** *necessary.*

PART – A

1. Discuss the different factors governing the location of an intake.
2. Write a short note on fluctuations in water demand.
3. What are the different forms of impurities commonly seen during water treatment ?
4. Determine the power requirement and paddle area for the following data.
   G = 100/s, volume of reactor = 2000 m^3
   Cd = 1.5, paddle velocity = 0.5 m/s
   Relative velocity of paddle = 80% of paddle velocity
5. Derive Stokes law of settling.
6. Discuss the different factors affecting chlorination.
7. Describe the phenomena of adsorption.
8. A 1m dia concrete pipe carries a discharge of 0.9 cumecs at an average temperature of 20°C. Compute the hydraulic gradient using
   a) Darcy Weisbach formula
   b) Manning's formula. **(5×8=40 Marks)**

P.T.O.

PART – B

Module – I

9. a) A city has the population data in the years 1951, 1971, 1991 as 50,000, 1,10,000 and 1,60,000 respectively. Determine the expected population in 2011 by Logistic method. **14**

   b) Discuss the factors affecting population growth. **6**

OR

10. Explain the different tests done in the laboratory for water quality assessment. **20**

Module – II

11. a) Find the settling velocity of a spherical silica particle of specific gravity 2.65 and a diameter of 0.1 cm γ at 25°C = 0.9 centi stoke. **10**

    b) Describe Type II settling. **10**

OR

12. a) Design a plain sedimentation tank to treat 6 Mld of water. **10**

    b) 12 Mld of water is treated in a water treatment plant, using alum dosage of 16 mg/l. Find (i) total quantity of alum used daily (ii) amount of CO_2 released. **10**

Module – III

13. a) Explain the method of finding the capacity of a service reservoir. **10**

    b) Explain the process of electrodialysis with the help of a neat sketch. **10**

OR

14. a) Discuss the process of water softening. **10**

    b) Explain hardy cross method. **10**

(Pages : 3) **5795**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012

(2008 Scheme)

08.705.3 Elective – III : DEEP FOUNDATIONS (C)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions in Part – **A** and **one** from **each** Module in Part – **B**.*

PART – A

1. Explain the classification of piles based on the mechanism of load transfer and method of installation.
2. Discuss various dynamic formulae. What are their limitations ?
3. What are the different types of load tests conducted on pile ? Explain the purpose of each test.
4. Explain different measures taken to reduce negative skin friction.
5. How would you estimate the group capacity of piles in sand ?
6. Explain equivalent raft approach.
7. What are the forces acting on a well foundation ?
8. What are the problems encountered in well sinking ? **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

9. a) A 30 cm. diameter pile penetrates a deposit of soft clay 9 m deep and rests on sand. Compute the skin friction resistance. The clay has a unit cohesion of 60 kN/m^2. Assume an adhesion factor of 0.6 for the clay. **10**

   b) Discuss the method for the design of tension piles. **10**

OR

10. a) A precast concrete pile is driven with a 30 kN drop hammer with a free fall of 1.5 m. The average penetration recorded in the last few blows is 5 mm per blow. Estimate the allowable load on the pile using the Engineering News formula. **8**

   b) A friction pile 300 mm in diameter is proposed to be driven in a layer of uniform clay. The pile tip is assumed to carry 20% of the load. The skin friction between the pile surface and soil may be taken as 50 kPa. Determine the length of the pile required to carry a specified safe load of 200kN with a F.S 4. Also determine the cohesion of the clay. **12**

Module – II

11. a) Determine the group efficiency of a rectangular group of piles with 4 rows, 3 piles per row, the uniform pile spacing being 3 times the pile diameter. If the individual pile capacity is 100 kN, What is the group capacity according to this concept ? **12**

   b) Explain the Skempton's method for determining settlement of pile groups in sand. **8**

OR

12. Estimate the load carrying capacity of drilled piers whose shaft is 100 cm. diameter for a length of 10 m, the diameter is belled to 300 cm. in a length of 5 m at the bottom. The top 12m of the pier passes through submerged soft clay (r sat = 19 kN/ m^2) with cohesion 25 kPa. The pier rests on dense sandy gravel with an angle of friction of 38°.The values of Nc, Nq, Nr for 38° are 75, 80 and 50, $\alpha = 0.8$. What are the assumptions used in the computation. **20**

Module – III

13. Explain Terzaghi's analysis for determining the lateral stability of well foundation. **20**

OR

14. a) Explain with neat sketches the construction aspects and the remedial measures for rectification of tilts and shifts in wells. **15**

    b) What is grip length of a well foundation ? **5**

(Pages : 2) **5792**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. a) Discuss merits and demerits of different water sources.
   b) What do you mean by percapita water demand and design period ?
   c) Discuss the effect of turbidity in raw water. What are the different means of measuring it ?
   d) Settling velocity of a particle is independent of depth of settling. Explain.
   e) Determine the quantity of alum required to treat 15 million litres of water per day if dosage of alum is 12 mg/L. Also calculate the amount of carbon dioxide released per litre of water treated.
   f) Write a short note about pressure filter.
   g) Differentiate chlorine demand and chlorine dosage.
   h) Explain lime soda process in water treatment. **(8×5=40 Marks)**

PART – B

MODULE – 1

2. a) What are the different methods of forecasting population ?
   b) Determine the population of a city by 2026. Using any three methods. **(8+12)**

Year	1940	1950	1960	1970	1980	1990	2000	2010
POP in thousands	30	32	35	37.5	40.5	42.5	44.1	45.7

OR

3. a) How will you conduct bacteriological analysis of water ? Explain.
   b) Bring out public health significance of iron, fluorine and hardness in water. **(10+10)**

P.T.O.

MODULE – 2

4. a) Derive an expression for settling velocity of a particle in a settling tank using Stoke's law. Also state the assumptions made.

   b) Design a slow sand filter to treat water for a population 75000 with average water demand 150 Lpcd. Assume maximum daily demand = 1.8 q. Provide 6 units of which one should be stand by. **(10+10)**

OR

5. Design a coagulation-sedimentation tank to treat 10 million litres of water per day. Assume suitable data wherever necessary. **20**

MODULE – 3

6. a) Explain Hardy cross method of analysis of pipe network.

   b) Name the different methods of disinfection of water. Compare their relative merits and demerits. **(10+10)**

OR

7. a) Compare the advantages and disadvantages of different systems of layout of water distribution system.

   b) Explain different methods employed for desalination of water. **(10+10)**

(Pages : 4) **5789**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.701 : ADVANCED STRUCTURAL ANALYSIS (C)

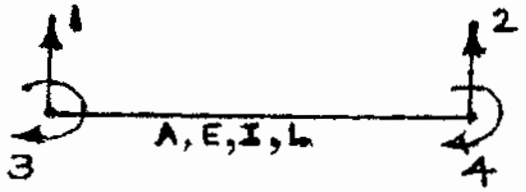
Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part **A** and **any one** question from **each** Module in Part **B**.*

PART – A

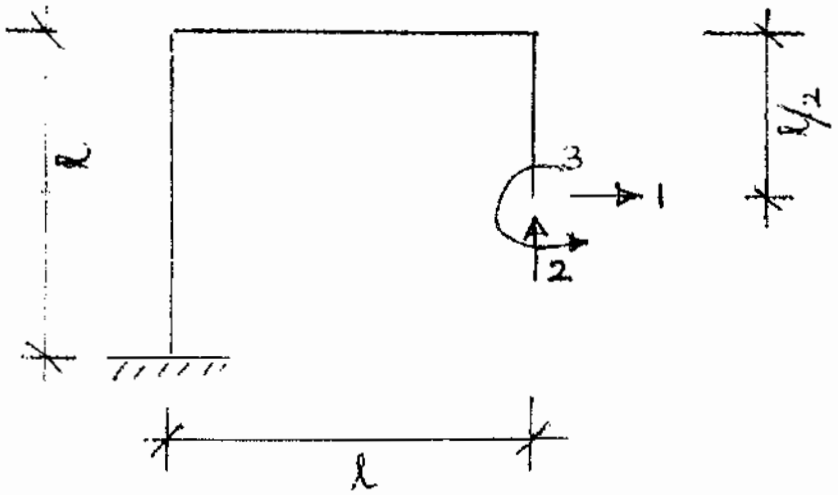
1. a) Define and explain (i) internal redundancy and (ii) external redundancy with examples.

   b) Generate the stiffness matrix for the element with the given co-ordinates and properties.



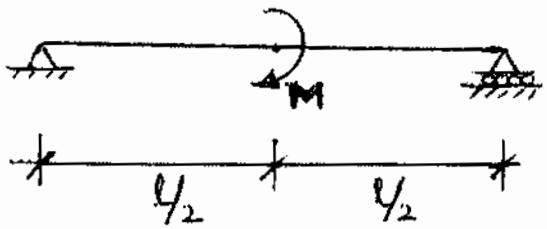
   c) Define flexibility and stiffness influence coefficients.

   d) Generate the force transformation matrix for the structure shown in figure. EI is constant.



P.T.O.

e) Evaluate the vertical deflection and rotation at the centre of a simply supported beam shown in figure.



f) Distinguish between plane stress and plane strain problems with examples.

g) Establish stress-strain relation for a three dimensional element.

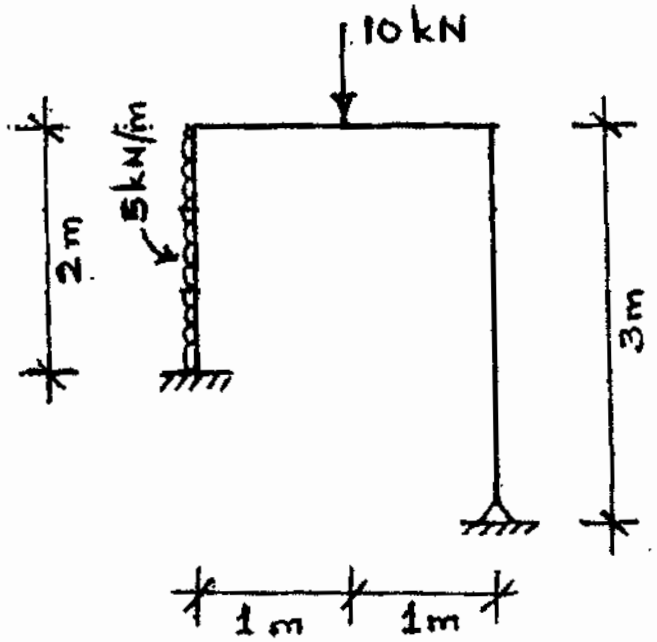
h) What is Pascal's triangle ? What is its use in finite element analysis ?

(8×5=40 Marks)

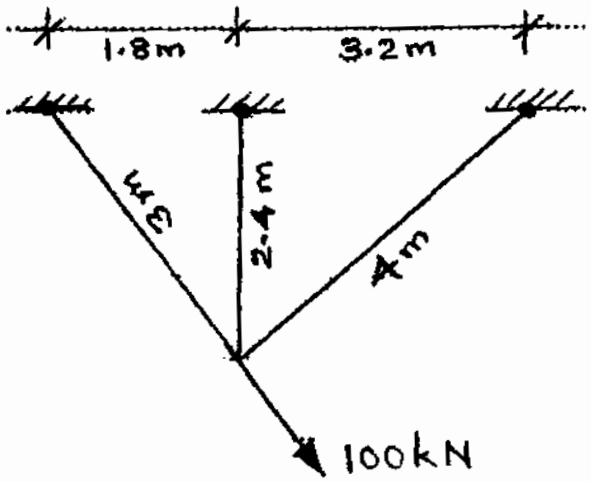
PART – B

Module – I

2. Analyse the rigid jointed plane frame shown in figure by flexibility matrix method and draw the bending moment diagram. EI is constant.

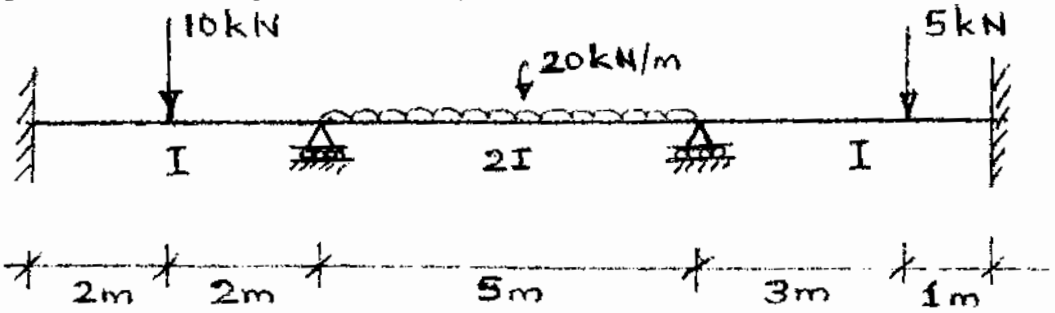


3. Analyse the pin-jointed plane frame shown in figure by flexibility matrix method. AE is constant.

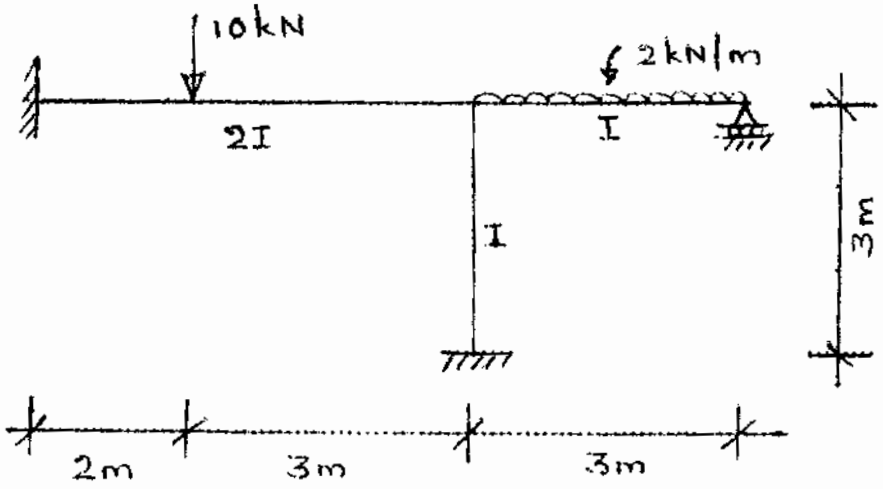


Module – II

4. Analyse the beam shown in figure by stiffness matrix method. Draw the shear force diagram and bending moment diagram.

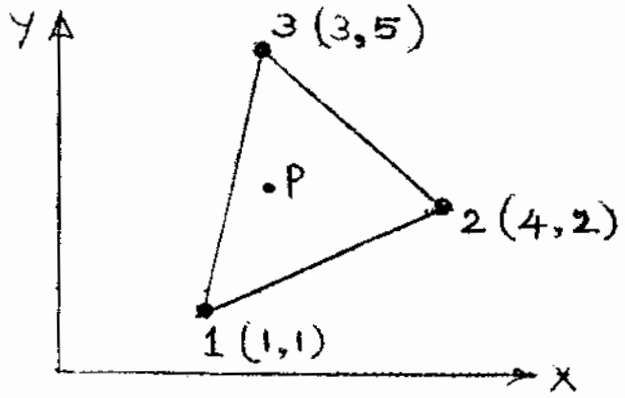


5. Analyse the rigid jointed plane frame shown in figure by stiffness matrix method and draw the bending moment diagram.



Module – III

6. a) For the point 'P' located inside the triangle shown in figure, the shape functions N_1 and N_2 are 0.15 and 0.25 respectively. Determine the X- and Y- coordinates of point P.



b) Develop the stiffness matrix for the 2-noded truss element with an axial displacement at each node.

7. a) Develop the shape functions for a beam element with two degrees of freedom per node and sketch the same.

b) Explain the step-by-step procedure involved infinite element method.

(3×20=60 Marks)

(Pages : 3) **5791**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

Instruction *: Answer* ***all*** *questions from Part* ***A*** *and* ***any one full*** *question from* ***each*** *Module of Part* ***B****.*

PART – A

I. a) Derive the principle of construction of Newmark's chart and explain its use.

b) Find the vertical pressure at a point 4 metres directly below a 20 kN point load acting at a horizontal ground surface. Use Boussinesq's equations.

c) Explain :

i) active

ii) passive and

iii) at rest conditions in earth pressure against a retaining wall.

d) Bringout clearly the effect of ground water table on the safe bearing capacity.

e) Explain briefly the standard penetration test.

f) What is meant by floating foundation ? Derive an expression for the depth of a floating foundation.

g) Explain briefly the pile load test.

h) Explain the different methods of vibration isolation in machine foundation.

(8×5=40 Marks)

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

II. a) The plan of a large circular raft foundation is 20 m diameter. The central portion of 10 m diameter transmits a contact pressure of 80kN/m^2 and the outer annular portion transmits a contact pressure of 200 kN/m^2. Find the intensity of vertical pressure induced at a point 6 m below the soil mass at the center of the loaded area. **10**

b) Two line loads P and Q acting at the surface of a soil mass at 3 m spacing. The vertical stress intensities under each load at 2 m depth are 18.57 kN/m^2 and 12.8 kN/m^2 respectively. Determine the intensities of the loads. P and Q using Boussinesq's theory. **10**

III. A 5 m high retaining wall supports cohesive backfill with upper horizontal surface. For the upper 3m depth. Soil properties are γ_{sat} =17.6 kN/m^3, C= 7.5 kN/m^2, ϕ = 20°. For the lower 2m depth, γ_{sat} = 19.2 kN/m^3, C = 10 kN/m^2, ϕ = 20° water table is at 4m from the top. Neglecting negative pressure, determine the total active earth pressure/m length of the wall. **20**

Module – II

IV. a) Determine the net ultimate bearing capacity of a 2 m square footing laid at a depth of 1.3 m below the ground surface, if

a) The water table rises to the level of the base.

b) The water table rises to the ground surface and

c) The water table is 1 m below the base.

Take γ = 20 kN/m^3, ϕ' = 30° and C' = 0 . For ϕ' = 30°, Nc = 30.14, Nq = 18.4 and Nγ = 22.4. **15**

b) Distinguish between local shear failure and general shear failure. **5**

V. a) What is meant by differential settlement ? Give causes and remedial measures for minimizing the same. Give permissible values as per IS. **12**

b) Determine the immediate settlement of a rigid footing 2 × 2.5 m founded on sandy silt at 1 m depth whose compression modulus is 10^4KPa. The load on the footing is 350 N. Poisson's ratio 0.3 and the influence factor is 0.82. **8**

Module – III

VI. a) A precast concrete pile is drives with a 50 kN hammer, having a free fall of 1.0 m. If the penetration in the last blow is 0.5 cm, determine the load carrying capacity of the pile using Engineering News Record Formula (F.S = 6.0). **10**

b) A group of nine piles, 8 m long is used as the foundation for a column. The piles are 30 cm. diameter with centre to centre spacing of 90 cm. The subsoil consists of clay with unconfined compression strength of 180 kN/m^2. Estimate the safe load (F.S = 3.0). **10**

VII. a) Design a trapezoidal combined footing for two columns (30 cm × 30 cm) carrying column loads of 1.2 MN and 0.90 MN, if the spacing between the two columns is 4 m . Take allowable soil pressure as 200 kN/m^2 and the length of footing as 5 m. **12**

b) Describe the measures for rectification of tilts and shifts during sinking of wells in the construction of well foundation. **8**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.705.6 ELECTIVE – III : AIR QUALITY MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

PART – A

1. Express the concentration of CO_2 in ppm if it has a concentration of 200 $\mu g/m^3$ at 30°C and 1 atmospheric pressure.
2. Discuss the fate of air pollutants in the atmosphere.
3. Derive a relation between altitude and variation of pressure.
4. Write a short note on wind velocity and turbulence.
5. Discuss the Pasquill's stability curves.
6. What are the principles of air pollution control ?
7. Explain briefly air pollution disasters.
8. Explain freeze out sampling. **(5×8=40 Marks)**

PART – B

Module – I

9. Discuss the effects of pollutants on human health, vegetation and property. **20**

OR

10. a) Discuss the various sources of sulphur oxide emissions. **10**

    b) Explain the different components of environment. **10**

P.T.O.

Module – II

11. Discuss in detail the different meteorological conditions affecting atmospheric stability. **20**

OR

12. a) Explain Gaussian plume model. **10**

    b) What are atmospheric inversions ? **10**

Module – III

13. Explain the different methods of sampling of particulate air pollutants. **20**

OR

14. Explain the different control methods of gaseous emissions. **20**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 3 Hours Max. Marks : 100

Instructions : *i) Assume suitable data* ***wherever*** *necessary.*
ii) Use of ***Khosla's charts*** *and* ***Blench curves*** *are* ***permitted*** *in the Examination Hall.*

PART – A

Answer **all** questions.

1. What are the factors to be considered while selecting the suitable site for dams ?
2. Show that the most economical central angle for a constant angle arch dam is 133° 34'.
3. Explain Bligh's theory.
4. Explain :
   i) Canal Siphon ii) Level Crossing **(4×5=20 Marks)**

PART – B

Module – I

5. Explain the salient features of different types of spillways. **10**

OR

6. Explain the different causes of failure of earth dams. **10**

Module – II

7. Explain Khosla's corrections for uplift pressure under the impervious floor of hydraulic structures. **10**

OR

8. What are Canal falls ? Explain their classification. **10**

P.T.O.

PART – C

9. Design a suitable cross drainage work for the following data :

Canal

Full supply discharge = 35 cumec

Bed width = 22 m

Full supply level = 200.0

Full supply depth = 1.5 m

Side slope = 1.5 H : 1 V

Drain

Catchment area = 160 km^2

Dicken's coefficient = 8

Bed level = 193.5

High flood depth = 3 m

General ground level = 199.0 **30**

Prepare the following drawings to a suitable scale :

a) Half plan at top and half at foundation level. **15**

b) Section along the centreline of the canal. **15**

OR

10. Design a 2 m trapezoidal notch type canal fall for the following data :

Hydraulic particulars above the drop :

Full supply discharge = 5 cumec

Bed width = 6 m

Bed level = $^{+}12$ m

Full supply depth = 1.5 m

Top of 2 m wide embankment = $^{+}14.5$ m Hydraulic particulars of the Canal below the drop :

Full supply discharge = 5 cumec

Bed width = 6 m

Bed level = + 10 m

Top of embankment = $^{+}12.5$ m

General ground level $^{+}12.5$ m

Good foundation soil is available at $^{+}10.5$ m. **30**

Prepare the following drawings to a suitable scale :

a) Half sectional plan at foundation level **18**

b) Section along the centreline of the canal. **12**

(Pages : 3) **1542**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.705.4 : Elective – III : STRUCTURAL ANALYSIS FOR DYNAMIC LOADS (C)

Time : 3 Hours Max. Marks : 100

Instruction** : IS 1893-2002 is **permitted.

PART – A

1. Define "impulse response function".
2. Explain the principle of vibration isolation.
3. Differentiate between "Transient response" and "steady state response".
4. Explain the orthogonalty property of normal modes.
5. Explain why mode super position method cannot be used for some damped systems.
6. Write the elemental dynamic equilibrium equation for the cross section of a beam of mass per unit length m, moment of inertia I and subjected to a distributed dynamic load.
7. Explain briefly the different methods in IS 1893-2002 for estimation of lateral loads due to earthquakes.
8. Write the equation of motion of the two degree of freedom system shown in fig.1 subjected to a support motion.

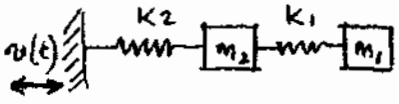


Fig. 1

(8×5=40 Marks)

P.T.O.

PART – B

MODULE – I

Answer **any one** question.

9. Derive an expression for the time varying displacement for a damped single degree of freedom system subjected to harmonic excitation. Using this, plot the graph of dynamic amplification factor (D) vs frequency ratio (β) for damping ratios ξ = 0.2, 0.7 and 1.0. **20**

10. a) Derive the expression for the response amplitude of a damped single degree of freedom system subjected to a harmonic base displacement. Also plot the response vs frequency ratio 'β'. **10**

    b) Determine the response of an single degree of freedom system (undamped) subjected to a rectangular impulse, both during the impulse and after the force is removed. Assume that the system is initially at rest. **10**

MODULE – II

Answer **any one** question.

11. a) From first principles, prove that the mode shape vectors are orthogonal with respect to mass and stiffness matrices. **8**

    b) Briefly explain the mode super position method for solution of the dynamic equilibrium equation for a multi degree of freedom system subjected to an external dynamic load. **12**

12. For the three storied building shown in fig.2, m = 3500 kg, k = 1500 kN/m. Determine the natural frequency and mode shapes. Assume that the beams are infinitely rigid. **20**

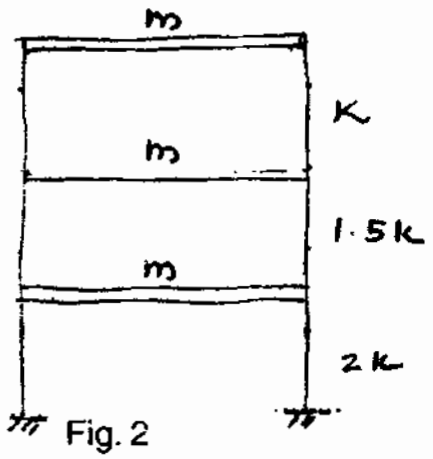


Fig. 2

MODULE – III

Answer **any one** question.

13. Derive the basic differential equation for a beam hinged at two ends, starting from first principles and hence determine the expression for natural frequencies and mode shapes by solving the above equation. **20**

14. Determine the base shear and shear force at each floor level of the four storied hospital building in fig.3 with infill walls, situated in Delhi with the following data.

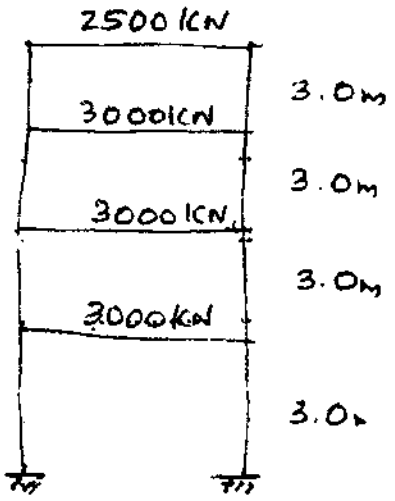


Fig .3

Floor height 3 m

Total height 12 m

Foundation – Hard rock

Frame - Special Moment Resisting

Breadth = 5 m, length = 10 m

Also estimate the base shear if there are no infills. **20**

(Pages : 3) **1536**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions: *i) Assume **suitable** data **wherever** necessary.*
*ii) Use of Khosla's charts and Blench curves are **permitted**.*

PART – A

Answer **all** questions.

1. Differentiate between 'factor of safety against sliding' and 'shear friction factor'.

2. Discuss the limitations of Bligh's creep theory.

3. What are the explicit site conditions appropriate for a gravity dam ?

4. What is meant by scour ? How would you determine the maximum scour depth ?

(4×5=20 Marks)

PART – B

5. a) Determine the uplift pressure on a gravity dam of 40m height, 10m top width, with u/s face vertical and base width 30m. The tail water depth is 5m and the free board is 3m. Also compute the uplift pressure when there is a drainage gallery at a distance of 6m from the u/s face. **15**

(20)

P.T.O.

b) What would be the maximum height of an elementary profile of a gravity dam if the safe compressive stress for the masonry is 1.5 Mpa ? Assume unit weight of masonry as 23 kN/m^3. **5**

OR

6. a) Discuss the various causes of failure of weirs constructed on permeable soils and suggest remedial measures. **10**

b) A hydraulic structure built on fine sand (C = 15) has the following detail :

Total length of the floor = 30m, a weir at 5m from u/s end, effective head of water 3m, sheet pile at u/s end 4m deep, sheet pile at d/s end 5m deep, intermediate piles at 12m from u/s end 3m deep. Determine (a) whether the percolation gradient is safe, (b) uplift pressures at A = 5m, B = 15m and C = 20m from upstream end and corresponding thicknesses of floor using Bligh's theory. **10**

PART – C

(Answer **any one full** question)

7. A cross drainage work is to be designed for the following data. **20**

Canal details	**Drain details**
Discharge = 354 m^3/ses	Maximum flood discharge = 600 cumecs
Full supply level = 207.600m	Bed level = 203.600
Bed level = 201.400	High flood level = 206.300
Bed width = 24 m	
Side slopes on either side = 0.5H : 1V	**(Assume other data, if required)**

Draw to scale the following views :

i) Plan at top. **20**

ii) Longitudinal section along the canal. **20**

OR

8. Design a canal drop of 2m with the following data. **20**

Hydraulic particulars of the canal above drop		**Hydraulic particulars of the canal below drop**	
Full supply discharge	4 cumecs	Full supply discharge	4 cumecs
Bed width	6.00 m	Bed width	6.00 m
Bed level	10.000	Bed level	8.000
Full supply depth	1.50 m	Full supply depth	1.50 m
Full supply level	11.500	Full supply level	9.500
Top of bank 2.00m wide at level	12.500	Top of bank 2.00m wide at level	10.500
Half supply depth	1.00 m	Good soil is available for foundation at 8.50	

Draw to scale the following views :

i) Half plan at top and half plan at foundation. **20**

ii) Longitudinal sectional elevation of the drop. **20**

(Pages : 2) **1544**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.705.6 Elective – III : AIR QUALITY MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

PART – A

1. Distinguish a primary pollutant from a secondary pollutant.
2. Discuss the effect of Carbon monoxide on human health.
3. Explain radiation inversion.
4. What is adiabatic lapse rate ?
5. What are the assumptions made in Gaussian plume model ?
6. How is plume rise estimated ?
7. Discuss the advantages and disadvantages of wet scrubbers.
8. Explain the condensation method of control of gaseous effluents. **(5×8=40 Marks)**

PART – B

Module – I

9. a) Classify air pollutants and give examples for each. **10**

   b) Explain the phenomena of photochemical smog. **10**

OR

10. a) Explain indoor air pollution. **12**

    b) What are the factors affecting temperature of a place ? Explain. **8**

P.T.O.

Module – II

11. a) Explain Gaussian plume model. **12**

    b) Estimate the plume rise from a chimney discharging particulate pollutants at a velocity of 15 m/s through an exit diameter of 5 m. The wind velocity is 5 m/s. The gas temperature is 150°C and ambient temperature is 30°C. **8**

OR

12. a) Explain the different types of plume behaviour with neat sketches. **12**

    b) Write a note on wind velocity profile. **8**

Module – III

13. Explain the different types of scrubbers and their working with neat sketches. **20**

OR

14. Explain the different methods of collection of gaseous air pollutants. **20**

(Pages : 3) **1537**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

PART – A

I. 1) List the assumptions in Boussinesq's theory. Comment on the limitations of the theory.

2) A purely cohesive backfill has unit weight 18 kN/m^3 and undrained cohesion 36 KPa. Estimate the surcharge to be placed on backfill to avoid tension crack.

3) The uniform surcharge of 4kPa is acting on the soil backfill of unit weight 18 kN/m^3 and coefficient of passive earth pressure 2.5. Determine the active earth pressure at a depth of 2 m beneath the backfill surface.

4) Discuss the factors affecting bearing capacity.

5) Differentiate between Bore log and soil profile.

6) Define the terms :
   1) natural frequency of foundation soil system
   2) coefficient of uniform elastic compression.

7) Differentiate between :
   1) initial test and routine test
   2) working pile and test pile.

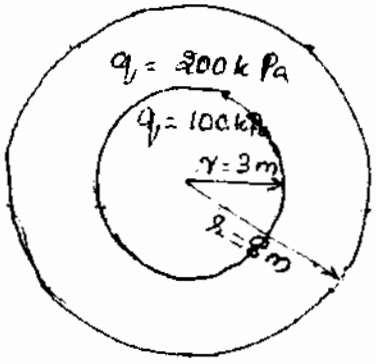
8) What are the problems associated with well sinking ? Mention any three methods to rectify the same. **(8×5=40 Marks)**

P.T.O.

PART – B
Module – I

II. a) The figure below shows the uniformly distributed load acting on different portions of a circular loaded area.

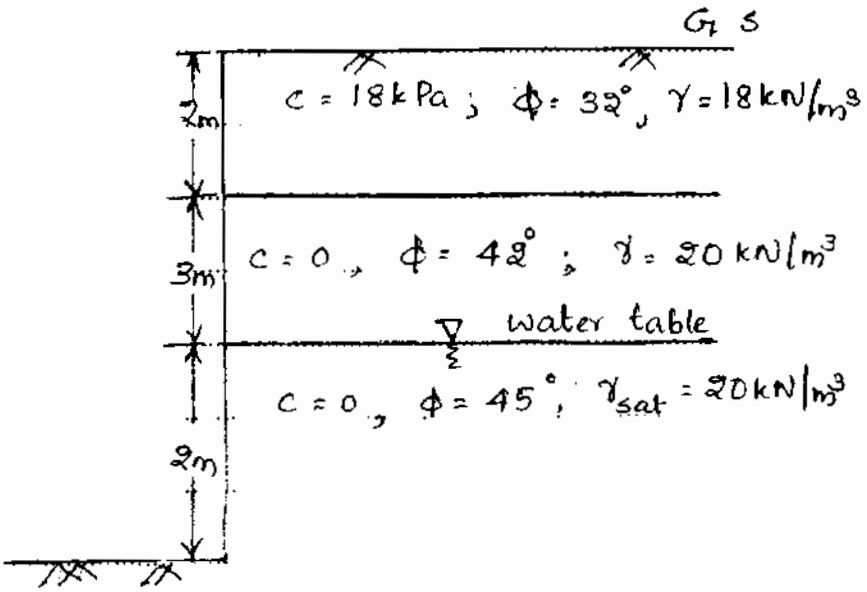
Determine the vertical stress at a depth of 4 m below the centre of loaded area. **12**



b) Determine the vertical stress at a depth of 3 m and at a radial distance of 2 m from a point load of 100 kN acting at the ground surface. Use Westergaard's theory. Take Poisson's ratio = 0.2. **8**

OR

III. Determine the total active earth pressure on the retaining wall shown in Figure. **20**



Module – II

IV. The construction of a strip footing of width 3 m and depth of footing = 1.2 m is undertaken during a summer period and the water table is observed at 2.5 m from the ground surface. Further, the soil above water table was observed to be in a saturated state. During monsoon, the water table was found to rise to the ground surface. The relevant soil parameters are = saturated unit weight = 19 Kn/m^3, Nc = 60, Nq = 70.2, Nr = 85.3, cohesion = 12 kPa. Determine the percentage reduction in net safe bearing capacity due to the rise of water table. **20**

OR

V. a) Describe (with a neat sketch) the standard Penetration Test on soils. How will you make use of the "N" value for evaluating the allowable soil pressure ? **14**

b) What are the causes of differential settlement ? Mention the methods to control the same. **6**

Module – III

VI. a) A 4 × 2 pile group [consisting of piles of 0.4 m diameter and 8 m length] is installed in a layered clay soil [upper layer : cohesion = 30 kPa, adhesion factor = 0.5, thickness = 6 m; Lower layer : cohesion = 50 kPa, adhesion factor = 0.4]. Determine the capacity of the pile group. Centre to centre spacing between piles in the group = 1.0 m. **14**

b) Define the terms group action and group capacity of piles. **6**

OR

VII. a) A raft of size 30 m × 30 m founded at a depth of 5 m carries a gross load of 150 MN. The soil is clay (cu = 15 kPa, γ = 19 kN/m^3). Estimate the factor of safety of the foundation. Also determine the depth for a fully compensated foundation. **14**

b) Discuss any two methods of vibration isolation. **6**

(Pages : 3) **6145**

Reg. No. : .....

Name : .....

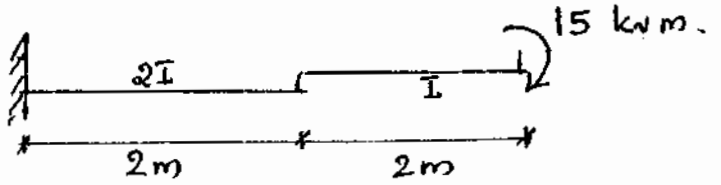
Seventh Semester B.tech Degree Examination, October 2011
(2008 Scheme)
08.701 ADVANCED STRUCTURAL ANALYSIS (C)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer all questions from* ***Part A*** *and* ***one*** *question from* ***each*** *module in* ***Part B.***

PART – A

1. Explain 'compatibility matrix' using example.
2. Find the rotation at the free end of the cantilever given below.



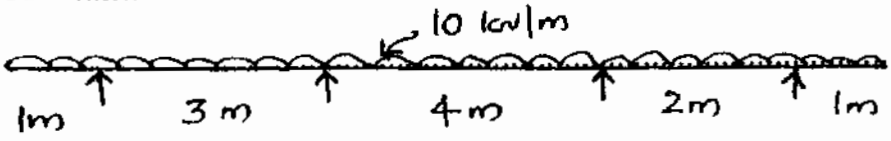
3. State and prove the relation between force transformation matrix and displacement transformation matrix.
4. Explain direct stiffness matrix. Write the direct stiffness matrix of a truss element.
5. What are the important reasons which make FEM so popular ?
6. Explain plane stress problem with example.
7. Explain CST element used in FEM.
8. What are the important factors to be considered for selecting a displacement model for analysis using FEM ? **(8×5=40 Marks)**

P.T.O.

PART – B

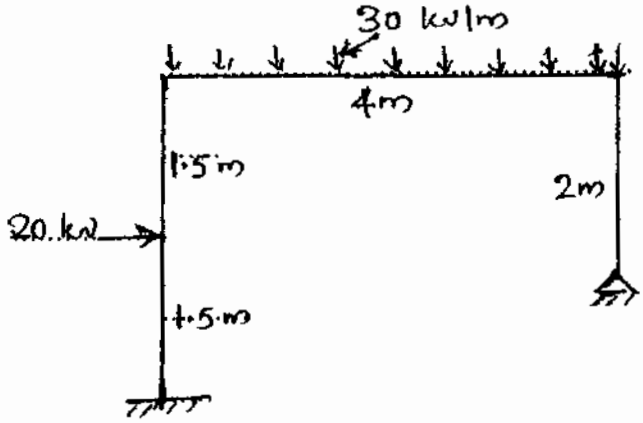
Module – I

9. Analyse the continuous beam and draw the BMD. Use flexibility method. EI constant. **20**



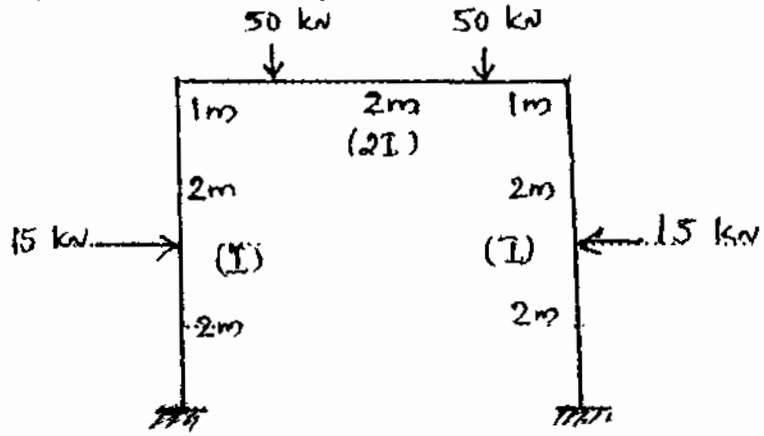
OR

10. Analyse the frame using flexibility method and draw the BMD. EI constant. **20**



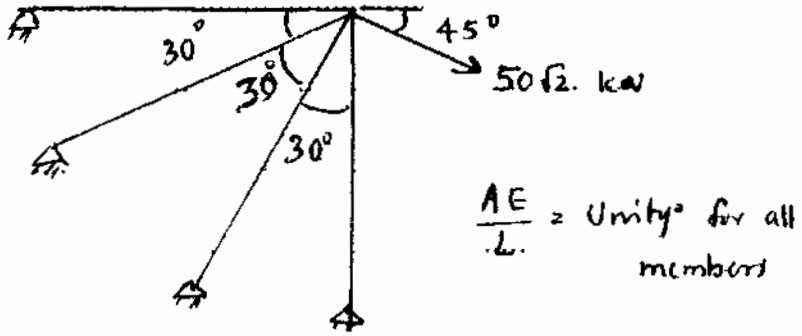
Module – II

11. Analyse the frame using stiffness method and draw the BMD. **20**



OR

12. Analyse the frame using stiffness method. **20**



Module – III

13. Explain finite element procedure in detail. Also explain different types of elements used in FEM. **20**

OR

14. Find the natural cordinates of point P(1.5, 1.5) of the CST element and hence find the displacement of point P using the following data. **20**

Node	1	2	3
Cordinates	1, 1	3, 1	2, 2
Displacement	125	375	50

(Pages : 2) **6148**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.704 : ENVIRONMENTAL ENGINEERING – I (C)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions. Assume suitable data* ***wherever*** *necessary.*

PART – A

1. Explain residential demand of water and how it is arrived at ?
2. Write short notes on hardness of water.
3. Give a short note on the materials used for conveying water.
4. Why is alum commonly used as a coagulant ? Write down the reactions.
5. Give the design criteria of a flocculator.
6. Explain the backwashing process of a rapid sand filter.
7. Explain the process of electrodialysis.
8. Explain the break through curve of adsorption. **(5×8=40 Marks)**

PART – B
Module – I

9. Explain the different methods that can be used for population forecasting. **20**

OR

10. Explain the different water quality parameters and discuss the significance of each. **20**

P.T.O.

Module – II

11. Describe the different types of settling of particles in a suspension. **20**

OR

12. Design a rapid sand filter for treating a water flow of 4 Mld with proper sketches. **20**

Module – III

13. Explain the disinfecting actions of chlorine in water. Discuss the significance of 'break point chlorination' and 'chlorine demand' in relation to disinfection process. **20**

OR

14. a) Explain Hardy Cross method of analysis of network of pipes. **10**

    b) Explain ion exchange method of water treatment. **10**

(Pages : 4) **6152**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.705.4 : Elective – III : STRUCTURAL ANALYSIS FOR DYNAMIC LOADS (C)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Use of IS : 1893 – 2002 is **permitted**.*
*2) Missing data, if any, may be suitably **assumed**.*
*3) Answer **all** questions from Part **A** and **one** question from **each** Module in Part **B**.*

PART – A

I. a) Briefly explain Duhamel integral.

b) A single degree of freedom system with mass 70 kg and stiffness 5000 N/m is subjected to a harmonic load of amplitude 100 N and frequency 9 rad/s. Assuming 5% damping, find the steady state amplitude.

c) What is transmissibility ratio ? Derive the expression for displacement transmissibility ratio.

d) Formulate the equation of motion of a two degrees of freedom shear building frame subjected to support motion.

e) Show that the mode shape vectors of a multi-degree of freedom dynamic system are orthogonal with respect to mass and stiffness matrices.

f) Briefly explain the procedure to determine the free vibration response of a multi-degree of freedom system.

P.T.O.

g) Write short notes on 'Earthquake response spectrum'.

h) Find the fundamental frequency of flexural vibration of a steel rod of length 2 m and diameter 25 mm, simply supported at the ends. Take density of steel as 7850 kg/m^3. **(8×5=40 Marks)**

PART – B

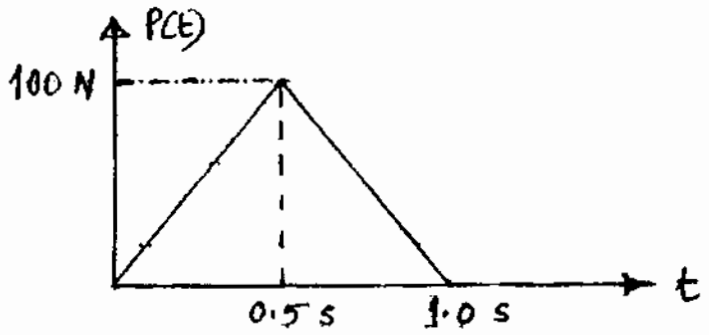
Module – I

II. A single storey building was tested using a harmonic loading machine, operated at two different frequencies with a force amplitude of 2000 N in each case. The test data is given below :

Operating frequency of machine (rad/s)	Response amplitude (mm)	Phase angle (degree)
15	0.20	15
25	0.42	50

Evaluate the mass, stiffness and damping of the structure, assuming it as a single degree of freedom system. **20**

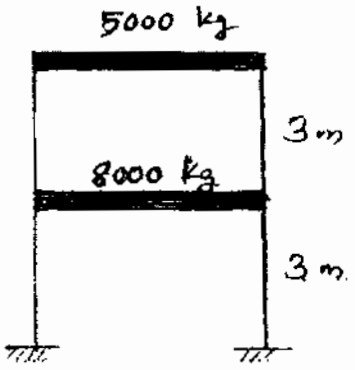
III. Obtain the response of an undamped single degree of freedom system with mass 150 kg and stiffness 12 kN/m due to a triangular load as shown :



20

Module – II

IV. Find the natural frequencies and mode shapes of the shear building frame shown. Columns are identical in section having flexural rigidity = 3×10^6 Nm^2. Sketch the mode shapes also.



20

V. A two storied shear building frame has the following properties :

Mass of first floor = 2000 kg

Mass of second floor = 1500 kg

The natural frequencies of the frame are found to be 5.164 rad/s and 12.247 rad/s.

The model matrix is obtained as $\begin{bmatrix} 1 & 1 \\ 1.667 & -0.8 \end{bmatrix}$.

Find the response of the system if the first floor is subjected to a harmonic load $P_0 \sin \lambda t$ (P_0 = 500 N and λ = 6 rad/s). Neglect damping. **20**

(Pages : 3) **6146**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.702 : DESIGN OF HYDRAULIC STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions : *i) Assume suitable data* ***wherever*** *necessary.*
ii) ***Use*** *of Khosla's chart and Blench curve is* ***permitted*** *in the examination hall.*

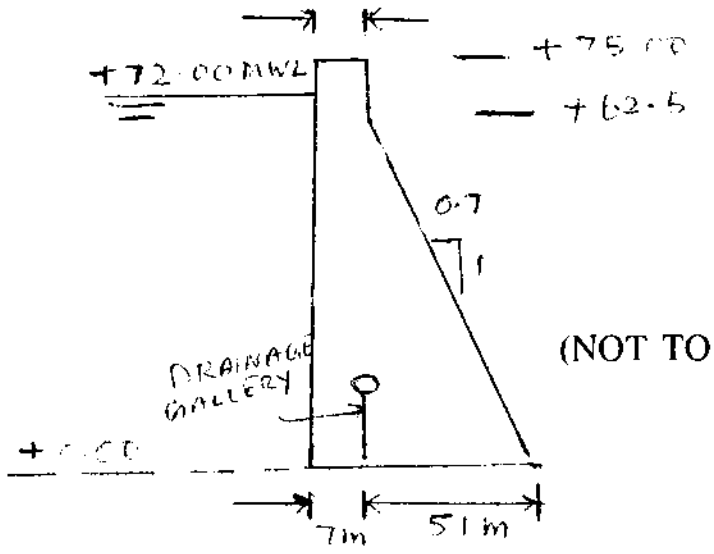
PART – A

Answer **all** questions :

1. Briefly describe different types of dams.
2. What are the causes of the failure of an earth dam ?
3. With sketches, explain Type I, Type II and Type III aqueducts.
4. What are canal falls ? Explain any two types of canal falls. **(4×5=20 Marks)**

PART – B

5. Compute the base pressure of the gravity dam shown in the figure. Take density of concrete as 24 kN/m^3 and density of water 10 kN/m^3. **10**



(NOT TO SCALE)

OR

P.T.O.

6. a) What are the limitations of thin cylinder theory ? **3**

   b) Using thin cylinder theory, find out the central angle of an arch dam for the most economical section. **7**

7. Design the impervious apron of a vertical drop weir for the following data using Bligh's Creep theory.

   Maximum flood discharge 2500 cumecs

   High flood level = 255.0 m.

   Minimum water level = 248.0 m (d/s level)

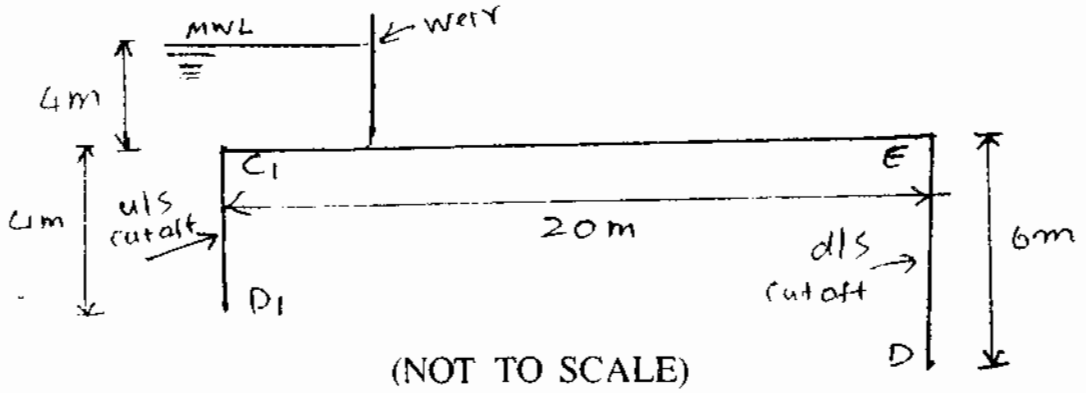
   Full supply level of canal = 254.0

   Allowable afflux = 1 m.

   Bligh's Creep co-efficient = 12 **10**

OR

8. Find out the uplift pressures at points C_1, D_1, E and D of the floor on a permeable foundation, shown in the sketch. Use Khosla's theory. **10**



(NOT TO SCALE)

PART – C

9. a) Design a syphon aqueduct for the following data :
   i) Discharge of the canal = 30 cumec.
   ii) Bed width of canal = 20 m.
   iii) Depth of water in the canal = 1.6 m.
   iv) Bed level of the canal = 260.00 m.
   v) High flood discharge of the drain = 450 cumecs.

vi) High flood level of the drain = 261.00 m.
vii) Bed level of the drain = 258.00 m.
viii) General ground level = 260.00 m.
ix) Silt factor = 0.9. **30**

b) Draw the following views to a suitable scale.
i) Plan at top. **15**
ii) Longitudinal section along the centre line of the aque duct. **15**

OR

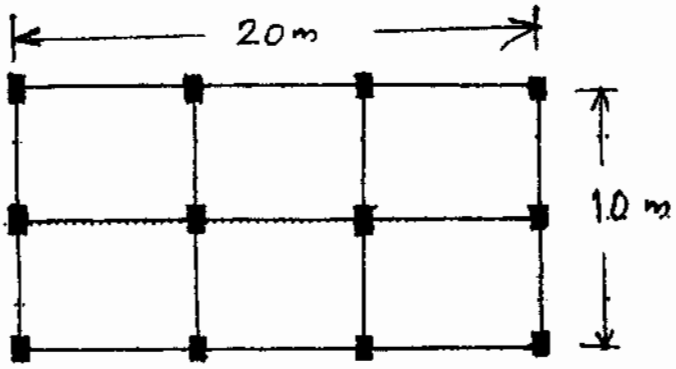
10. a) Design a Sarda type fall for the following data.
Full supply discharge = 45 cumecs.
Full supply level – u/s =118.30 m, d/s = 116.80 m.
Full supply depth – u/s = 1.8 m, d/s = 1.8 m.
Bed width – u/s = 28 m, d/s = 28 m.
Bed level – u/s = 116.50 m, d/s = 115.00 m.
Drop = 1.5 m. **30**

b) Draw the following views to a suitable scale.
i) Half plan at top and half at foundation. **15**
ii) Longitudinal section along the centre line of the canal. **15**

Module – III

VI. Explain the response spectrum method to analyse a multi-degree of freedom system subjected to a base acceleration. Derive the relevant equations. **20**

VII. Figure shows the plan of a 10 storied RC framed structure to be constructed at Thiruvananthapuram. Height of each storey is 3.0 m. Calculate the seismic forces at various floor levels.



Data given:

Column section : 30×60 cm

Beam section : 30×50 cm

Slab thickness : 12 cm

Thickness of brick wall around : 23 cm (No walls inside)

Type of soil at the site : Hard soil

Live load on floors : 4 KN/m^2

Live load on roof : 1.5 KN/m^2

Unit weight of concrete : 25 KN/m^3

Unit weight of brick wall : 22 KN/m^3. **20**

(Pages : 2) **6154**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.705.6 : Elective – III : AIR QUALITY MANAGEMENT (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions.*

PART – A

1. Define air pollution and list out the man-made pollutants.
2. What are primary pollutants ?
3. Explain Atmospheric inversions.
4. Explain diffusion of pollutants.
5. Write a note on wind velocity profile.
6. Define adsorption. What is the difference between chemical and physical adsorption ?
7. Discuss the advantages and disadvantages of cyclones.
8. What are the basic considerations of ambient air sampling ? **(5×8=40 Marks)**

PART – B

Module – I

9. Discuss the general effects of air pollution on human beings, vegetation, animals and inert materials. **20**

OR

10. a) How will you classify air pollutants according to source ? Explain the effects of pollutants on living things. **12**

    b) Define photo chemical smog. Explain the theory of its formation and explain its harmful effects. **8**

P.T.O.

Module – II

11. a) Derive an expression for constant density lapse rate. **12**

    b) Write a note on sub adiabatic lapse rate and plume behavior. **8**

OR

12. Explain Gaussian plume model and Pasquill Gifford diffusion curves for an isolated point source. **20**

Module – III

13. Explain any one method each for the control of SO_2, NO_x, CO and Hydrocarbons. Give the national ambient air quality standards for the above two. **20**

OR

14. a) Explain the following methods of collection of gaseous air pollutants :

    i) Adsorption on solids

    ii) Freeze out sampling. **12**

    b) Write a brief note on air quality standards. **8**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.703 : GEOTECHNICAL ENGINEERING – II (C)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions in Part A and **any one** full question from **each** Module.*

PART – A

1. Explain Westergaard's theory for evaluating vertical stress below loaded area with concentrated load.

2. Write down the expression for vertical stress below the centre of circular loaded area and explain the terms.

3. What is the effect of surcharge on depth of tension crack, in the case of a retaining wall with purely cohesive backfill ? Explain.

4. In a standard penetration test, the following observations were taken at a depth of 4 m below ground level.
   1st 15 cm 10 blows, 2nd 15 cm 16 blows, 3rd 15 cm 23 blows and 4th 15 cm 30 blows. Estimate the observed SPT value used for correction.

5. Differentiate between general and local shear failure. How will you evaluate the bearing capacity of a strip footing for local shear failure as per Terzaghi's theory ?

6. Under what circumstances raft foundations are preferred ? What do you mean by a fully compensated raft ?

7. What are the problems associated with well sinking ? Mention any two methods of rectifying the same.

8. What is the natural frequency of a machine foundation having a base area of 2m×2m and weight 150 KN including the weight of the machine ? Take coefficient of elastic uniform compress 4×10^4 KN/m^3. **(8×5=40 Marks)**

PART – B

Module – I

9. a) Explain the principle and use of Newmark's chart. **10**

   b) A water tower is founded on a circular ring type foundation. The width of the ring is 4 m and its internal radius 8 m. Assuming the distributed load per unit area as 300 kPa. Determine the vertical pressure at a depth of 6 m below the centre of the foundation. **10**

10. A wall of 6 m height retains non-cohesive backfill of dry unit weight 18 KN/m^3 and $\phi = 30^\circ$. Use Rankine's theory and find total active earth pressure per meter length of the wall. Estimate the change in the total pressure in the following cases :

    i) The top of b/f carrying a surcharge of 6 kPa

    ii) The b/f under submerged condition with the watertable at an elevation of 2 m below the top of the wall. Assume G = 2.65 and soil above W.T. remains saturated. **20**

Module – II

11. What will be the gross and net safe bearing capacity of sand having $\phi = 36^\circ$ sp.gravity 2.65 and void ratio 0.6, under the following cases :

    i) 1 m wide strip footing

    ii) 1m×1m square footing

    iii) Circular footing of 1 m dia.

    The footing is placed at a depth of 1 m below ground surface and W.T. at the base of the footing. Use FS 3, Terzaghi's theory. For $\phi = 36^\circ$, $N_q = 49$, $N_r = 54$. **20**

12. a) Explain the procedure for conducting SPT. What are the corrections applied to the observed value ? **10**

    b) A standard penetration test was conducted on a saturated fine sand below the ground water table. The SPT value was found to be 32. Does the value represent the true SPT value ? Explain. **10**

Module – III

13. A precast concrete pile 400 mm dia is installed in a sandy stratum to a depth of 12 m by driving. The W.T. is at 3 m below ground level. The saturated unit weight of sand is 21 KN/m^3 and the dry unit weight 17 KN/m^3. The angle of shearing resistance of sand is 32°. The coefficient of lateral pressure can be taken as 1.2 and the bearing capacity factor Nq as 34. Calculate the safe load on the pile for a Fs 2.5. **20**

14. a) Explain with a neat sketch the components of a well foundation.

    b) What are the forces acting on a well foundation ?

    c) Explain with neat sketch the isolation methods adopted in vibrations. **20**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014

(2008 Scheme)

08.705.3 : DEEP FOUNDATIONS (C) (Elective – III)

Time: 3 Hours Max. Marks: 100

Instruction : *Answer **all** questions in Part – A and **one** from **each** Module in Part – **B**.*

PART – A

1. What is the basis on which the dynamic formulae are derived ? Mention two well known dynamic formulae and explain the symbols involved.
2. What are the different types of load tests conducted on Pile ? Explain the purpose of each test.
3. Explain negative skin friction. How can the negative skin friction of pile groups be computed ?
4. Explain group efficiency of piles. Suggest two formulae to find out group efficiency of a pile group.
5. Explain equivalent raft approach.
6. Explain the determination of settlement of pile groups in sands.
7. What is 'Grip Length' of well ? What are the conditions in the determination of the grip length ?
8. Enumerate the various methods for the analysis of the lateral stability of a well acted on by horizontal forces. **(8×5=40 Marks)**

P.T.O.

PART – B

Module – I

9. A 35 cm diameter concrete pile is driven in a normally consolidated clay deposit 15 m thick. Estimate the safe load. Take Cu = 60 kN/m^2, α = 0.85 and F.S. 2.5. **8**

10. A 35 cm square pile, 12 m long, is driven in a deposit of medium dense sand (ϕ = 35°, N_r = 38 and N_q = 40). The unit weight of sand is 16 kN/m^3. What is the allowable load with a factor of safety of 3 ? Assume lateral earth pressure coefficient = 0.6 **12**

OR

11. A pile is driven with a single acting steam hammer of weight 15 kN with a free fall of 900 mm. The final set, the average of the last three blows is 27.5 mm. Find the safe load using the engineering news formula. **8**

12. A 300 mm×300 mm concrete pile penetrates in a deep uniform deposit of clay (cu = 40 kN/m^2) and rest in a stratum of good bearing. Estimate the load taken by skin friction. Assume adhesion factor is 0.7. **12**

Module – II

13. Design a square pile group to carry 400 kN in clay with an unconfined compression strength of 60 kN/m^2. The piles are 30 cm diameter and 6m long. Adhesion factor may be taken as 0.5. **20**

OR

14. a) A straight shaft drilled pier of 1.2 m diameter is constructed in a dense sand deposit (ϕ = 40° and r = 20 kN/m^3). The total depth of the pier is 18 m. Estimate the allowable load (factor of safety = 2.5). **10**

    b) A square pile group of 9 piles passes through a recently filled up material of 4.5 m depth. The diameter of the pile is 30 cm and pile spacing is 90 cm centre to centre. If the unconfined compression strength of the cohesive material is 60 kN/m^2 and unit weight is 15 kN/m^3. Compute the negative skin friction of the pile group. **10**

Module – III

15. a) What are the forces acting on well foundation ? List the different shapes of cross-sections of well, giving the merits and demerits of each. **10**

    b) What are the problems encountered in well sinking ? How are they minimised ? **10**

OR

16. A circular well has an external diameter of 7.5 m and is sunk into a sandy soil to a depth of 20 m below the maximum scrur level. The resultant horizontal force is 1800 N. The well is subjected to a moment of 36,000 kN.m about the maximum scour level due to the lateral force. Determine whether the well is safe against lateral forces, assuming the well to rotate :

    a) about a point above the base and

    b) about the base.

    Assume $\gamma' = 10$ kN/m^3 and $\phi = 36°$. Use Terzaghi's analysis and a factor of safety of 2 against passive resistance. **20**

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Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.801 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. How is a software product different from other engineering products ?

2. List the major activities represented by four quadrants of the spiral model.

3. What are the different techniques used to gather requirements ?

4. What are the advantages of function oriented metrics over the size oriented metrics ?

5. Explain different categories of Risks.

6. What is a task network ?

7. What is the role of Software Quality Assurance Group ?

8. What is meant by Software Practitioner's myth ? Explain.

9. How can software metrics improve the quality of software ?

10. 'Adding people to a late software project can make it later.' There are circumstances in which this is true. Explain. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** module. **(3x20=60 Marks)**

Module – I

11. a) Suggest a process model when the requirements for a job are well understood. Explain the pros and cons of this model. **10**

    b) What is a software process ? Describe its different characteristics. **10**

OR

12. a) Explain in detail ISO 9000 model. **10**

    b) Explain the Rapid Application Development model. **10**

Module – II

13. a) Explain COCOMO model for software estimation. **10**

    b) Explain about dynamic testing tools. **10**

OR

14. a) Explain equivalence class partitioning with an example. **10**

    b) Explain Function Point Analysis. **10**

Module – III

15. a) Explain the Software Configuration Management (SCM) process. **10**

    b) Discuss about different CASE tools. **10**

OR

16. a) How is a task set defined for the software project ? **8**

    b) What are the reliability factors, influencing the quality of software ? **12**

(Pages : 2) **7679**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806 (2) : DIGITAL IMAGE PROCESSING (Elective – IV) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. What are solid state array sensors ? Mention its advantage.
2. Define connectivity between pixels.
3. Give the formulae for the two dimensional DFT and its inverse.
4. Explain histogram of a digital image.
5. What are median filters ? Give a spatial low pass filter of size 3×3.
6. What do you mean by inverse filtering ?
7. Explain Gray-level slicing.
8. Why 'LOG' operator is considered a better edge detector compared to the Laplacian operator ?
9. Discuss Region-splitting method for segmentation.
10. Differentiate between data and information.

(10x4=40 Marks)

P.T.O.

PART – B

Answer **any one** question from **each** Module. **All** question carry **equal** marks.

Module – I

11. a) With a neat block diagram explain the fundamental steps in image processing.

    b) Compare Walsh and Hadamad transforms. **(2×10=20 Marks)**

OR

12. a) A 2×2 image block is given as $A = \begin{bmatrix} 20 & 13 \\ 20 & 1 \end{bmatrix}$. Determine the DCT coefficient.

    b) Describe the basic concepts in sampling and quantization. **(2×10=20 Marks)**

Module – II

13. a) Discuss various image enhancement techniques based on the intensity of single pixels.

    b) What do you mean by Gaussion Noise ? How does an averaging filter eliminate it ? **(2×10=20 Marks)**

OR

14. a) Briefly explain constrained least mean square filtering.

    b) Discuss Laplacian filter. **(2×10=20 Marks)**

Module – III

15. a) Discuss block transform coding.

    b) Explain arithmetic coding with an example. **(2×10=20 Marks)**

OR

16. a) Explain the thresholding approach of segmentation of an image.

    b) Discuss the concept of bit-plane coding. **(2×10=20 Marks)**

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Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806 (1) : ARTIFICIAL INTELLIGENCE (Elective – IV) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Calculate the total number of nodes visited in iterative deepening research in a defined level.

2. Discuss the control strategies for production systems.

3. What do you mean by constraint satisfaction ?

4. Represent the following statement using conceptual dependency : John ate the ice cream with a spoon.

5. Discuss about perceptron learning.

6. Write notes on explanation based learning.

7. Discuss the various components of a script.

8. Discuss the basic concepts of Markov Model.

9. Differentiate between 'assert' and 'asserta' in PROLOG.

10. Discuss about the different abstract data types in PROLOG. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module. **All** questions carry **equal** marks.

Module – I

11. a) Discuss the AO* algorithm. **10**

    b) List the production rules for water-jug problem. Using the same, solve the given problem :

    You are given 2 jugs, a 4-gallon, jug and a 3-gallon jug. Neither has measuring marks in it. How can you measure 2-gallon of water in 4-gallon jug. **10**

OR

12. a) Explain the significance of heuristics in games. **10**

    b) Discuss any three applications of AI. **10**

Module – II

13. a) Consider the following facts :

    1) The members of St. Bridge Club are Joe, Sally, Bill and Ellen.
    2) Joe is married to Sally.
    3) The spouse of every married person in the club is also in the club.
    4) The last meeting of the club was at Joe's club.

    Decide the truth on the following statement.

    "The last meeting of the club was at Sally's Home." **12**

    b) Discuss various steps for converting a well-formed formula (wff) into clause form. **8**

OR

14. a) Discuss back propagation algorithm. **10**

    b) Explain analogical learning. **10**

Module – III

15. a) Discuss rule based expert system. **10**

    b) Explain two different stochastic tools for language analysis. **10**

OR

16. a) Give one application of Natural language processing. **10**

    b) Discuss about symbolic analysis for deconstructing language. **10**

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806 (4) : INTERNET TECHNOLOGY (Elective – IV) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Can an arbitrary web server function as a proxy server ? Why ?
2. Write a Java Script which obtains information about the browser and the OS running in the host machine.
3. Give two examples where TELNET uses TCP's urgent data mechanism. Why is this useful ?
4. What is Secure Electronic Transaction (SET) ?
5. What are server-side and client-side scripts ? Give examples of each.
6. What happens in FTP if the TCP connection for data transfer breaks, but the control connection does not ?
7. What is the difference between GET and POST methods in HTTP ?
8. What are the potential problems when 3 address domains are connected by two NAT boxes ?
9. What are the basic components of an e-commerce software ?
10. Under what circumstances will a VPN transfer substantially more packets than conventional IP when sending the same data over the internet. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) What are the advantages in using PHP for developing web pages ? Explain in detail. **10**

    b) How is an XML document parsed using DOM ? Explain. **10**

OR

12. Create an HTML web page that does the following :

    a) Embed a map within the web page.

    b) Fix some hot spots in the embedded map.

    c) Show related information when hot spots are clicked. **20**

Module – II

13. a) Explain the terms i) electronic cash and ii) electronic wallet. **10**

    b) How does a search engine ensure that the most relevant pages are retrieved ? Explain. **10**

OR

14. a) Explain how a plug-in is developed and integrated with the browser. **10**

    b) Write software and hardware specifications for a web server machine. Explain in detail. **10**

Module – III

15. a) A DHCP client is required to handle at least 312 octets of options (as per standard). Why is 312 chosen ? **8**

    b) Explain anyone protocol for transferring video over IP. **12**

OR

16. a) Write any 9 DNS resource record types. Explain each in detail. **10**

    b) Explain the role of RPC and XDR in NFS. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.803 : CRYPTOGRAPHY AND NETWORK SECURITY (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Compare differential and linear cryptanalysis.
2. Distinguish between stream cipher and block cipher.
3. Define a trapdoor one way function and explain its use in asymmetric key cryptography.
4. What is double DES ? What kind of attack on double DES makes it useless ?
5. What is the difference between a MAC and a hash function ?
6. Show that Diffie-Hellman key exchange is insecure against man-in-the middle attack.
7. Explain how Bob finds out what cryptographic algorithms Alice has used when he receives a PGP message from her.
8. Compare Transport mode ESP and tunnel mode ESP.
9. List the security services provided by a digital signature.
10. What are the encrypted tunnels ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one full** question from **each** Module. **Each full** question carries **20** marks.

Module – I

11. a) Explain different transposition techniques used in cryptography. **10**

    b) List and briefly define types of cryptanalytic attackes based on what is known to the attacker. **10**

OR

12. Explain AES encryption algorithm and its security. **20**

Module – II

13. a) Alice wants to send a message to Bob. Alice wants Bob to be able to ensure that the message did not change in transit. Briefly outline the cryptographic steps that Alice and Bob must follow to ensure the integrity of the message by creating and verifying a MAC. **10**

    b) Consider a Diffie-Hellman scheme with a common prime q = 11 and primitive root $\alpha = 2$

        i) If User A has public key $Y_A = 9$, what is A's private key X_A.

        ii) If User B has public key $Y_B = 3$, what is the shared secret key, shared with A. **10**

14. a) What is the smallest value of a valid encryption key and the corresponding decryption key for an RSA modulus 143 ? **10**

    b) Describe Digital Signature Standards. **10**

Module – III

15. a) Explain Secure Socket Layer Protocol. **10**

    b) Describe different types of firewalls. **10**

OR

16. a) Describe S/MIME used for e-mail security. **10**

    b) How Encapsulating Security Payload (ESP) provide confidentiality and authentication ? **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.803 : AUTOMOBILE ENGINEERING (M)

Time : 3 Hours Max. Marks : 100

Instruction : *i) Answer **all** questions from Part – **A**.*
*ii) Answer **one** question from **each** Module in Part – **B**.*

PART – A

1. Explain the different ways in which automobile engines can be classified.
2. What are the qualities of a good lubricant for use in an automobile ?
3. Describe the principle involved in the functioning of a simple carburettor.
4. Explain the terms 'ignition timing' and 'ignition advance'.
5. What are the advantages of synchromesh transmission ?
6. Distinguish between three speed and four speed gear boxes.
7. Explain the working of Epicyclic gear train.
8. Prepare a brief note on 'tandem master cylinder'.
9. What is a steering knuckle and what is its importance ?
10. Explain briefly on hybrid vehicles. **(4×10=40 Marks)**

PART – B

Module – I

11. a) Explain any two types of valve operating mechanisms used in an engine. **10**
    b) With neat sketches, explain the working of Wankel rotary piston engine. **10**
12. a) With the help of sketch explain the working of battery coil ignition system. **10**
    b) Describe the most popular method of lubrication used in passenger cars. **10**

P.T.O.

Module – II

13. a) Explain the common troubles encountered in gear boxes and suggest suitable remedies. **10**

    b) Describe the working of a torque converter. **10**

14. a) Give an account on the working of Hobbs and Smiths transmission system. **10**

    b) Discuss briefly on variometric transmission used in two-wheelers. **10**

Module – III

15. a) Sketch a reciprocating ball type steering gear and explain its working. **10**

    b) Describe the working and construction of a torsion bar suspension with sketches. **10**

16. Prepare short notes on following : **(4×5=20 Marks)**

    a) Rack and pinion

    b) Chasis lubrication

    c) Stratified charge engine

    d) Automotive Air conditioning.

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805 (3) : MOBILE AND WIRELESS NETWORKS (Elective – III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What are the different kinds of fading that can occur in mobile environment ?
2. Briefly explain the concept of spread spectrum. What are its advantages ?
3. Mention the reasons, why a baseband signal cannot be directly transmitted in a wireless system ?
4. Brief hidden and exposed terminal problem in wireless communication system.
5. Differentiate 2G and 3G networks.
6. What are the significances of SIFS, PIFS and DIFS in MAC layer ?
7. List and explain three different ways classifying satellite orbits.
8. What is DHCP ? Why it is important for a mobile host ?
9. How does registration on layer 3 of a mobile node work ?
10. What do you mean by Indirect TCP ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) Describe the frequency spectrum used in wireless transmission. Mention the characteristics of each. **10**

    b) Explain about different multiplexing mechanism used in wireless communication system. Give the significance of guard space in each multiplexing method. **10**

OR

12. a) Explain advanced FSK. Advanced PSK used in wireless communication system. **10**

    b) Generate BPSK and MSK signal with user data 1011010 after selecting suitable LF and HF signal. Mention number of phase difference happening with given data in BPSK and MSK. **10**

Module – II

13. a) Explain architectural reference model and protocol reference model of GPRS. **10**

    b) Explain domain and interfaces of UMTS. **10**

OR

14. a) Explain system architecture and MAC frame structure of infrastructure based IEEE 802.11. **10**

    b) Explain performance characteristics and working of BLUETOOTH. **10**

Module – III

15. a) Define the entities of mobile IP and describe the data transfer between mobile node and fixed node. **10**

    b) What is MANET ? Explain with example how does DSR protocol handles routing in MANET. **10**

OR

16. a) Describe the components and interfaces of WAP 1.x Architecture. **10**

    b) Explain with example the integration of WAP components in to existing fixed and wireless network. **10**

(3×20=60 Marks)

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Reg. No. : .....

Name : .....

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.804 : DISTRIBUTED SYSTEMS (R)

Time : 3 Hours Max. Marks : 1

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. Give the key characteristics of peer-to-peer distributed systems.
2. What is meant by mobile code ? What are its disadvantages ?
3. What are Byzantine failures ?
4. Explain the challenges of distributed systems with respect to the transparency of its components.
5. Compare between pre-emptive scheduling and non pre-emptive scheduling of threads.
6. "Parameter passing mechanisms of conventional procedure calls are not suitable for distributed systems." Why ?
7. What are sockets ? Does port and socket the same ?
8. Explain linearizability of replicated objects.
9. Explain 'dirty read' and 'premature write' problems with respect to transactions.
10. How is backward validation of transaction done ? **(10×4 = 40 Mar**

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.804 : DISTRIBUTED SYSTEMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. Give the key characteristics of peer-to-peer distributed systems.
2. What is meant by mobile code ? What are its disadvantages ?
3. What are Byzantine failures ?
4. Explain the challenges of distributed systems with respect to the transparency of its components.
5. Compare between pre-emptive scheduling and non pre-emptive scheduling of threads.
6. "Parameter passing mechanisms of conventional procedure calls are not suitable for distributed systems." Why ?
7. What are sockets ? Does port and socket the same ?
8. Explain linearizability of replicated objects.
9. Explain 'dirty read' and 'premature write' problems with respect to transactions.
10. How is backward validation of transaction done ? **(10×4 = 40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carry **20** marks.

Module – I

11. a) Describe challenges in the design of scalable distributed systems. **8**

    b) Explain failure model of distributed systems. **12**

OR

12. a) Explain Mobile IP routing mechanism. **10**

    b) Explain the use of firewall in an organization. Describe different types of firewall configurations. **10**

Module – II

13. a) How IP multicast facilitate group communication ? **10**

    b) State the similarities and differences between RPC and RMI. **10**

OR

14. a) Explain different components for the implementation of RMI. **10**

    b) What is marshalling ? Why is it necessary for inter process communication ? Explain. **10**

Module – III

15. a) Explain edge chasing algorithm for distributed transactions using a suitable example. How many messages are transferred between servers to detect a deadlock involving N transactions ? Explain. **12**

    b) Describe the architecture of distributed file system. **8**

OR

16. a) Explain the sequence of events when a client requests an operation in passive replication. How does it differ from active replication ? **8**

    b) Explain the rules for commitment of nested transactions. How can locks be applied for nested transactions ? **12**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
08.803 : CRYPTOGRAPHY AND NETWORK SECURITY (R)

Duration : 3 Hours Total Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

I. 1) List the parameters (block size, key size and number of rounds) for three AES version.

2) Use extended Euclidean algorithm to find multiplicative inverse of 9 in Z_{26}.

3) Use Vignere cipher with keyword 'HEALTH' to encipher the message 'full of surprises'.

4) Define a Security Association.

5) Draw possible scheme for authentication using a public key encryption system.

6) Define weak collision resistance and strong collision resistance.

7) Write any two benefits of providing security at IP level (IP SeC).

8) What is the function of Handshake protocol in SSL ?

9) Show how public keys can be distributed using public key certificates.

10) What is steganography ?

PART – B

Answer **one full** question from **each** Module. **Each** question carries **20** marks.

Module – I

II. a) Describe Mixcolumn transformation of AES. **8**

b) Discuss how DES can be used to encrypt/decrypt blocks of size less than 64. **12**

OR

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Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.801 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Why is it important to follow a life cycle model while developing a large software product ?
2. List few challenges faced during requirement elicitation.
3. What is a prototype ? What are the advantage of a prototyping software process model ?
4. Discuss about SRS validation.
5. What are the various activities during software planning ?
6. Distinguish among error, fault and failure, which of these condition is detected by testing.
7. What is the difference between coupling and cohesion ?
8. What are the activities for configuration management of software ?
9. Discuss the characteristics of good user Interface.
10. What is the role of a repository in a CASE environment ?

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. a) What do you understand with the term requirement elicitation ? Discuss any two techniques in detail. **10**

b) What is software life cycle ? Discuss the generic waterfall model. **10**

OR

P.T.O.

12. a) Explain the spiral model of software development. What are the limitations of such a model ? **10**

    b) Discuss the difference between the following
       i) Functional and non functional requirement
       ii) User and system requirements. **10**

Module – II

13. a) Discuss various types of COCOMO mode. Explain the phasewise distribution of effort. **10**

    b) What are the objectives of modular software design. What are the effect of module coupling and cohesion ? **10**

OR

14. a) Discuss the various kinds of functional testing. **10**

    b) What are the different risk management activities ? Is it possible to prioritize the risk ? **10**

Module – III

15. a) Describe data integration, user interface integration, and activity integration with respect to CASE tools. **10**

    b) What are the different activities in user interface design process ? **10**

OR

16. a) Draw a general architecture of CASE environment. Explain its important characteristics. **10**

    b) What are the advantages and disadvantages of CASE tools ? **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.801 : ADVANCED CONTROL THEORY (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are the properties of state transition matrix ?

2. Represent the following differential equation in state variable form.

$$\frac{d^2y}{dt^2} + \frac{5dy}{dt} + 2y = 4u(t).$$

3. What is similarity transformation ? Explain.

4. Write the diagonal form of state model of n^{th} order system ? What are its merits ?

5. What are the advantages of sampled data control system ?

6. Discuss the criteria for selecting sampling frequency.

7. Write the properties of Z-transform.

8. What is zero order hold ? Obtain its transfer function.

9. Distinguish between stable limit cycle and unstable limit cycle.

10. Derive the describing function of relay.

P.T.O.

PART – B

Answer **one full** question from **each** Module. **Each** question carries **20** marks.

Module – 1

11. a) Obtain the state model of an armature controlled dc motor.

b) $\frac{v(s)}{u(s)} = \frac{s^3 + 5s^2 + 3s + 4}{s^3 + 7s^2 + 12s}$; obtain the state space model in phase variable form and diagonal form.

12. a) Obtain the step response of the system

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ -1 \end{bmatrix} u \text{ with the initial}$$

conditions $\begin{bmatrix} x_1(0) \\ x_2(0) \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$;

output $y = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$.

b) $\frac{v(s)}{u(s)} = \frac{10}{s(s+1)(s+2)}$. Design a state feedback controller with a state feedback so that the closed loop poles are placed at $-2, -1 \pm j1$.

Module – 2

13. a) Find the inverse Z-transform of

i) $F(z) = \frac{1 + z^{-1} + 2z^{-2} - z^{-3} + 3z^{-4}}{1 + 2z^{-1} + 3z^{-2}}$

ii) $F(z) = \frac{1}{1 - 1.5z^{-1} + 0.5z^{-2}}$.

b) Find the z-transform of

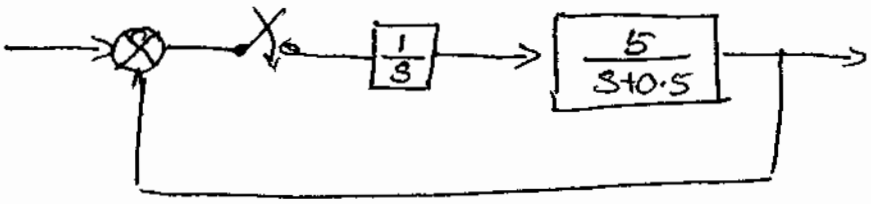
i) $e^{-at} \sin \omega t$

ii) $k^2 a^k$.

14. a) Solve the difference equation

$c(k+2) + 3c(k+1)+2c(k) = u(k)$. Given that $c(0) = 1$, $c(1) = -3$, $c(k) = 0$ for $k < 0$.

b) Determine the pulse transfer function of the system shown in fig. Is the system stable for sampling time T = 1sec.



Module – 3

15. a) Explain the terms stable, asymptotically stable and asymptotically stable in the large.

b) Explain Liapunov stability theorems.

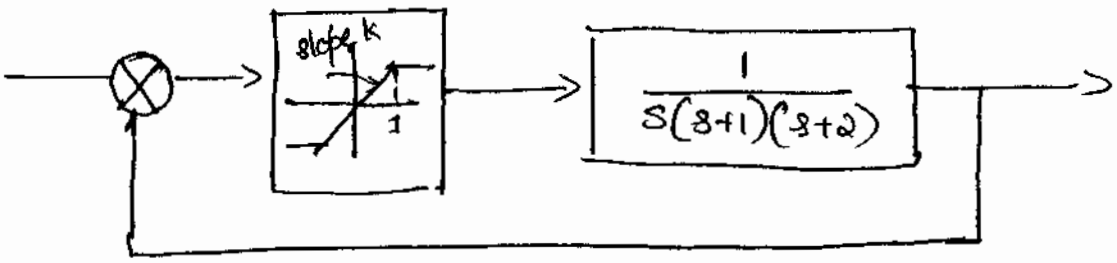
c) Consider a non-linear system governed by the equations

$\dot{x}_1 = -x_1 + 2x_1^2 x_2$

$\dot{x}_2 = -x_2$

Check stability using Liapunov method.

16.



For the unity feedback system shown in fig : having a saturation amplifier with gain k, determine the maximum value of k for the system to be stable. What would be magnitude, frequency and nature of limit cycle for a gain of k = 3.

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806 (2) : DIGITAL IMAGE PROCESSING (Elective – IV) (R)

Time : 3 Hours Max. Marks :100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Explain image sampling with an example.
2. What do you mean by contrast-stretching ?
3. Write notes on Hotelling transform.
4. What is an affine transform ?
5. What is the mathematical significance of histogram equalisation ?
6. How will you achieve image enhancement with a sharpening filter ?
7. Write notes on least-mean-square filtering.
8. Differentiate between lossy and lossless compression.
9. Briefly explain Sobel and Prewitt edge detectors.
10. Write notes on run length encoding.

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) Explain with the help of a block diagram, the elements of a digital image processing system. **8**

    b) State and explain 2-D convolution theorem. Explain the significance of zero padding. **12**

OR

12. a) Write notes on the following :

    i) Neighbourhood of a pixel

    ii) Adjacency

    iii) Connectivity

    iv) Regions

    v) Boundaries. **10**

    b) Briefly explain 2-D discrete Fourier Transform of an image. **10**

Module – II

13. a) Write notes on spatial correlation and convolution. **8**

    b) Describe the different smoothing spatial filters. **12**

OR

14. a) Describe the most commonly occurring noise PDFs in images. **8**

    b) How is periodic noise reduced by frequency domain filtering ? Which are the different filters used for this purpose ? **12**

Module – III

15. a) Write notes on the different types of redundancy occurring in digital images. **8**

    b) Describe arithmetic coding. Given a four symbol source {a, b, c, d} with source probabilities p(a) = 0.1, p(b) = 0.4, p(c) = 0.3 and p(4) = 0.2, arithmetically encode the sequence bbadc. **12**

OR

16. a) Describe the process of edge linking and boundary detection. **12**

    b) How will you detect isolated points in an image? **8**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.802 : COMPUTER SYSTEM ARCHITECTURE (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is PRAM model ? Compare the different PRAM models.
2. List out the metrics affecting the scalability of a computer system for a given application.
3. Distinguish between register-to-register and memory-to-memory architecture for building conventional multivector supercomputers.
4. Explain how instruction set and memory hierarchy affect the CPU performance in terms of clock rate, program length and effective CPI.
5. What is the significance of Bernstein's condition to detect parallelism ?
6. Describe the cache inconsistencies caused by process migration.
7. Justify the statement : "Multiple functional units as well as Hazard avoidance improve throughput of pipelined processor".
8. Distinguish between static and dynamic interconnection network.
9. Compare multiprocessors and multicomputers.
10. Describe multithreaded architecture. **(10×4=40 Marks)**

P.T.O.

PART – B

Each question carries **20** marks.

Module – I

11. a) Analyze the dependencies among the following statements in a given program. Show the dependence graphs among the statements with justification

```
DO 10 I = 1, N
    A (I + 1) = B (I – 1) + C (I)
    B (I) = A (I) * K
    C (I) = B (I) – 1
CONTINUE
```

b)

S1 : Load R1, M (100)	/R1 ← Memory (100)/
S2 : Move R2, R1	/R2 ← (R1)/
S3 : Inc R1	/R1 ← (R1) + 1/
S4 : Add R2, R1	/R2 ← (R2) + (R1)/
S5 : Store M (100), R1	/Memory (100) ← (R1)/

Where (Ri) means the content of register Ri.

i) Draw dependence graph to show all the dependences with justification.

ii) Are there any resource dependences if only one copy of each functional unit is available in the CPU ?

OR

12. Consider the execution of the following code segment consisting of seven statements. Use Bernstein's conditions to detect the maximum parallelism embedded in this code. Justify the portions that can be executed in parallel and the remaining portions that must be executed sequentially. Rewrite the code using parallel constructs such as Cobegin and Coend. No variable substitution is allowed. All statements can be executed in parallel if they are declared within the same block of a (Cobegin, Coend) pair

S1 : A = B + C
S2 : C = D + E
S3 : F = G + E
S4 : C = A + F
S5 : M = G + C
S6 : A = L + C
S7 : A = E + A

Module – II

13. Consider the five-stage pipelined processor specified by the following reservation table :

	1	2	3	4	5	6
S1	X					X
S2		X			X	
S3			X			
S4				X		
S5		X				X

a) List the set of forbidden latencies and collision vector.

b) Draw state transition diagram showing all possible initial sequences (cycle) without causing a collision in the pipeline.

c) List all the simple cycles from the state diagram.

d) Identify the greedy cycles among the simple cycles.

e) What is the minimum average latency (MAL) of this pipeline ?

f) What is the minimum allowed constant cycle in using this pipeline ?

g) What will be the maximum throughput of this pipeline ?

h) What will be the throughput if the minimum constant cycle is used ?

OR

14. a) What is the use of reorder buffer ?

b) Discuss the various instruction issue and completion policies with and without instruction look ahead in a superscalar processor.

Module – III

15. a) Explain any two cache coherence protocol.

b) Describe how multiport memories used in multistage networks.

OR

16. a) Explain blocking and non-blocking network with the help of Omega network.

b) Describe data flow in hybrid architecture. **(3×20=60 Marks)**

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806 (1) : ARTIFICIAL INTELLIGENCE (Elective – IV) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Describe Turing's criteria for computer software being "intelligent".
2. Discuss the merits of using heuristics in game playing.
3. Differentiate between data driven and goal driven search.
4. Explain DFS with iterative deepening.
5. Convert the following statement into predicate calculus. There is a faculty member who has never been asked a question by a student.
6. What is the importance of unification in resolution ?
7. Represent the following statement using semantic net. The dog bite the bag.
8. How unification is done in PROLOG ?
9. Explain the various stages in language analysis.
10. Specify one application of natural language processing. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module. **All** questions carry **equal** marks.

Module – I

11. a) Discuss A* algorithm. Is it optimal under all conditions. **10**

    b) Using constraint satisfaction. Solve the crypt arithmetic problem.
    SEND + MORE = MONEY
    (Hint : Each letter should be assigned on unique digit from 0 to 9). **10**

OR

P.T.O.

12. a) Briefly discuss Min-max procedure used in game playing. **10**

    b) What are production system ? Specify the requirements (any two) of a good production system. **10**

Module – II

13. a) Briefly discuss the candidate elimination algorithm. **12**

    b) What is meant by classifier system ? Explain. **8**

OR

14. a) Consider the following sentences :
    1) John likes all kinds of food
    2) Apples are food
    3) Chicken is a food
    4) Anything anyone eats and isn't killed by in food.
    5) Bill eats peanuts and is still alive.

    Prove that 'John likes peanuts' using resolution. **8**

    b) Discuss how genetic programming can be applied for solving travelling salesman problem. **12**

Module – III

15. a) Discuss different abstract data types used in PROLOG. **10**

    b) Give the architecture of an expert system. **10**

OR

16. a) With an example, explain rule based expert systems. **10**

    b) Explain how information extraction and summarization works for the web. **10**

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.801 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (R)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is an object point ? Explain how it is useful in estimating project effort ?
2. What do you understand by the term "Life cycle model" of software development ? Discuss its significance.
3. What is 40-20-20 rule of effort distribution ?
4. Define the term concept scoping.
5. Is "tracking" important in scheduling of projects ? Justify your answer.
6. Distinguish between reactive and proactive risk strategies.
7. Differentiate between validation and verification of software.
8. Illustrate the importance of software scope in planning.
9. Give the importance of people in management.
10. When do we use classical life cycle model in a project ? Explain. **(10×4=40 Marks)**

PART – B

Module – I

11. a) With a neat diagram explain incremental model for software development. **10**

    b) Explain the different maturity levels of CMM. **10**

OR

12. a) What are the main activities carried out during requirement analysis and specification ? Discuss the characteristics of good software requirement specification document. **15**

    b) Bring out the advantages of spiral model over waterfall model. **5**

Module – II

13. a) How are risks classified ? Explain. **10**

    b) Explain validation testing. Give an example illustrating how validation testing is done. **10**

OR

14. a) Define the term software design. What is coupling in the context of software design ? For a good design, modules should have low coupling. What is the reason for this ? **10**

    b) What categories of errors are traceable using black box testing ? Explain black box testing in detail. **10**

Module – III

15. a) Discuss CASE tool and CASE environment. What are the different types of CASE tools used in different phases of software development ? **15**

    b) What is configuration audit ? **5**

OR

16. a) How are changes controlled in software engineering ? **15**

    b) Explain the significance of software configuration management. **5**

(Pages : 2) **5830**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.804 : DISTRIBUTED SYSTEMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Can firewall prevent denial of service attack ? What other methods are available to deal with such attacks ?
2. Distinguish between architecture model and fundamental model for distributed systems.
3. Discuss the issue of naming applied to shared memory regions.
4. What is the role of skeleton in RMI ?
5. A search engine is a web server that responds to client requests to search in its stored indexes and (concurrently) runs several web crawler tasks to build and update the indexes. What are the requirements for synchronization between these concurrent activities ?
6. How can we detect distributed deadlock ?
7. What is the function of automounter in NFS ?
8. Compare the worker pool multi-threading architecture with the thread-per-request architecture.
9. Mention the role of coordinator in distributed transaction.
10. Compare flat and nested transactions. **(10×4=40 Marks)**

P.T.O.

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
Computer Science and Engineering
08.806 (4) : INTERNET TECHNOLOGY (Elective – IV)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is the use of MAC address in connecting a computer to internet ?
2. What is an IP ? Name the various IP that is used by the user applications to interact with other computers.
3. What is electronic wallets ?
4. Write short note on Internet utility program.
5. Explain stored value cards.
6. Write notes on the various helper applications.
7. Explain the role of proxy servers in http.
8. How can the privacy of an organization be guaranteed without using leased circuits ?
9. Why do we need two file transfer protocols ?
10. Explain the DNS message format. **(4×10=40 Marks)**

P.T.O.

PART – B

Answer **one full** question from **each** Module.

Module – I

11. a) Explain how to use arrays in JavaScript. Also mention the JavaScript types. Illustrate how an image can be embedded in a webpage using JavaScript.

    b) Explain with the help of a diagram the process of web crawling.

(10×2=20 Marks`

OR

12. a) What is XML ? Discuss the structure of XML. Define the role of DTD in XML.

    b) Write notes on PHP functions and forms. **(10×2=20 Marks)**

Module – II

13. a) Explain the functions of electronic commerce software.

    b) Briefly explain electronic cash. **(10×2=20 Marks)**

OR

14. What do you mean by web server ? With the help of a diagram explain how web servers works. Also provide notes on web server-browser interactions. **20**

Module – III

15. a) Explain in detail video over IP.

    b) What is the need of DHCP ? Explain. **(10×2=20 Marks)**

OR

16. a) Explain Pointer queries and inverse mapping in the context of DNS.

    b) Explain the significance of NAT. Also explain about multi address and port-mapped NAT. **(10×2=20 Marks)**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, January 2014
(2003 Scheme)
03.806(1) : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM
(Elective – V) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Draw the architecture of AI systems.
2. Discuss any two production system characteristics.
3. How blind search differ from heuristic search ? Explain.
4. Explain the role of Alpha-Beta cutoff in Mini-Max search.
5. Specify any one drawback of semantic net.
6. Explain various components of a script form of knowledge representation.
7. Draw the architecture of an expert system.
8. What is meant by fuzzy reasoning ? Explain.
9. Define Modus Ponens and Modus Tollens.
10. Discuss rule-value approach. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Give A* search algorithm. Discuss its optimality and completeness. **10**
    b) Explain how an unstructured problem is treated to solve instate space approach. **10**

OR

12. a) Briefly discuss Mini-Max search procedure. **10**
    b) Differentiate between forward and backward chaining with examples. **10**

P.T.O.

Module – II

13. a) Briefly discuss any one AI representation scheme. **10**

    b) Explain unification with an example. **10**

OR

14. a) Convert the following sentence to clause form "Anything Anyone eats and is not killed by is food". **10**

    b) Compare and contrast Weak-Slot and filler structures with strong Slot-Filler structures. **10**

Module – III

15. a) Explain the steps involved in the development of a frame based expert system. **10**

    b) Explain, what for and how, probability and fuzzy logic are adapted in expert systems. **10**

OR

16. a) Give the advantages of expert system architecture based on decision trees over that based on production rules. What are its disadvantages ? **8**

    b) Discuss various types of expert systems. **12**

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Reg. No : ....

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EIGHTH SEMESTER B.Tech. DEGREE EXAMINATION, JANUARY 2014

(2003 Scheme)

03.806(4): Elective-V: WIRELESS NETWORKS (R)

Time: 3 Hours Max. Marks: 100

PART -A

Answer ***all*** questions.

1. Discuss Nyquist Bandwidth and Shannon Channel Capacity.
2. Differentiate analog and digital transmission.
3. Illustrate the concept of Cellular Radio Network.
4. What are the frequency domain concepts of signals? State the relationship between data rate and bandwidth.
5. Discuss any two error detection methods.
6. Explain adaptive differential PCM.
7. What are the advantages of WLL over wired approach?
8. Write any two wireless LAN requirements.
9. Write a brief notes on 802.11 standard.
10. Differentiate Infrared and Bluetooth. **(10X4=40 Marks)**

PART -B

Answer ***anyone full*** question from ***each*** module.

MODULE- I

11. a) Describe in detail the architecture of ATM cell and the service categories. **(12)**

    b) Write short notes on;
    i) Terrestrial Microwave ii) Satellite Microwave **(8)**

OR

12. a) Describe in detail the system architecture of GSM. **(10)**

    b) Write short notes on;
    i) Frequency division Multiplexing. ii) Time Division Multiplexing. **(10)**

P.T.O.

MODULE- II

13. a) Explain
    i) Frequency hopping Spread Spectrum.
    ii) Direct sequence Spread Spectrum. **(12)**

    b) Write short notes on ;
    i) CDMA ii) TDMA **(8)**

OR

14. a) Describe in detail the working of Mobile IP. **(12)**

    b) Explain WAP protocol stack **(8)**

MODULE- III

15. a) Explain in detail 802.11 architecture and services. **(12)**

    b) Describe Infrared LANS **(8)**

OR

16. a) What do you mean by Adhoc network? Describe the working of Bluetooth network. **(10)**

    b) Describe Wireless ATM. **(10)**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.805(3) : MOBILE AND WIRELESS NETWORKS (Elective – III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain about multipath propagation in radio transmission.
2. What are the advanced techniques in PSK ?
3. Explain FDMA.
4. What do you mean by frequency reuse in cellular systems ?
5. What is UTRAN ? What are the main functions of UTRAN ?
6. Compare Infrared transmission with Radio transmission.
7. What are the requirements of a HIPERLAN ?
8. What do you mean by selective retransmission ?
9. Define WML and explain the basic features included in WML.
10. Explain dynamic host configuration protocol. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** Module.

Module – I

11. i) Define spread spectrum and explain how spread spectrum eliminates narrowband interferences. **10**

    ii) Explain DSSS and FHSS technology. **10**

OR

12. i) What is MACA and explain how this scheme eliminates hidden and exposed terminal problems. 10

ii) Explain CDMA technology. 10

Module – II

13. i) Explain GSM architecture. 10

ii) Explain the features and architecture of UMTS. 10

OR

14. i) Explain IEEE 802.11 MAC layer and its management. 10

ii) Explain BLUETOOTH architecture and its protocol stack. 10

Module – III

15. i) Explain Dynamic Source Routing in MANET with example. 10

ii) What do you mean by tunneling and encapsulation and explain different methods of encapsulation used in Mobile IP ? 10

OR

16. i) Explain about indirect TCP and Snooping TCP. 10

ii) Explain wireless transaction protocols of WAPI.X. 10

(3×20=60 Marks)

(Pages : 2) **6865**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.803 : CRYPTOGRAPHY AND NETWORK SECURITY (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Distinguish between a stream cipher and a block cipher.
2. Define an S-box and mention the necessary condition for an S-box to be invertible.
3. Explain differential and linear cryptanalysis.
4. Define a state in AES. How many states are there in each version of AES ?
5. Define Fermat's little theorem and explain its application.
6. Distinguish between message integrity and message authentication.
7. Define a cryptographic hash function.
8. Explain how Bob finds out what cryptographic algorithms Alice has used when he receives a S/MIME message from her.
9. What are security associations ?
10. What is the difference between a firewall and an Intrusion Detection System ?

PART – B

Answer **one** full question from **each** Module. **Each** full question carries **20** marks.

MODULE – I

11. a) Discuss about the different substitution techniques used in cryptography.
    b) Explain Fiestel cipher model. **20**

OR

12. Explain AES Encryption algorithm. **20**

P.T.O.

MODULE – II

13. Explain :
    a) Write key exchange algorithm using ECC. **12**
    b) Use of modular arithmetic in cryptography. **8**

OR

14. a) What are digital signatures ? Write DSA algorithm. **10**
    b) Explain MD 5 algorithm. **10**

MODULE – III

15. a) What is Secure Electronic Transaction ? What are the key features of SET ? Explain the various categories of SET participants. **12**
    b) Write short notes on Dual signature. **8**

OR

16. a) Explain IPSec Architecture. **12**
    b) Name different protocols in SSL. **8**

(Pages : 2) **6866**

Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.804 : DISTRIBUTED SYSTEMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is meant by middlewave ? What is its role in a distributed computing environment ?

2. What is the difference between fail-stop and crash failure ?

3. What is clock drift rate ? Explain clock drift in the context of synchronous and asynchronous distributed systems.

4. List different methods for defeating security threats in distributed systems.

5. Explain the terms (i) socket and (ii) ports in the context of interprocess communication.

6. Describe the request reply message structure in client server communication.

7. Differentiate between remote and local method invocations.

8. What is a persistent object in the context of RMI ?

9. What is the role of virtual file system in NFS.

10. Explain lost update problem. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) What are the challenges associated with distributed system design ? **10**

    b) Explain the model that simplifies and abstracts the functions of individual components of a distributed system. **10**

OR

12. a) Describe and illustrate the client server architecture of three major internet applications. **10**

    b) Can firewall prevent denial of service attacks ? What are the other methods available to deal with such attacks ? **10**

Module – II

13. a) Explain how external data representation and marshalling is done in CORBA. **8**

    b) Why is there no explicit data typing in CORBA CDR ? **5**

    c) How can we create a new process in a distributed system ? **7**

OR

14. a) Explain how traditional object model can be extended to distributed systems. **10**

    b) Explain how an event-based distributed system works with suitable examples. **10**

Module – III

15. a) Describe the architecture of Andrew File System (AFS) emphasizing the distribution of processes in the file system. **10**

    b) Explain how optimistic concurrency control schemes work. **10**

OR

16. a) Explain how transaction serialization is done using locks. **10**

    b) Illustrate different techniques for replicating transactions. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.801 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are the characteristics of software process ? Discuss in detail.
2. What are the activities during software verification ?
3. What is a test plan ?
4. Why is software validation important ?
5. Distinguish between DFD and ER diagram.
6. What are non functional requirements for a software ?
7. Discuss the impact of cohesion and coupling in design phase.
8. Justify the phrase "software is engineered".
9. Distinguish between alpha testing and beta testing.
10. Define software reengineering. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Explain waterfall model for software development. **10**
    b) Explain how both waterfall model of software process and prototyping model can be automated in the spiral model. **5**
    c) List out the core principles of software engineering. **5**

OR

P.T.O.

12. a) Explain spiral model for software development. What types of software projects are suitable for this model ? **15**

    b) What are the ways and means for collecting software requirements ? **5**

Module – II

13. a) What is black box testing ? Is it necessary to perform this ? Explain various test activities. **15**

    b) What are the difficulties involved in software maintenance ? **5**

OR

14. a) Describe the design process in software development. **10**

    b) What are the characteristics and criteria for design ? **10**

Module – III

15. a) List out and explain dominant issues in configuration management for web applications. **10**

    b) Explain what is meant by project scheduling. What are the different techniques used for scheduling ? **10**

OR

16. a) Explain the various factors which contribute to effective software project management. **15**

    b) What are the risks associated with managing software projects ? **5**

(3×20=60 Marks)

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.802 : COMPUTER SYSTEM ARCHITECTURE (R)

Time : 3 Hours Max. Marks : 100

PART – A

(Answer **all** questions.)

1. Define the following terms for various system interconnect architectures :
   a) Node degree
   b) Network diameter
   c) Bisection bandwidth
   d) Network latency.
2. Distinguish between implicit parallelism and explicit parallelism of parallel programming.
3. Describe different types of hazards due to data dependency.
4. What is the significance of Bernstein's condition to detect parallelism ?
5. Write a short note on CPA and CSA.
6. Define a base scalar processor and illustrate the execution of successive instruction in a base scalar processor by a space-time diagram.
7. Distinguish between register-to-register and memory-to memory architecture for building conventional multivector super computers.

8. Give an overview about the memory level hierarchy.

9. Differentiate between write-through laches and write-back laches.

10. Write a short note on interleaved memory organization in multiprocessor system.

(10×4=40 Marks)

PART – B

Module – I

11. Distinguish between multiprocessors and multi computers based on their structures, resource sharing and interprocessor communications. Also explain the differences among UMA, NUMA, COMA and NORMA computers. **20**

OR

12. a) Describe briefly about the operational model of SIMD computers with an examples. **10**

b) Answer the following questions for the K-ary n-cube network.

I) What is the network diameter, bisection bandwidth ?

II) What is the node degree and number of nodes ?

III) Under the assumption of constant wire bisection, why do low-dimensional networks (tort) have lower latency and higher hot-spot through put than high-dimensional networks (hypercubes) ?

IV) Mention the difference between a conventional torus and a folded torus. **10**

Module – II

13. Explain the concept of pipelining in

i) Superscalar processors

ii) VLIW processors. **20**

OR

14. Consider the following pipeline reservation table

	1	2	3	4
S1	X			X
S2		X		
S3			X	

1) What are the forbidden latencies ?

2) Draw the state transition diagram.

3) List all the simple cycles and greedy cycles.

4) Determine the optional constant latency cycle and the minimal average latency.

5) Let the pipeline clock period be λ = 20 ns. Determine the throughput of this pipeline. **20**

Module – III

15. a) Describe how crossbar switch and multiport memories are used in multistage networks. **15**

b) Distinguish between static and dynamic dataflow computers. **5**

OR

16. Explain the following Cache Coherence Protocol.

a) Snoopy Bus Protocol

b) Full map directory based protocol. **20**

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, December 2012
(2003 Scheme)
03.801 : INTERNET TECHNOLOGY (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question has **4** marks.

1. Explain streaming of stored audio.
2. Explain the relevance of HTML and XML in the CONTEXT of the Internet.
3. What are the functions of a DNS ?
4. Enumerate the goals of RSVP.
5. What is a trusted system and what are its characteristics ?
6. Explain the structure of an e-mail address.
7. Explain the characteristics of DHCP.
8. What is an ad-hoc network ?
9. Explain the important types of viruses.
10. What is the relevance of snooping TCP ? **(4×10=40 Marks)**

PART – B

Answer **any one** full question from **each** Module. **Each** full question has **20** marks.

MODULE – I

11. a) Describe the various scheduling and policing mechanisms used in multimedia networking. **10**

    b) Compare and contrast Persistent HTTP with Pipelining and Persistent HTTP without Pipelining. **10**

P.T.O.

12. a) Describe the architecture and the characteristics of the RTP. **10**

    b) Describe the process of establishing a connection between the client and the server during a data transmission session on the Internet. **10**

MODULE – II

13. Describe how the different protocols of the IPsec protocol suite help in providing security. **20**

14. a) Describe the roles of the Oakley Key Determination Protocol and the ISAKMP in IPsec. **10**

    b) Discuss the techniques of any four different types of firewalls. **10**

MODULE – III

15. a) Describe minimal encapsulation and generic routing encapsulation in the context of mobile IP. **10**

    b) Describe the features of WML and explain how do WAP and WML are inter-linked. **10**

16. a) Describe Indirect-TCP and explain its advantages and disadvantages. **10**

    b) Describe the characteristics of the various protocols in the WAP suite. **10**

(3×20=60 Marks)

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Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.804 : Distributed Systems (R)

Time: 3 Hours Max. Marks: 100

Answer **all** questions. **Each** question carries **4** marks :

1. How can we achieve openness is distributed systems ?
2. Compare client server model and peer to peer model for distributed system design.
3. What are the different types of switching schemes used in computer networking ?
4. What are the overheads associated with guaranteed message delivery in TCP stream communication ?
5. How are remote object references represented in a distributed system ?
6. Are reliability and ordering the major issues in multicast ? Justify your answer.
7. Explain the various invocation semantics for RMI.
8. Explain execution environment of a process in detail.
9. Is phantom deadlock really a deadlock ? Justify your answer.
10. What is the complexity associated with edge chasing algorithm ? **(10x4=40 Marks)**

P.T.O.

Answer **any one** question from **each** Module. **Each** question carries **20** marks :

MODULE – I

11. a) What aspects of distributed system's are captured in fundamental models. Explain in detail. **12**

    b) Explain the relevance and need for a fire wall in a network along with the several nodes of implementation of the same. **8**

OR

12. a) What are the design requirements of distributed systems ? **12**

    b) Can fire wall prevent denial of service attacks ? What are the other methods available to deal with such attacks ? **8**

MODULE – II

13. a) Describe the request reply protocol associated with client server communication in detail. **10**

    b) Explain how group communication can be implemented taking IP multicast as a case study. **10**

OR

14. a) What are the major design issues for RMI ? **10**

    b) Explain the importance of digital signatures in a secure system. Describe different techniques of signing a document. **10**

MODULE – III

15. a) Describe centralized distributed deadlock detection in detail. **10**

    b) Give a brief over view of Network File System (NFS). **10**

OR

16. a) What are the requirements of distributed file systems ? **10**

    b) Describe various techniques for concurrency control in distributed transactions. **10**

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Eighth Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.806 (4) : INTERNET TECHNOLOGY (Elective – IV) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Write notes on CSS text properties.

2. Describe name space in XML.

3. What do you mean by a web browser ?

4. Differentiate between a static webpage and a dynamic webpage.

5. Write short notes on route tracing utility programes.

6. Write notes on stored value cards.

7. What do you mean by response time of a webserver ?

8. Explain the process of file transfer using FTP.

9. Differentiate between persistent and nonpersistent connections in HTTP.

10. Write notes on ARP. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. Explain about DOM. What are the different DOM methods ? **20**

OR

12. a) Explain basic XHTML syntax and semantics. **10**

    b) Describe how images are inserted into an HTML document. **10**

Module – II

13. Explain about the different electronic payment cards. What are the advantages and disadvantages of payment cards ? **20**

OR

14. a) Explain the web client/server architecture. **10**

    b) What are the different softwares for webservers ? **10**

Module – III

15. a) Describe the role of DNS in a content distribution network. **10**

    b) Describe the key components of Email system. **10**

OR

16. Explain remote login using TELNET. **20**

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Eighth Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.805 (3) : MOBILE AND WIRELESS NETWORKS (Elective – III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the time domain, frequency domain and phase domain representations of a signal.
2. Explain the behaviour of ground wave propagation, sky wave propagation and line of sight propagation of radio waves.
3. Differentiate between short-term fading and long-term fading of signals.
4. Explain the advantages and disadvantages of cellular systems with small cells.
5. Explain the DECT system architecture reference model.
6. What are the merits of LEO and MEO satellites ?
7. Explain the merits and demerits of WLANS.
8. Explain the snooping TCP approach.
9. Write a note on DHCP.
10. Explain the merits and demerits of ad-hoc networks. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** full question from **each** Module. **Each** full question carries **20** marks.

Module – I

11. Describe SDMA, FDMA, TDM and CDM. **20**

OR

12. Discuss the working of DSSS and FHSS systems. **20**

Module – II

13. a) Describe the nine services defined in IEEE802.11 standard. **10**

    b) Describe the Bluetooth architecture and bluetooth protocol stack. **10**

OR

14. Discuss the architectures of RSS, NSS and OSS of a GSM system. **20**

Module – III

15. Describe the components and interface of WAP 1.X architecture and explain the method of integrating WAP components into existing fixed and wireless networks. **20**

OR

16. Describe the following file systems used in mobile and wireless environments

    i) CODA

    ii) FICUS

    iii) LITTLE WORK

    iv) MIO-NFS

    v) ROVER. **20**

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Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.803 : CRYPTOGRAPHY AND NETWORKS SECURITY (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks. **(10×4=40 Marks)**

1. What is substitution cipher ? Give an example.
2. Explain brute force and statistical attack.
3. Explain chosen plain text attack and chosen cipher text attack.
4. What is affine cipher ?
5. Given 2 prime numbers p and q. Find a public key and private key for the RSA algorithm.
6. What are the applications of public-key cryptosystems ?
7. What is DSA ?
8. What are the functions of S/MIME ?
9. What are the services provided by SSL Record Protocol ?
10. Explain the TLS Record Format.

P.T.O.

PART – B

Answer **one full** question from **each** Module. **Each** questions carries **20** marks.

Module – I

11. a) Explain AES Algorithm with its basic structure. How is key expansion performed in AES ? **20**

OR

12. a) Explain play fair cipher. Encrypt the message 'good morning' using playfair cipher. **10**

b) Explain the working of rotor machine with a diagram. **10**

Module – II

13. a) Explain :

a) Factoring Problem and

b) Timing attacks in the context of RSA security. **10**

b) What is MAC ? Explain with a figure the use of MAC for

i) Message Authentication.

ii) Message Authentication and confidentiality.

Some applications prefer MAC over symmetric encryption. Why ? **10**

OR

14. a) Explain the following schemes used in the distribution of public keys with a diagram.

i) Publicly available directory

ii) Public-key certificate. **10**

b) Explain Secure Hash Algorithm. **10**

Module – III

15. a) What is Secure Electronic Transaction ? What are the key features of SET ? Explain the various categories of SET participants. **15**

    b) Write short notes on Dual Signature. **5**

OR

16. a) Explain IPSec Architecture. **10**

    b) Write short notes on :

    a) Circuit level gateway.

    b) Application level gateway. **10**

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Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 COMPUTER SYSTEM ARCHITECTURE (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define the following terms related to parallelism :
   a) Flow dependence
   b) Antidependence
   c) Control dependence
   d) Resource dependence
2. Discuss briefly about Flynn's classification.
3. What is a PRAM model ? How is it different from the RAM model ?
4. Mention any four basic metrics affecting the scalability of a computer system for a given application.
5. Distinguish between scalar RISC and super scalar RISC in terms of instruction issue, pipleline architecture and processor performance.
6. Give an overview about the memory level hierarchy.
7. Distinguish between temporal locality and spatial locality of references.
8. Distinguish between multiprocessors and multicomputers.
9. Write a short note on snoopy bus protocol for multiprocessor system.
10. Compare static and dynamic data flow computer. **(10×4=40 Marks)**

P.T.O.

PART – B

11. a) Analyze the data dependencies among the following statements in a given program. Also show the dependence graphs among the statements with justification.

    i) S1 : A = B + D
    S2 : C = A × 3
    S3 : A = A + C
    S4 : E = A/2

    ii) D0 10 I = 1, N
    A (I + 1) = B (I – 1) + C (I)
    B (I) = A (I) × K
    C (I) = B (I) – 1
    10 continue. **12**

    b) List the basic differences between UMA, NUMA and COMA models. **8**

OR

12. a) Explain the architecture of a vector super computer with register-to-register architecture. How is it different from a memory-to-memory architecture ? **12**

    b) Explain the routing functions used for perfect shuffle and exchange network. **8**

13. Consider the following reservation table for a four stage pipeline with a clock cycle λ = 20 ns.

	1	2	3	4	5	6
S1	X					X
S2		X		X		
S3			X			
S4				X	X	

    a) What are the forbidden latencies and the initial collision vector ?

    b) Draw the state transition diagram for scheduling the pipeline.

    c) Determine the MAL associated with the shortest greedy cycle.

    d) Determine the pipeline throughput corresponding to the MAL and given λ. **20**

OR

14. a) Discuss the various instruction issue and completion policies with and without instruction look ahead in a superscalar processor. **15**

    b) Explain pipelining in VLIW processors. **5**

15. a) Explain in detail the different types of interleaved memory organization in multiprocessor system. **12**

    b) Describe how multiport memories are used in multistage networks. **8**

OR

16. Explain the different latency hiding techniques for enhancing scalability and programmability. **20**

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Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 COMPUTER SYSTEM ARCHITECTURE (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define the following terms related to parallelism :
   a) Flow dependence
   b) Antidependence
   c) Control dependence
   d) Resource dependence
2. Discuss briefly about Flynn's classification.
3. What is a PRAM model ? How is it different from the RAM model ?
4. Mention any four basic metrics affecting the scalability of a computer system for a given application.
5. Distinguish between scalar RISC and super scalar RISC in terms of instruction issue, pipleline architecture and processor performance.
6. Give an overview about the memory level hierarchy.
7. Distinguish between temporal locality and spatial locality of references.
8. Distinguish between multiprocessors and multicomputers.
9. Write a short note on snoopy bus protocol for multiprocessor system.
10. Compare static and dynamic data flow computer. **(10×4=40 Marks)**

P.T.O.

PART – B

11. a) Analyze the data dependencies among the following statements in a given program. Also show the dependence graphs among the statements with justification.

    i) S1 : A = B + D
    S2 : C = A × 3
    S3 : A = A + C
    S4 : E = A/2

    ii) D0 10 I = 1, N
    A (I + 1) = B (I – 1) + C (I)
    B (I) = A (I) × K
    C (I) = B (I) – 1
    10 continue. **12**

    b) List the basic differences between UMA, NUMA and COMA models. **8**

OR

12. a) Explain the architecture of a vector super computer with register-to-register architecture. How is it different from a memory-to-memory architecture ? **12**

    b) Explain the routing functions used for perfect shuffle and exchange network. **8**

13. Consider the following reservation table for a four stage pipeline with a clock cycle λ = 20 ns.

	1	2	3	4	5	6
S1	X					X
S2		X		X		
S3			X			
S4				X	X	

    a) What are the forbidden latencies and the initial collision vector ?

    b) Draw the state transition diagram for scheduling the pipeline.

    c) Determine the MAL associated with the shortest greedy cycle.

    d) Determine the pipeline throughput corresponding to the MAL and given λ. **20**

OR

14. a) Discuss the various instruction issue and completion policies with and without instruction look ahead in a superscalar processor. **15**

    b) Explain pipelining in VLIW processors. **5**

15. a) Explain in detail the different types of interleaved memory organization in multiprocessor system. **12**

    b) Describe how multiport memories are used in multistage networks. **8**

OR

16. Explain the different latency hiding techniques for enhancing scalability and programmability. **20**

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.801 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Differentiate between a software process and product.
2. Define process maturity. Write down the different process levels in CMM.
3. Define requirement analysis. Write down the different areas of effort in requirement analysis.
4. Differentiate between functional models and behavioral models.
5. What is the difference between known risks and predictable risks ?
6. Enumerate different types of coupling that might exist between two modules.
7. Discuss test care design.
8. What are the different activities in user interface design process ?
9. What are the advantages and disadvantages of CASE tools ?
10. Comment how 'CASE' approach affects Programming effort. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. a) Explain spiral model of software development. Write down the advantages and disadvantages of this model. **10**

    b) Illustrate the role of elsecares in requirement elicitation for a software. **10**

OR

12. a) Write short notes on :
    i) SRS validation
    ii) Components of SRS
    iii) Data flow diagram
    iv) E-R-Diagram. **20**

Module – II

13. a) Distinguish between Integration testing and System testing. **10**

    b) Why is maintenance important in SDLC ? What are the different types of maintenance ? **10**

OR

14. a) Discuss the concept of cohesive module. What are the different types of cohesion ? **10**

    b) What are the testing principles that software engineer must apply while performing testing ? **10**

Module – III

15. a) Write down the special features exhibited by CASE tools.

    b) Define 'baselines' in the context of software engineering. **20**

OR

16. a) Give the complete architecture of a CASE environment and discuss its support in software life cycle. **15**

    b) Why case tools are unable to mitigate software crisis ? **5**

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Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.803 – CRYPTOGRAPHY AND NETWORKS SECURITY (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks. **(10×4=40 Marks)**

1. What are the different components of a symmetric cipher model ?
2. Give the purpose of S-boxes in DES algorithm.
3. Differentiate monoalphabetic and polyalphabetic cipher with an eg.
4. Explain linear and differential cryptanalysis.
5. Give a simple procedure for picking a prime number.
6. What is Elliptic Curve Cryptography ?
7. What are the basic requirements of a hash function ?
8. Explain the basic services provided by PGP.
9. Why does ESP include a padding field ?
10. List out the benefits of IPSec.

PART – B

Answer **one full** question from **each** Module.

Module – I

11. a) What are the different block cipher modes of operations ? Explain. **15**

    b) Differentiate block cipher and stream cipher with an eg. each. **5**

OR

12. a) Explain DES key generation algorithm and Encryption algorithm. **15**

    b) What are the different features that add to the strength of DES ? **5**

P.T.O.

Module – II

13. a) What is key management ? Explain with figure a secret key distribution scheme that provides both confidentiality and authentication using public-key cryptography. **10**

    b) What is a message Digest ? Explain with figure the basic ways in which it can be used for message authentication. **10**

OR

14. Explain RSA algorithm. What are its basic requirements ? Explain the key generation of RSA with an example. **20**

Module – III

15. a) Explain the role of key identifiers and key rings in PGP. **10**

    b) Explain Transport Mode ESP and Tunnel Mode ESP. **10**

OR

16. a) Explain SSL architecture. **10**

    b) Describe the operation of PGP. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.804 : DISTRIBUTED SYSTEMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

(Answer **all** questions. **Each** question carries **4** marks.)

1. Define architectural model of a distributed system. Explain its significance.
2. If a distributed system is to be designed, what can be the challenges regarding scalability.
3. Give the differences between IPV4 and IPV6.
4. Describe the failure model in UDP datagram communication. How is reliability ensured in UDP communication ?
5. Define Multicasting.
6. Struct Person {string name; string place; long year;

   };

   Describe with a sample data, how CORBA represents the above structure.
7. Distinguish between monolithic kernels and microkernels.
8. What are the conditions to be satisfied to have distributed deadlock ?
9. What is a nested transaction ? List advantages of a nested transaction.
10. Why should UFID be unique across all possible file systems ? How is uniqueness for UFIDs ensured ? **(10×4=40 Marks)**

P.T.O.

PART – B

(Answer **any one** question from **each** Module. **Each** question carries **20** marks.)

MODULE – I

11. a) Explain the challenges in designing a distributed system. **15**

    b) Illustrate the use of middleware in distributed system with CORBA as an example. **5**

OR

12. a) Discuss resource sharing in distributed environment and enumerate issues related to system design. **6**

    b) Explain Classless Interdomain Routing (CIR). **6**

    c) What are the challenges in designing asynchronous distributed system. **8**

MODULE – II

13. a) What are the three different types of RPC exchange protocols ? How does their behaviour vary in presence of communication failures ?. **8**

    b) Describe how IP multicast is used to implement group communication. **12**

OR

14. a) TCP stream abstraction hides network characteristics such as message size, lost messages, flow control, message duplication and ordering etc. Discuss how this is achieved. **10**

    b) Explain how operating system provides protection in a distributed environment ? **10**

MODULE – III

15. Explain the architecture and implementation details of Andrew File system. **20**

OR

16. a) Explain in detail 'distributed deadlocks'. **12**

    b) Describe how two-phase commit protocol for nested transactions ensures that if the top-level transaction commits, all the right descendants are committed or aborted. **8**

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Eighth Semester B.Tech. Degree Examination, April/May 2012

(2008 Scheme)

08.806 (4) : INTERNET TECHNOLOGY (Elective – IV) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Differentiate between HTML and XHTML.
2. What are the features of Java script ?
3. What do you mean by a scripting language ? Give examples of scripting languages.
4. What is the function of a proxy server ?
5. What is the function of a webserver ?
6. Write short notes on electronic wallets.
7. What are the functions of DNS.
8. Compare SMTP and HTTP.
9. Write short notes on HIME.
10. Why do HTTP, FTP, SMTP, POP3 and 1 MAP run on top of TCP rather than UDP ?

(10×4 =40 Marks)

P.T.O.

PART – B

Module – I

11. a) Write a Java script program to randomly display image from image pool. **8**

    b) Write short notes on DHTML. **12**

OR

12. a) What is the significance of schemes in XML ? **10**

    b) Explain XML security frame work. **10**

Module – II

13. Briefly explain webserver hardware. **20**

OR

14. a) Describe the different website and internet utility programs. **12**

    b) Write short notes on search engines. **8**

Module – III

15. Explain the role of SMTP in email. **20**

OR

16. a) Write notes on VPN. **10**

    b) Briefly explain TFTP. **10**

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Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.805 (3) : MOBILE AND WIRELESS NETWORKS (Elective III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are location dependent services ?
2. Explain diversity antenna systems.
3. Explain AFSK and APSK.
4. Write a note on the chief components of UMTS.
5. Explain the structure of a normal burst used for data transmission inside a time slot in GSM.
6. Explain the GPRS architecture reference model.
7. Explain DHCP.
8. What are the advantages of ad-hoc networks ?
9. Explain the efficiency, transparency and consistency aspects of file systems used in mobile and wireless environments.
10. What are advantages and disadvantages of WLANs ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** full question from **each** Module. **Each** full question carries **20** marks.

MODULE – I

11. Draw the respective schematic diagrams and discuss the advantages and disadvantages of SDM, FDM, TDM and CDM. **20**

OR

12. Draw the respective block diagrams of transmitters and receivers and describe the working of DSSS and FHSS systems. **20**

MODULE – II

13. Discuss the architectures of RSS, NSS and OSS of a GSM system. **20**

OR

14. a) Describe the system architecture and protocol architecture of IEEE 802.11 standard. **10**

    b) Discuss the architecture and protocol stack of Bluetooth. **10**

MODULE – III

15. Describe the components and interface of WAP 1.X architecture and explain how one can integrate WAP components into existing wireless and fixed networks. **20**

OR

16. Describe the following classical enhancements to TCP for mobility.

    i) Snooping TCP

    ii) Indirect TCP

    iii) Mobile TCP

    iv) Transaction-oriented TCP. **20**

(3x20=60 Marks)

(Pages : 2) **1821**

SREE B[illegible] [illegible]GINEERING

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.801 : SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (R)

Time : 3 Hours Max. Marks: 100

PART – A

Answer **all** questions.

1. List the various Umbrella activities that are applied throughout the software process.
2. What are the different Key Process Areas (KPAs) defined in SEI CMM ?
3. Write down the drawbacks of RAD Model.
4. Give an example of a design fault that leads to failure.
5. What is Horizontal partitioning ? Compare it with vertical partitioning.
6. Justify the statement "Software maintenance is costlier".
7. What is an object point ? Explain how is it useful in estimating project effort.
8. Write down the options for applying human resources to a software project.
9. What are the different categories of project coordination techniques ?
10. Bring out the necessity of architectural design in software project management.

(10×4=40 Marks)

PART – B

Answer **any one** question for **each** Module.

Module – I

11. a) Explain evolutionary software process models. **10**

    b) Discuss three different techniques used for requirement elicitation of a software. **10**

OR

12. a) What is SEI-CMM ? Explain different levels and areas of CMM. Compare CMM with ISO 9000 standard. **12**

    b) Compare and contrast waterfall and RAD model for software development. **8**

Module – II

13. a) Explain clearly the concepts of coupling and Cohesion with necessary diagrams. Why are these concepts important in system design ? **12**

    b) What are the different design heuristics for effective modularity ? **8**

OR

14. a) Explain basis path testing technique for a software project ? Illustrate each step with an example. **10**

    b) What is cyclomatic complexity ? With an example, explain how it is computed. **10**

Module – III

15. a) Give complete architectural model for integration frame work. **10**

    b) How does CASE tools help software engineers in software development ? List any five CASE tools with their specific applications. **10**

OR

16. a) Define 'task set' for a software project. **10**

    b) Write notes on building blocks of CASE tools. Also list any five functions of CASE tools. **10**

(Pages : 2) **1823**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.803 – CRYPTOGRAPHY AND NETWORKS SECURITY (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks. **(10×4=40 Marks)**

1. What are the different components of a symmetric cipher model ?
2. Give the purpose of S-boxes in DES algorithm.
3. Differentiate monoalphabetic and polyalphabetic cipher with an eg.
4. Explain linear and differential cryptanalysis.
5. Give a simple procedure for picking a prime number.
6. What is Elliptic Curve Cryptography ?
7. What are the basic requirements of a hash function ?
8. Explain the basic services provided by PGP.
9. Why does ESP include a padding field ?
10. List out the benefits of IPSec.

PART – B

Answer **one full** question from **each** Module.

Module – I

11. a) What are the different block cipher modes of operations ? Explain. **15**

    b) Differentiate block cipher and stream cipher with an eg. each. **5**

OR

12. a) Explain DES key generation algorithm and Encryption algorithm. **15**

    b) What are the different features that add to the strength of DES ? **5**

P.T.O.

Module – II

13. a) What is key management ? Explain with figure a secret key distribution scheme that provides both confidentiality and authentication using public-key cryptography. **10**

    b) What is a message Digest ? Explain with figure the basic ways in which it can be used for message authentication. **10**

OR

14. Explain RSA algorithm. What are its basic requirements ? Explain the key generation of RSA with an example. **20**

Module – III

15. a) Explain the role of key identifiers and key rings in PGP. **10**

    b) Explain Transport Mode ESP and Tunnel Mode ESP. **10**

OR

16. a) Explain SSL architecture. **10**

    b) Describe the operation of PGP. **10**

(Pages : 4) 1822

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.802 : COMPUTER SYSTEM ARCHITECTURE (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Characterize the architectural operations of SIMD and MIMD computers.

2. Distinguish between multiprocessors and multicomputers based on their structures, resource sharing and interprocessor communications.

3. What is the significance of Bernstein's condition to detect parallelism ?

4. Define the following :

   (i) I/O Dependence (ii) Control Dependence (iii) Resource Dependence

5. Justify the statement: "Multiple functional units as well as Hazard avoidance improve throughput of pipelined processor".

6. Differentiate temporal locality, spatial locality and sequential locality.

7. Describe collision-free scheduling.

8. What is the use of crossbar network ?

9. Distinguish between single-threaded and multithreaded architecture.

10. Briefly describe cache coherence problem. **(10×4=40 Marks)**

P.T.O.

PART – B

Each question carries **20** marks.

11. a) A workstation uses a 15 MHz processor with a claimed 10-MIPS rating to execute a given program mix. Assume one cycle delay for each memory access.

    i) What is the effective CPI of this computer ?

    ii) Suppose the processor is being upgraded with a 30 MHz clock. However the speed of the memory subsystem remains unchanged, and consequently two clock cycles are needed per memory access. If 30% of the instructions require one memory access and another 5% require two memory accesses per instruction, what is the performance of the upgraded processor with a compatible instruction set and equal instruction counts in the given program mix ? **10**

    b) Briefly describe static and dynamic interconnection network with example. **10**

OR

12. a) Distinguish between register-to-register and memory-to-memory architecture for building conventional multivector supercomputers. **6**

    b) Analyze the data dependences among the following statements in a given program :

    S1 : Load R1, 1024 /R1 ← 1024/

    S2 : Load R2, M(10) /R2 ← Memory (10)/

    S3 : Add R1, R2 /R1 ← (R1) + (R2)/

    S4 : Store M(1024), R1 /Memory(1024) ← (R1)/

    S5 : Store M((R2)), 1024 /Memory(64) ← 1024/

    Where (Ri) means the content of register Ri and Memory (10) contains 64 initially.

    i) Draw dependence graph to show all the dependences.

    ii) Are there any resource dependences if only one copy of each functional unit is available in the CPU ? **14**

13. a) Consider the execution of a program of 15000 instructions by a linear pipeline processor with a clock rate of 25 MHz. Assume that the instruction pipeline has five stages and that one instruction is issued per clock cycle. The penalties due to branch instruction and out-of-sequence executions are ignored.

i) Calculate the speed up factor in using this pipeline to execute the program as compared with the use of an equivalent nonpipelined processor with an equal amount of flow-through delay.

ii) What are the efficiency and throughput of this pipelined processor. **10**

b) A two-level memory system has eight virtual pages on a disk to be mapped into four page frames (PFs) in the main memory. A certain program generated the following page trace :

1,0,2,2,1,7,6,7,0,1,2,0,3,0,4,5,1,5,2,4,5,6,7,6,7,2,4,2,7,3,3,2,3

i) Show the successive virtual pages residing in the page frames with respect to the above trace using LRU replacement policy. Compute the hit ratio in the main memory. Assume PFs are initially empty. **10**

OR

14. Consider the five-stage pipelined processor specified by the following reservation table :

	1	2	3	4	5	6
S1	X					X
S2		X			X	
S3			X			
S4				X		
S5		X				X

i) List the set of forbidden latencies and collision vector.

ii) Draw state transition diagram showing all possible initial sequences (cycle) without causing a collision in the pipeline.

iii) List all the simple cycles from the state diagram.

iv) Identify the greedy cycles among the simple cycles.

v) What is the minimum average latency (MAL) of this pipeline ?

vi) What is the minimum allowed constant cycle in using this pipeline ?

vii) What will be the maximum throughput of this pipeline ?

viii) What will be the throughput if the minimum constant cycle is used ? **20**

15. Explain :

a) Full map directory based protocol

b) Snoopy bus protocol. **20**

OR

16. a) Explain dynamic interconnection network with help of example.

b) Describe data flow and hybrid architecture. **20**

(Pages : 3) **6238**

Reg. No. : .....

Name : .....

SREE BU[illegible] OF ENGINEERING
[illegible]Y
[illegible]D

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.704(3) : COMMUNICATIVE ENGLISH AND TECHNICAL WRITING (R)
(Common with F 08.705D)

Time : 3 Hours Max. Marks : 100

PART – A

Module – I

1. Attempt **any six**. Give answers in **not** less than **five** complete sentences. **(6×5=30 Marks)**

   1) Mention five major characteristics of technical communication.

   2) Point out five principles for choosing appropriate words and phrases in scientific and engineering communication. Give at least one example for each.

   3) What are the major features of an abstract ?

   4) In what ways visual aids help one to communicate better ?

   5) What are the points to be kept in mind to make one's communication effective ?

   6) What are the different levels of communication ? Use the appropriate diagram for each.

   7) Fill in the blanks with suitable prepositions :

      a) We rejoiced _____ the success _____ our friend.

      b) The demand _____ talented professionals has also created big gaps _____ important sectors.

      c) I went _____ the party _____ Jane.

      d) Thank you _____ your invitation _____ attend the meeting on 20th September.

      e) How good are you _____ your pronunciation _____ English ?

P.T.O.

8) Choose the word which goes best with the verbs given below :

a) Organize

i) the deal ii) the meeting

iii) the syllabus iv) the machine

b) Reserve

i) a bank ii) a course iii) a room iv) a tour

c) Strike

i) the work ii) a flow

iii) a slump iv) a word

d) Plunge into

i) loss ii) debt iii) distress iv) dispute

e) Initiate into

i) a person ii) a problem

iii) a prospect iv) a group

PART – B

Module – II

II. Attempt **any two** of the following : **(2×15=30 Marks)**

1) What are the points to be kept in mind while writing an engineering or scientific paper ?

2) You are a software engineer. You want to get a suitable initial posting in TCS, Pune. Draft an application letter to its HR Head.

3) Place an order letter for the college library for display boards and racks, in your capacity as the Principal. Give stress for a substantial concession expected, as it is for an educational institution.

4) Give an account of the guidelines in detail, for writing a technical report.

Module – III

III. Attempt **any two** of the following : **(2×20=40 Marks)**

1) Narrate the experiences of Abdul Kalam at Schwartz High school, St.Joseph's college and MIT, with a review of the incidents and persons who influenced him there.

2) Abdul Kalam's perception of Dr. Sarabhai as a source of inspiration for space research activities in India. Give a few instances to highlight his contributions as recalled by the author.

3) Write about the SLV programme in detail, giving stress to its failure and success.

4) To what extent did the Agni launch bring out Abdul Kalam's invaluable qualities as a scientist and leader ?

  6238 A

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.704 (5) : CONTROL SYSTEMS ENGINEERING (Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define transfer function of a system.
2. Differentiate between the poles and zeros of a transfer function. Identify the poles and zeros of the following system

$$\frac{d^2y}{dt^2} + 6\frac{dy}{dt} + 9 = x(t)$$

3. What are the components of a closed loop system ? Represent a closed loop control system with a block diagram.
4. What is a signal flow graph ? How is it different from block diagram ? Explain with an example.
5. What do you understand by steady state error of a system ?
6. What are the necessary and sufficient conditions for stability using Routh Hurwitz criterion ?
7. Define Gain margin and Phase margin and explain their significance.
8. What is a DC tachogenerator ? How do you represent it in block diagram form ?
9. What is a transducer ? Define active and passive transducers with example.
10. Explain the working of a resistance thermometer. **(10×4=40 Marks)**

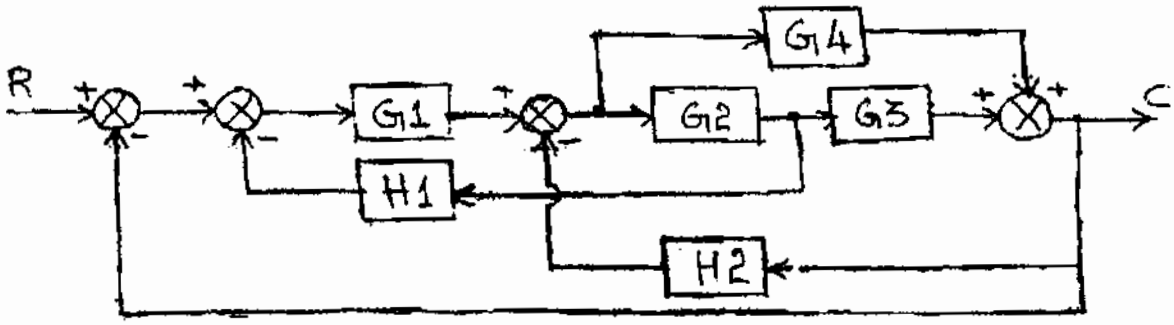
P.T.O.

PART – B

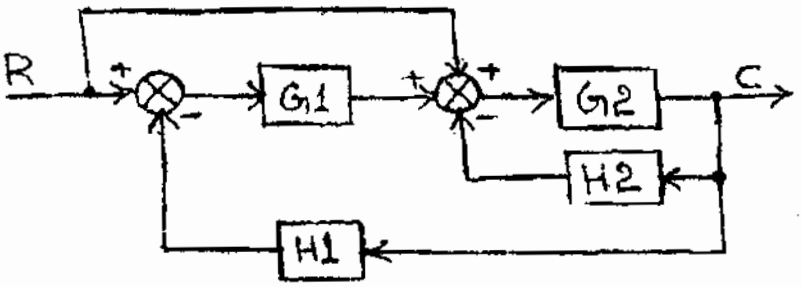
Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – 1

11. Using block diagram reduction technique find the transfer function of the following system.



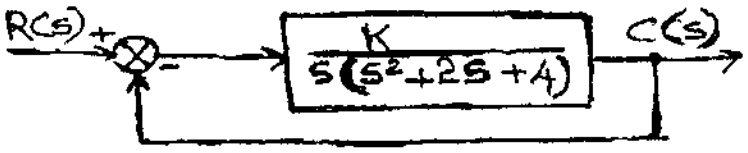
12. Draw an equivalent signal flow graph for the following block diagram and find the transfer function.



Module – 2

13. a) What are generalized error coefficients ? Give the relationship between generalized error coefficients and static error coefficients.

b) Find the range of K for closed loop stability and the value of K for marginal stability for the following control system.



14. a) For a generalized second order underdamped system derive an expression for the maximum overshoot.

b) A second order unity feed back system is characterized by the following transfer function, $\frac{C(s)}{R(s)} = \frac{361}{s^2 + 16s + 361}$. Find the damping ratio, natural frequency, settling time, peak time, and maximum overshoot. Assume input to be 1 V.

Module – 3

15. a) Explain with diagram the working of AC servo motors.

b) Explain with diagram one method of pressure measurement.

16. a) Describe with diagram how the flow rate of liquids can be measured by electromagnetic flow meters

b) Write short notes on :

i) Potentiometer error detector

ii) Gear trains

iii) Strain gauges

iv) Thermocouples. **(3×20=60 Marks)**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011

(2008 Scheme)

08.704(2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION

(Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. What are the characteristics of data stream for continuous media ?

2. Explain the architecture of raster display.

3. Explain the features of MMDBMS.

4. What are the different encoding schemes used in multimedia systems ?

5. Explain the JPEG standard.

6. Differentiate intraframe coding and interframe coding.

7. Explain any one text compression technique.

8. What is virtual reality ?

9. What is the reference model for multimedia synchronization ?

10. How is motion compensation done ?

P.T.O.

PART – B

Answer **any** question from **each** Module.

Module – I

11. Explain the client server operation in distributed environment with suitable examples in multimedia systems. **20**

OR

12. Discuss the key issues of data organization in Multimedia Database Management Systems. **20**

Module – II

13. a) Explain the various standards of MPEG compression. **10**

    b) Explain how the conversion from RGB to YUV and YIQ color models can be achieved. **10**

OR

14. a) Explain the Huffman encoding algorithm. **10**

    b) Discuss DPCM and Adaptive DPCM. **10**

Module – III

15. a) Discuss motion detection, tracking and understanding. **10**

    b) How is intra object synchronization achieved ? **10**

OR

16. a) Explain the basic principle of video compression. **10**

    b) Discuss the MPEG-2 standard. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
08.703 : COMPUTER NETWORKS (RF)
(2008 Scheme)

Time : 3 Hours Marks :100

PART – A

Answer **all** questions.

1. Compare LAN, WAN and MAN with the help of diagrams.

2. Distinguish between interface, service and protocols.

3. List two ways in which the OSI reference model and TCP/IP reference model are the same. Also list two ways in which they differ.

4. Explain the frame format for PPP.

5. Explain Manchester encoding and differential Manchester encoding with an example.

6. What is the difference between a bridge and a router ?

7. What is count to infinity problem ? Explain.

8. What is tunneling ?

9. Explain the TCP header layout.

10. With the help of a diagram explain how a connection is established in TCP ?

(10×4=40 Marks)

P.T.O.

PART – B

MODULE – I

11. Explain the following sliding window protocols.

a) One bit sliding window protocol. **6**

b) Go Back N. **7**

c) Selective repeat. **7**

OR

12. Explain the various framing methods in data link layer with example for each. **20**

MODULE – II

13. Explain 802.3, 802.4 and 802.5. **20**

OR

14. a) Explain leaky bucket and token bucket algorithms. **14**

b) Explain packet routing for mobile hosts. **6**

MODULE – III

15. a) Explain IPV6 addressing. **14**

b) What is an IP address ? Which are the various IP address format ? Explain. **6**

OR

16. a) Write short notes on the following internet control protocols.

i) ICMP

ii) ARP

iii) RARP. **(5×3=15 Marks)**

b) Explain exterior routing gateway protocol briefly. **5**

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Reg. No. : ....

Name : ....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. Explain briefly what do you mean by feedforward and feedback networks.
2. State the 'Perceptron Learning' algorithm and give an example to explain its use.
3. Explain the 'delta rule' briefly.
4. How a McCulloch-Pitts neuron works ?
5. How the bi-directional associative memory network is superior than associative memory network ?
6. Explain the activation functions used in the radial basis function networks.
7. Explain the operation of the learning matrix.
8. What is meant by learning vector quantization ? Explain.
9. How is ART networks different from other competitive networks ?
10. Explain the main difference between ART – 1 and ART – 2 networks.

P.T.O.

PART – B

Answer **any one** question from **each** Module, **each** question carries **20** marks.

Module – I

11. a) Why single layer perceptron cannot simulate simple XOR function ? Explain how linear separability limitation is overcome. **8**

    b) Give the architecture of the backpropagation network and explain the algorithm to train the network. **12**

12. a) What is the function of counter propagation network ? Give the architecture, algorithm, and application of a counter propagation network. **12**

    b) Derive a suitable feedforward network that models the logical AND function. **8**

Module – II

13. a) What is a Hopfield network ? Justify the necessity of setting the main diagonal elements of the weight matrix of the network to zero. **6**

    b) Design a heteroassociative memory network to store the following binary input-output vector pairs :

    S1 = (1 0 0 0) t1 = (1 0)

    S2 = (1 0 0 1) t2 = (1 0)

    S3 = (0 1 0 0) t3 = (0 1)

    S4 = (0 1 1 0) t4 = (0 1)

    Using the unit step function with threshold '0' as the output units activation function, test the response of the network on each of the input pattern. **14**

14. a) Explain the two main types of associative memory networks. Discuss the advantages and limitations of both the networks. **6**

    b) Draw the architecture of the discrete bi-directional associative memory network and explain the storage and testing algorithms. **14**

Module – III

15. a) What is meant by competitive learning ? Explain. **6**

    b) Explain the architecture and operation of a Kohonen's self-organizing feature maps. **14**

16. a) What is stability-plasticity dilemma ? How it is overcome in ART networks ? **6**

    b) An ART – 1 network consists of four input units and three output units. The weight matrices after some training are :

$$W = \begin{bmatrix} 1 & 0 & 0.2 \\ 0 & 0 & 0.2 \\ 0 & 0 & 0.2 \\ 0 & 1 & 0.2 \end{bmatrix}, \quad T = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix}$$

    Where W and T are the feedforward and feedback weights, respectively. Determine the new weight matrices after presenting the input vector (0 0 1 1) with vigilence threshold 0.7. **14**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **4** marks.

1. What is the difference between Big Oh(O) and Little oh(o) notations ?
2. Explain the terms :
   a) Best Case Analysis
   b) Average Case Analysis
   c) Worst Case Analysis.
3. Use mathematical induction to show that the solution to the recurrence

$$T(n) = \begin{cases} 2 \text{ if } n = 2 \\ 2T\left(\frac{n}{2}\right) + n \text{ if } n = 2^k, k > 1 \end{cases}$$ is $T(n) = n \log n$.

4. What is priority Queue ? Suggest an efficient method for implementing priority queue.
5. Discuss a data structure used for implementing disjoint sets.
6. Explain the properties of a B-tree.
7. Prove that Kruskal's algorithm generates a minimum cost spanning tree for every connected undirected graph G.
8. Compare divide-and-conquer and dynamic programing strategies.
9. Define 8-Queen's problem.
10. Prove that if any NP-complete problem is polynomial time soluable, then P = NP.

P.T.O.

PART – B

Answer **one** full question from **each** Module. **All** questions carry **equal** marks.

MODULE – I

11. a) Given n-integers residing in the array A[1...n]. The mode of A is an element which occurs most often. Write an efficient algorithm which determines the mode of A and the number of times the mode occurs in A. Analyse its computing time. If the array is already sorted, write a modified algorithm which computes the mode and frequency efficiently. What is the running time of the modified algorithm ?

    b) State Master method for solving recurrences.

OR

12. a) What is meant by randomized algorithms ? Explain the randomized version of Quick sort.

    b) What is a heap ? Write an algorithm to build a heap. Obtain the time complexity of the algorithm for building a heap of n-items.

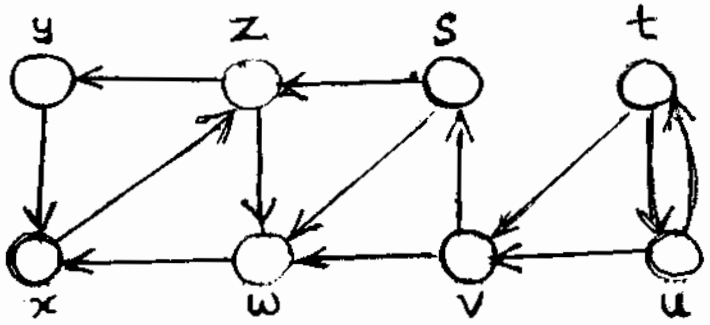
MODULE – II

13. a) Discuss the various cases involved in deleting a node from a red-black tree.

    b) Suppose that a node x is inserted into red-black tree and then deleted immediately with the above algorithm. Is the resulting red-black tree the same as the initial red-black-tree ? Justify your answer.

OR

14. a) Perform a DFs traversal on the following graph and mark the back edges, forward edges and cross edges.



b) Write and explain Dijkstra's algorithm for finding single source shortest path. Obtain its running time.

MODULE – III

15. a) Give the algorithm for Knapsack problem using Greedy strategy. Also find an optimal solution to the Knapsack instance n = 7, w = 15,

$(P_1, P_2, ..., P_7) = (10, 5, 15, 7, 6, 18, 3)$ and

$(W_1, W_2, ..., W_7) = (2, 3, 5, 7, 1, 4, 1)$.

b) Using dynamic programming technique write an efficient algorithm for ordering a chain of n-matrices such that the number of scalar multiplications is minimum.

OR

16. a) Explain the algorithm for Merge-sort ? Also determine the time complexity of the algorithm.

b) Explain the branch-and -bound technique used for designing algorithms.

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, Oct./Nov. 2011
(2008 Scheme)
08.705(5) : C # AND . NET FRAMEWORK (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is a static constructor ?
2. Write a C# code to loop through all rows of a Data Table using For and Foreach loop.
3. What are exception ? Explain exception handling in C#.
4. Discuss .Net namespaces.
5. Give examples where fallthrough is allowed and not allowed in switch.
6. Discuss the webservice support in Visual Studio.Net.
7. Explain Type Discovery.
8. What is marshaling and remoting ?
9. What are assemblies ? Explain private assembly.
10. What are the tasks for which reflection is used ?

P.T.O.

PART – B

Answer **any one** of the options given. **Each** question carries **20** marks.

11. With a complete example, discuss a context where nesting of classes is required.

OR

12. Explain the use of static delegates. What are the disadvantages ? How will you overcome this by using delegates as properties ?

13. Create a window form without using the .Net designer. (hint : Hand drawn form).

OR

14. Build a simple inventory application with ADO.Net. Explain steps in detail.

15. Explain the building of multiple assembly in .Net Framework.

OR

16. Explain the mechanisms provided by CLR for synchronization between threads.

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(Pages : 2) **1623**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is the role of a display controller in a raster scan display system ? Explain.
2. Describe the functioning of a random scan display system.
3. Explain the flood fill polygon filling algorithm.
4. What is meant by scan conversion ? List some methods employed to optimize the memory requirements of a frame buffer.
5. Write note on the two dimensional rotation transform.
6. Describe the terms :
   a) Window
   b) Viewport
   c) World coordinates
   d) Device coordinates
7. What are homogeneous coordinates ? Explain their relevance in simplifying the geometric transformations of graphical objects.
8. What is meant by a vanishing point in the context of a perspective projection ?
9. What is meant by the perimeter of a region in an image ? Distinguish between pixel perimeter and crack perimeter.
10. Distinguish between object space methods and image space methods for visible surface detection. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) With a neat diagram, describe the working of a cathode ray display device in detail. **10**

    b) Describe the DDA line drawing algorithm. Use the algorithm to find the coordinates along the line joining the pixel positions (5, 12) and (15, 20). **10**

OR

12. a) Describe the midpoint circle algorithm. Use the algorithm to obtain the coordinate positions along the circumference of a circle with centre at the origin and a radius of 12 units. **12**

    b) Write notes on the following input devices :

    i) Trackball and Spaceball ii) Joystick iii) Image scanner **8**

Module – II

13. a) A polygon is defined by the pixel coordinates (0,0), (10,0), (15, 5) and (5,5). It is subjected to the following transformations :

    i) Anti clockwise rotation through an angle of 30 degrees and reflection about the y-axis.

    ii) Scaling along the x and y axes with scaling factors of 1.5 and 0.5 respectively and a subsequent translation along x and y axes with 5 and 10 units respectively.

    Obtain the composite transformation matrix in homogeneous coordinates and calculate the coordinates of the transformed polygon in each case. **10**

    b) Describe an efficient line clipping algorithm. **10**

OR

14. a) Write notes on the three dimensional rotation and scaling transformations. **10**

    b) Describe the Sutherland Hodgeman polygon clipping algorithm. **10**

Module – III

15. a) Write notes on parallel projection. Outline the steps involved in obtaining the transformation equations for orthographic and oblique parallel projections. **10**

    b) Write notes on the segmentation and labelling of digital images. Explain the region labelling algorithm in detail. **10**

OR

16. a) Describe the scan line method for removing hidden surfaces. **10**

    b) Write notes on edge detection in digital images. Describe Robert and Sobel edge detectors. **10**

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Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. Compare a biological neuron and an artificial neuron.
2. How a McCulloch-Pitts neuron works ?
3. Explain the 'Perceptron Learning' algorithm.
4. Explain the difference between 'threshold function' and 'sigmoid function' and give reasons why the latter is preferred in the mathematical modeling of neurons.
5. Explain the operation of the 'learning matrix'.
6. Distinguish between auto-associative and hetero-associative memories.
7. How do you say that hop field network is a symmetrically weighted network ?
8. What is meant by competitive learning ? Explain.
9. What is meant by 'stability plasticity' dilemma ?
10. How is ART network different from other competitive networks ?

PART – B

Answer **any one** question from **each** Module, **each** question carries **20** marks.

Module – I

11. a) What are the common features of 'Artificial Neural Networks' ? Explain. **10**

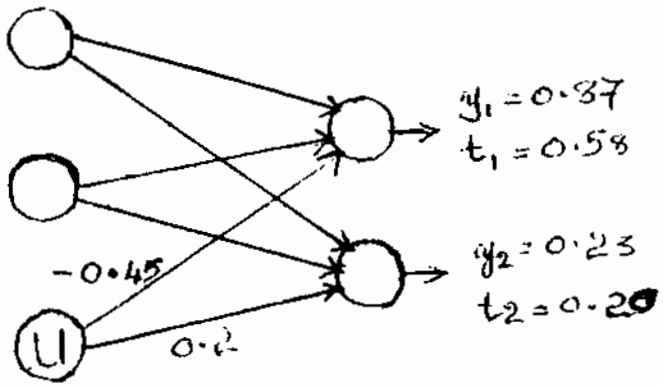
    b) What is the limitation of a single layer perceptron network ? Explain how a multilayer feed-forward network solves the XOR problem. **10**

OR

12. a) Explain the architecture and training algorithm of a back-propagation network. **14**

P.T.O.

b) Figure shows the hidden and output layers of a feedforward network. Calculate the error for hidden unit 'U' given that its activation for the pattern being processed is 0.64. y_1 and y_2 denote the actual outputs and t_1 and t_2 the corresponding target outputs. **6**



Module – II

13. a) Explain the architecture and operation of a hopfield network. **10**

b) Design a hopfield network for four-bit bipolar patterns. The training patterns are : (S_1 = (1 1 −1 −1), S_2 = (−1 1 −1 1), and S_3 = (−1 −1 −1 1). Find the weight matrix for the three input patterns. Also determine the pattern to which the pattern S = (−1 1 −1 −1) associates. **10**

OR

14. a) How bi-directional associative memory network is superior than associative memory network ? Explain the storage operation of the former. **8**

b) Explain the architecture and operation of the radial basis function network. **12**

Module – III

15. a) Explain the architecture and training algorithm of the learning vector quantization network. **12**

b) Explain the Kohonen self organizing networks. **8**

OR

16. a) Give the architecture of ART-1 network and explain its operation in detail. **14**

b) List three applications of neural networks and comment on the suitability of network topologies for each application. **6**

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Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain Big-Oh notation used for expressing time complexity of an algorithm.
2. What is a heap data structure ? Give two applications of heap data structure.
3. Can the master method be applied to solve the recurrence

   $T(n) = 4T(n/2) + n^2 \lg n$? Why or why not ?
4. What is a disjoint set data structure ? Explain the different operations performed on a disjoint set data structure.
5. Write the Pseudo code for performing a left rotation on a node rooted at 'x', in tree T.
6. What are strongly connected components of a graph ? Give an example.
7. Analyze the complexity of Breadth First Search (BFS).
8. Explain branch and bound technique used in problem solving.
9. Define an NP-hard problem.
10. Explain fractional knapsack problem. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) Analyze the complexity of insertion sort algorithm. **8**

    b) Explain randomized version of Quicksort. Analyze its performance also. **12**

OR

12. a) Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = 3T(n/2) + n$. **10**

    b) Use substitution method to solve the recurrence relation $T(n) = 2T(\lceil n/2 \rceil) + 1$. **10**

Module – II

13. a) What is a minimum spanning tree ? Discuss an algorithm to find the minimum spanning tree in a graph. Also analyze the performance of the algorithm. **10**

    b) Define single source shortest path problem. Discuss an algorithm to find the shortest path in a graph. Also analyze the performance of the algorithm. **10**

OR

14. What are B-trees ? Discuss an algorithm to insert a new key value into a B-Tree. Also analyse the performance of the algorithm. Use examples to discuss the different cases of insertion. **20**

Module – III

15. a) Explain backtracking. Discuss how backtracking can be used to solve the 8-Queen's problem. **10**

    b) Explain divide and conquer method of problem solving. How it can be used to Solve Integer Multiplication problem ? **10**

OR

16. What are NP-Complete problem ? Discuss about different NP-Complete Problem. **20**

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Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.703 : COMPUTER NETWORKS (RF)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Compare connection oriented communications and connectionless communication.
2. Explain the concept of framing with respect to Data Link layer.
3. What is meant by interface and service in the protocol hierarchies ?
4. What is the difference between simple bridge and transparent bridge ?
5. What are the functions of Media Access Control sub layer ?
6. What is QoS in internetworking ? Explain some methods to improve QoS.
7. List out major features of IPv6.
8. Explain with the help of diagram, how a connection is established in TCP.
9. What are the roles played by the IGMP protocol ?
10. Explain DLL in internet and VoIP.

PART – B

Answer **one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. A) What are the goals of layered protocol ? Describe OSI model in brief. **12**

    B) Explain various LAN architectures. **8**

OR

P.T.O.

12. A) Explain in detail the High Level Data Link Control (HDLC) protocol architecture. **12**

    B) Compare Go-Back -N, Selective-Repeat in terms of storage and bandwidth requirements. **8**

Module – II

13. A) What are the most popular routing algorithms ? Describe each in detail. **12**

    B) What is high speed LANs ? Describe briefly the various types of high speed LANs used in computer communication networking. **8**

OR

14. A) Compare the IEEE standards 802.2, 802.3 and 803.4 briefly. **9**

    B) Explain about congestion control. Explain Leaky bucket and Token bucket Algorithms. **11**

Module – III

15. A) What are the following acronyms MIME, SNMP and WWW stand for ? Explain their uses and state the strength and weakness of each of them. **12**

    B) What is classful and classless addressing ? **8**

OR

16. A) Compare and contrast the two TCP/IP transport protocols, TCP and UDP in terms of demultiplexing, flow control and reliability. **12**

    B) Briefly explain any three application layer protocols. **8**

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Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.704 (2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Define Multimedia and Hypermedia.
2. Explain the isochronous transmission mode of data stream.
3. What is a database model in multimedia ? Mention any 2 types.
4. Compare lossless compression and lossy compression.
5. Explain the source encoding process used in multimedia systems.
6. Explain the MPEG basic steps of audio encoding.
7. Describe the steps involved in LZW coding.
8. What are the different types of frame in video transmission ?
9. What is motion compensation ?
10. Mention any two video compression technique.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain the various application of multimedia systems. **10**

    b) What are the different approaches for implementing database for multimedia systems. **10**

OR

12. Explain the general architecture of MMDBMS. **20**

P.T.O.

Module – II

13. a) Discuss the static and dynamic Huffman coding with example. **10**

    b) Explain about MPEG audio coder. **10**

OR

14. a) Explain any one lossless compression technique with example. **10**

    b) Explain the steps involved in the JPEG compression process. **10**

Module – III

15. a) Discuss the necessity of synchronization of distributed objects and their management. **10**

    b) How is inter object synchronization achieved in multimedia system ? **10**

OR

16. How is motion estimation and compensation done in video frames ? Explain. **20**

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Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.705.5 : C # and Net Framework (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **4** marks.

1. What are component libraries and how are they different from executable application programs ?
2. Differentiate between boxing and unboxing and illustrate with an apt program code.
3. Explain structures and enumerations.
4. Can one have two main ( ) in a C# code ? If so, how can one resolve it ?
5. Draw a block diagram and explain the ADO.NET architecture.
6. Explain how one can add relation between tables in a Dataset.
7. Write a note on the five groups of .NET related Namespaces.
8. Explain Type Discovery.
9. What are the uses of Marshalling ?
10. What are Assemblies ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** full question carries **20** marks.

MODULE – I

11. a) List out the exception handling statements supported in C# and explain with an apt example.

    b) Create a class distance that stores a distance value using meters and kilometers. Overload the – operator (minus operator) to subtract two distance objects.

12. a) What is a jagged array ? Explain its use with a simple example.

    b) Discuss the various value and reference types supported in C#.

MODULE – II

13. Build a ADO.NET application that can be used to process customer orders for a car repair shop. Make suitable assumptions and explain your steps in detail.

14. Write the code for building a calculator with simple functions and write code using the web services classes for accessing the calculator over the web. Explain your steps.

MODULE – III

15. a) Discuss the facilities provided by CLR for synchronization between threads.

    b) List the steps involved in building a multi-assembly .NET Framework.

16. a) What is Reflection ? Explain its use with an apt example.

    b) What is Remoting ? Explain the steps involved in the process of creating Remoting Applications.

(3×20=60 Marks)

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.705 (5) C# AND .NET FRAMEWORK (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Describe the structure of typical C# program.
2. What is unboxing ? How is it achieved ?
3. Write a program to demonstrate the working of Copy and Coscat Methods.
4. Write a program to illustrate the application of multicast delegates.
5. What are the major components of .NET ?
6. What are the main namespaces included in the base class library ?
7. List and explain the various components of Microsoft Visual Studio IDE.
8. With neat diagram illustrate the difference between MBV and MBR objects.
9. What is metadata and what it contains ?
10. What are the tasks for which reflection is used ? **(10×4=40 Marks)**

PART – B

Answer **any one** of the options given. **Each** question carries **20** marks.

Module – I

11. Explain the four constructs provided by C# for performing loop operations. Give suitable example.

OR

12. What are the two forms of inheritance ? How it is achieved in C# ? Give your own examples.

P.T.O.

Module – II

13. Create a window form without using the .Net designer.

OR

14. Build a simple payroll application with ADD .Net and explain each steps in detail.

Module – III

15. Explain the architecture of .NET framework.

OR

16. Explain how thread interact with processes in .NET platform.

(3x20=60 Marks)

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.703 : COMPUTER NETWORKS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(4×10=40 Marks)**

1. What are the reasons for using layered protocols in network design ?
2. Explain the use of hamming code to correct burst error with example.
3. How does the protocol using go back N efficiently make use of the long round trip delay ?
4. Explain the different types of frames used in HDLC.
5. Sketch the Manchester encoding for the bit stream – 0001110101.
6. Compare virtual circuits and datagrams.
7. How is backward learning implemented in transparent bridges ?
8. What are the different classes of IP addresses ?
9. How does transport layer perform the multiplexing of connections ?
10. Explain the component of SNMP management model.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Discuss the ISO's OSI reference model. **12**

    b) Compare LAN, MAN and WAN. **8**

OR

12. a) What are the different sliding window protocols used by the Data Link Layer ? Explain. **12**

    b) Define :

    i) Service

    ii) Interface

    iii) Protocols. **8**

Module – II

13. a) Discuss the features of IEEE 802.3 standard. **12**

    b) Compare IEEE 802.3 and 802.4 standards. **8**

OR

14. a) How is packet routing of mobile hosts implemented ? **10**

    b) Discuss any two congestion control algorithm. **10**

Module – III

15. a) Compare TCP and UDP used by the transport layer. **10**

    b) Discuss about the DNS. Name space and how the Resource Records are managed in the system. **10**

OR

16. Explain any two Voice-over IP protocols. **20**

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.704 (2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Compare synchronous and asynchronous transmission of data streams.
2. Explain how a conceptual video data can be generated.
3. Define the MIDI standard.
4. Explain data modelling in MMDBMS.
5. Define entropy coding.
6. Explain D-frames in video compression.
7. What are the different layers of video data stream ?
8. Explain the run length encoding scheme. Perform the run length encoding of the following sequence.
   WWWWWWBBWWWWBBBB
9. What is motion tracking ?
10. Explain the Discrete Cosine Transform.

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) How is data modelling done for time based media ? Explain with an example. **12**

    b) Explain the various types of media. **8**

OR

12. What are the key issues regarding the multimedia storage and retrieval in MMDBMs ? **20**

Module – II

13. a) What are the different approaches for text compression ? Explain. **10**

    b) Explain LZ compression technique with an example. **10**

OR

14. a) Compare source, entropy and hybrid encoding techniques used in multimedia system. **10**

    b) Explain arithmetic encoding with an example. **10**

Module – III

15. a) Compare interframe synchronization and intraframe synchronization. **10**

    b) Explain the reference model for multimedia synchronization. **10**

OR

16. a) Explain the MPEG standard. **10**

    b) Compare MPEG-1 and MPEG-2. **10**

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. Describe a biological neuron.
2. Compare neural computing and conventional computing.
3. Explain the 'delta rule' briefly.
4. What is the function of counter propagation network ?
5. What are the characteristic features of associative memory ?
6. What is the significance of energy function in Hop field network ?
7. State the Boltzmann training algorithm.
8. What is the difference between pattern recognition and pattern classification ? How is a neural network applied in both ?
9. Distinguish between supervised learning and unsupervised learning.
10. What is meant by self organizing networks ?

PART – B

Answer **any one** question from **each** module, **each** question carries **20** marks.

Module – I

11. a) Distinguish between 'Perceptron learning rule' and 'Hebbian learning rule'. **5**

    b) Find the weights required to perform classification for the following vectors using perceptron network. The vectors (1, 1, –1, –1) and (1, –1, 1, –1) belong to the class with target value '1' and vectors (–1, –1, –1, 1) and (–1, –1, 1, 1) not belong to the class with target value '–1'. Assume learning rate '1' and initial weights as '0'. **15**

P.T.O.

12. a) What is meant by linear separability ? Give illustrations for linear and non-linear separable patterns. **5**

    b) Sketch the architecture of a multilayer backpropagation network and explain the algorithm for training the network. **15**

Module – II

13. a) Describe the architecture of a radial basis function network. **6**

    b) For an autoassociative network, find the weight matrix to store the vectors V1 = (1 , 1, 1, 1, 1, 1) and V2 = (1, 1, 1, –1, –1, –1). Test the performance of the network using V1, V2, T1 = (1, 1, 1, 1, –1, –1) and T2 = (1, 1, 1, –1, 0, 0) as inputs. Set the main diagonal of the weight matrix to zero and use bi-polar step function as the activation function. **14**

14. a) What is a Bi-directional Associative Memory (BAM) network ? How are weights determined for a discrete BAM ? **6**

    b) What is a Hopfield network ? Draw the architecture of the discrete Hopfield network and explain the storage and testing algorithms. **14**

Module – III

15. a) Draw the architecture of the LVQ network and explain how the network is trained. **10**

    b) A self-organizing feature map network with two input units and five cluster units has initial weights $W = \begin{bmatrix} 0.3 & 0.2 & 0.1 & 0.8 & 0.4 \\ 0.5 & 0.6 & 0.7 & 0.9 & 0.2 \end{bmatrix}$

    Use the square of the Euclidean distance to find the cluster unit which is closest to the input vector , (0.2 0.4). Determine the new weights for the winner unit. Use a learning rate of 0.2 and initial radius zero. **10**

16. a) What is meant by stability-plasticity dilemma ? How can it be overcome ? **5**

    b) Sketch the architecture of ART-1 network and explain the operation of the network. **15**

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Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
Branch : Computer Science
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

(Answer **all** questions)

1. The need to be able to measure the complexity of a problem, algorithm or structure and to obtain bounds and quantitative relations for complexity arises in more and more sciences. Justify this statement by giving a suitable example. **4**

2. With a neat figure explain the comparison of different orders of complexity. The horizontal axis shall represent the size of the problem and the vertical axis shall represent the computational effort required by algorithms for each class. **4**

3. State and explain Master theorem. **4**

4. Analyse the complexity of bubble sort algorithm using recurrence relation. **4**

5. Prove that an AVL tree with n nodes has height O (lgn). **4**

6. Write in pseudo code for deleting an element from a binary search tree. What is the time complexity of your algorithm ? **4**

7. Write an algorithm for BFS traversal on a graph and explain it. **4**

8. Explain a greedy technique for solving optimisation problem. **4**

9. What do you mean by NP-complete problem ? How to solve such problems practically ? **4**

10. Explain 0-1 knapsack problem. **4**

P.T.O.

PART – B

Answer **one** question from **each** module.

Module – I

11. a) Write pseudocode, which multiplies two polynomials represented using arrays. What is the computing time of your function ? **12**

    b) Explain heap sort algorithm. **8**

12. a) i) Using masters theorem solve the following : **8**

    1) $T(n) = 4T(n/2) + cn$ 2) $T(n) = 2T(n/2) + n^3$

    b) i) Explain the randomised version of Quick sort algorithm with an example. **10**

    ii) What is the time required to access one element from a linear array ? **2**

Module – II

13. a) Apply depth first and breadth first search to a complete graph on four vertices. List the vertices in the order they would be visited. **6**

    b) i) Describes how to compute a minimum-weight spanning tree of a graph. **7**

    ii) Given a directed graph G = (V, E), a weighting function w(e) for the edges of G and a source vertex v_0. Write an algorithm to determine the shortest paths from v_0 to all the remaining vertices of G. **7**

14. a) i) List four properties of Red-Black Trees. **2**

    ii) Explain the steps involved in deletion of a node from Red black tree. **8**

    b) Write algorithm for union operation on sets implemented using singly linked list. What is the time complexity of the algorithm ? **10**

Module – III

15. a) Write recursive version of merge sort and analyse best case, average case and worst case running time of the algorithm. **12**

    b) Explain booths algorithm for the multiplication of integer numbers. **8**

16. a) Write note on the following :

    i) Greedy versus dynamic programming. **5**

    ii) Branch and bound algorithm for travelling salesman problem. **5**

    iii) Divide and conquer techniques. **5**

    b) Briefly explain Strassen's matrix multiplication algorithm. **5**

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Seventh Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Explain the following terms
   i) pixel
   ii) persistence
   iii) resolution
   iv) aspect ratio in the context of a CRT display.
2. Write notes on the working of a random scan display system.
3. What is meant by a frame buffer ? Why is it used ?
4. Explain some of the inside-outsides test used by area filling algorithms.
5. What are homogeneous co-ordinates ? Explain their relevance in simplifying 2D and 3D geometric transformations.
6. Describe the methodology involved in point clipping.
7. Write notes on the two dimensional reflection and shear transformations.
8. What is meant by the gray level of a pixel when images are represented digitally ? What is meant by the gray level histogram of an image ?
9. What is meant by a parallel projection ? Distinguish between orthogonal and oblique parallel projection.
10. Distinguish between object space methods and image space methods for visible surface detection. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module. **Each** question carries **20** marks.

MODULE – I

11. a) Write notes on the following input devices :
    i) joystick
    ii) digitizers
    iii) light pens **8**

    b) Describe the Bresenham's line drawing algorithm. Use the algorithm to calculate the co-ordinates along the line joining the pixel positions (10, 5) and (20, 12) **12**

OR

12. a) Describe the various methods employed to display coloured images on a CRT display. **8**

    b) Write notes on the boundary fill and flood fill area filling algorithms. **12**

MODULE – II

13. a) Write notes on the basic two dimensional geometric transformations. **10**

    b) Explain the Cohen Sutherland line clipping algorithm. **10**

OR

14. a) What is meant by (a) window (b) viewport ? Describe the steps involved in window to viewport transformation. **10**

    b) Write down the steps involved in the general pivot point rotation and scaling operations in homogeneous co-ordinates. **10**

MODULE – III

15. a) What is meant by a perspective projection ? Outline the steps involved in obtaining the transformation equations for perspective projection. **10**

    b) What is meant by equalization in image processing ? Write notes on the equalization transform. **10**

OR

16. a) Explain the depth buffer algorithm for visible face detection. **10**

    b) Write notes on the segmentation and labelling of digital images. Explain the region lebelling algorithm in detail. **10**

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Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4 = 40 Marks)**

1. Explain any two interactive graphic input devices.
2. What is the difference between raster scan systems and random scan systems ?
3. Explain about frame buffer.
4. What is anti aliasing ? Explain.
5. Discuss the significance of homogeneous co-ordinate systems.
6. A triangle is defined by $\begin{bmatrix} 2 & 4 & 4 \\ 2 & 2 & 4 \end{bmatrix}$. Find the transformed co-ordinate after following a reflection about line $y = -x$.
7. What is viewing transformation ?
8. How is backface detection done ?
9. Compare Robert's and Sobel's edge detector.
10. Explain the region labeling algorithm.

P.T.O.

PART – B

Answer **any one** question from **each** Module. **(3×20 = 60 Marks)**

Module – I

11. a) Explain bresenhan's line drawing algorithm for slope < 1. **10**

    b) Explain the working of any two graphic output devices. **10**

OR

12. a) Compare floodfill and boundary fill algorithm. **10**

    b) Explain DDA scan conversion line drawing algorithm with example. **10**

Module – II

13. a) Explain the Cohen Sutherland line clipping algorithm. **10**

    b) Determine a sequence of basic transformations that is equivalent to the x-direction shearing matrix. **10**

OR

14. Explain the 3-D transformations. Derive the 3-D transformation matrix for the following operations in homogeneous co-ordinates.
    1) Translation
    2) Rotation
    3) Scaling
    4) Reflection **20**

Module – III

15. a) What do you mean by projection ? Differentiate between parallel projection and perspective projection. **10**

    b) Explain equalization using cumulative frequency function with example. **10**

OR

16. a) Explain the different methods used for following and representing boundaries. **10**

    b) What are the different methods used for back face detection ? Explain. **10**

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Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.704 (2) – MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective – I) (R)

Time: 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Explain how to generate a conceptual video data.
2. Discuss the different image data types.
3. Compare asynchronous and synchronous transmission of data stream.
4. What are the data stream characteristics of continuous media ?
5. Distinguish between lossless compression and lossy compression.
6. Explain the basic step for MPEG audio encoding.
7. Describe the steps involved in LZW coding.
8. What is the reference model for multimedia synchronization ?
9. What are the different types of data in a video file ?
10. Explain motion tracking.

PART – B

Answer **any one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. Explain the general architecture of MMDBMSs. **20**

OR

12. a) Explain the logical architecture for multimedia information systems. **10**

    b) Mention the applications of multimedia systems. **10**

P.T.O.

Module – II

13. a) Explain about MPEG audio coders. **10**

    b) Explain any one lossy compression technique. **10**

OR

14. a) Compare source, entropy and Hybrid coding technique used in multimedia systems. **10**

    b) Explain arithmetic encoding with an example. **10**

Module – III

15. a) Differentiate interframe synchronization and intra frame synchronization. **10**

    b) Discuss the necessity of synchronization of distributed objects and their management. **10**

OR

16. a) How is motion estimation and motion compensation done on video frames ? **10**

    b) Compare MPEG-1 and MPEG-2 standard. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.703 : COMPUTER NETWORKS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Briefly explain the design issues for the layers.
2. Distinguish between connection oriented and connectionless services.
3. Explain the frame format for HDLC protocol.
4. Discuss the various phases for bringing a line up and down using PPP.
5. Compare 802.3, 802.4 and 802.5.
6. Where is the routing table maintained ? Also state the purpose of maintaining a routing table.
7. Briefly explain wireless LAN protocol.
8. Explain the IP header frame format.
9. Compare classful and classless addressing.
10. Distinguish between transparent and non transparent fragmentation.

(10×4=40 Marks)

PART – B

11. a) Explain ISO OSI reference model with a neat sketch. **7**
    b) List atleast two functionalities of each layers of OSI model. **7**
    c) Explain the criticisms against OSI reference model. **6**

OR

P.T.O.

12. Explain the following data link protocols.
    a) Unrestricted Simplex Protocol. **6**
    b) Simplex Stop and Wait Protocol **7**
    c) Simplex Protocol for Noisy Channel. **7**

13. Explain the following types of bridges
    a) Transparent bridges
    b) Spanning tree bridges
    c) Source routing bridges. **20**

OR

14. State the major difference between vector routing and link state routing. Discuss how these routing techniques work. **20**

15. Write short notes on :
    a) DNS
    b) SMTP
    c) E-Mail
    d) WWW. **(5×4=20 Marks)**

OR

16. Explain the following transport protocols.
    a) TCP **12**
    b) UDP. **8**

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Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Compare biological neuron with artificial neuron.
2. Explain about the limitation of perceptron network.
3. Discuss the architecture of multilayer perceptron.
4. Explain the delta learning law.
5. What is meant by simulated annealing ?
6. How is training done in a heteroassociative network ?
7. Explain the activation function used in radial basis function network.
8. Draw and explain the simplified ART network.
9. What is the learning law used for training Grossberg layer of Kohonen's self organizing network ?
10. What are the different applications of neural network ?

PART – B

Answer **one** question from **each** Module. **(3×20=60 Marks)**

Module – I

11. a) Discuss the perceptron training algorithm. **10**

    b) What are the limitations of backpropogation network ? Explain. **10**

OR

P.T.O.

12. Draw the architecture of multilayer perceptron network. Illustrate the backpropogation algorithm by adjusting the weights of hidden layer and output layer. **20**

Module – II

13. a) Explain the storage and retrieval algorithm in Hopfield network. **10**

    b) What is called as pattern association ? Explain. **10**

OR

14. a) Explain the training procedure used in Boltzman machine. **10**

    b) Draw the architecture of RBF and explain its training process. **10**

Module – III

15. a) Explain the architecture and operation of Kohoren's self organizing network. **10**

    b) Explain the difference between ART – 1 and ART – 2 network. **10**

OR

16. a) Explain the training algorithm of linear vector quantization with the help of architecture. **10**

    b) Discuss the operation of comparison layer and recognition layer of an ART network. **10**

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Reg. No. : ....

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Name : ....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is the difference between Big oh (O) and Little oh (o) notations ?

2. Show that, the array representation for storing an n-element heap, the leaves are the nodes indexed by $\lfloor n/2 \rfloor + 1$, $\lfloor n/2 \rfloor$, ..., n.

3. Suppose we are comparing implementations of insertion sort and merge sort on the same machine. For inputs of size n, insertion sort runs in 8 n^2 steps, while merge sort runs in 64 n log n steps. For which values of n does insertion sort beat merge sort ?

4. What is meant by order of growth ?

5. What is the largest possible number of internal nodes in a red-black tree with black-height k ? What is the smallest possible number ?

6. Explain B-tree search algorithm.

7. Discuss a data structure used for implementing disjoint sets.

8. Explain branch and bound technique.

9. Define P, NP and NP complete classes.

10. Compare divide-and-conquer and dynamic programming strategies.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **one full** question from **each** Module.

Module – I

11. a) The operation Heap-Delete (A, i) deletes the item in node i from heap A. Give an implementation of Heap-Delete that runs in O (log n) time for an n-element max-heap.

    b) State Master method for solving recurrences. Can master method be applied to the recurrence $T(n) = 4\ T\ (n/2) + n^2 \log n$?

OR

12. a) Solve the following recurrences :

    i) $T(n) = 3T(\lceil N/2 \rceil) + n$

    ii) $T(n) = 2T(\sqrt{n}) + 1$.

    b) Write the recursive version of insertion sort, which can be expressed as follows : In order to sort A [1..n], we recursively sort A [1.. n –1] and then insert A[n] into the sorted array A [1..n –1]. Write and solve the recurrence for the running time of this version of insertion sort.

Module – II

13. a) i) Explain topological sort algorithm with example.

    ii) Give a simple example of a directed graph with negative-weight edges for which Dijkstra's algorithm produces incorrect answers.

    b) Show the red-black trees that result after successively inserting the keys 41, 38, 12, 19, 8 into an initially empty red-black tree. Then delete the keys 19 and 41.

OR

14. a) Explain Kruskal's algorithms and analyse the running time.

    b) Show the results of inserting the keys F, S, Q, K, C, L, H, T, V, W, M, R, N, P, A, B in order into an empty B-tree with minimum degree 2. Then delete the nodes C, T, R in order.

Module – III

15. a) Explain 8-queens problem. How back tracking technique can be used to solve the problem ?

    b) Explain Strassen's matrix multiplication algorithm. Use this algorithm to compute the matrix product $\begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix}\begin{pmatrix} 8 & 4 \\ 6 & 2 \end{pmatrix}$.

OR

16. a) Explain how dynamic programming technique can be used to solve matrix-chain multiplication problem. Find the optimal parenthesization of a matrix - chain product whose sequence of dimensions is $< 5,10, 3, 12, 5, 50 >$.

    b) i) Explain any two NP-complete problems.

    ii) Prove that if any NP-complete problem is polynomial time solvable, then P= NP.

(3×20=60 Marks)

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.705(5) : C# AND .NET FRAMEWORK (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain multicast delegates.
2. What is a conversion operator ?
3. Write a C# program to overload relational operator.
4. Explain any three standard exceptions used in C#.
5. What is URI ?
6. Explain how a message box is used in C# ?
7. Briefly explain WebRequest and WebResponse.
8. What is the use of Cookie ?
9. Explain the features of assemblies.
10. Explain how thread priorities are set in C# ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** of the option given. **Each** question carries **20** marks.

Module – I

11. With suitable example explain the four kinds of parameters employed in C# for managing the process of passing values and getting back the result. **20**

OR

12. Explain how errors are handled in C#. With an example explain a user-defined exception. **20**

Module – II

13. a) Explain SOAP and WSDL. **10**

    b) Explain the steps to create an MDI form. How is it different from SDI form ? **10**

OR

14. Explain the steps in detail to create an application with ADO.NET. **20**

Module – III

15. Write short notes on :

    a) Reflection b) Remoting

    c) Attributes d) Marshalling. **20**

OR

16. Explain in detail how a server and client is built in .NET framework. **20**

(3×20=60 Marks)

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Reg. No. : ...1041409...

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Compare raster scan systems and random scan system.

2. How is inside outside tests performed on a polygon ?

3. What are the steps required to fill a region using 4 connected boundary fill method ? Explain the situations where the 4 connected method fails to successfully fill the region.

4. What are the features of scan line algorithm for area filling ?

5. Explain the significance of a homogeneous coordinate system.

6. How can scaling with respect to a point P(x, y, z) be defined in terms of scaling with respect to origin ?

7. Find the transformation matrix for mirror reflection with respect to the xy plane.

8. The gray levels in an image g1(x, y) range from 10 to 100. It is desired to change it into an image g2(x, y) in which gray levels range from 0 to 255 using linear transformations of its gray levels. Write the equation for g2(x, y) as a function of g1(x, y).

P.T.O.

9. Compare Z buffer algorithm with A Buffer algorithm.

10. Explain the region labeling algorithm.

PART – B

Answer **any one** question from **each** module : **(3×20=60)**

Module – I

11. a) Illustrate the Bresenham's Line drawing algorithm by digitizing the line with end points (20, 10) and (30, 18). Determine the successive pixel positions along the line path. **10**

    b) Explain the working principle of any two graphic output devices. **10**

OR

12. a) Compare Flood fill and Boundary fill algorithms. **12**

    b) Discuss about raster scan systems and random scan systems. **8**

Module – II

13. a) Show that two successive reflections about either the x axis or y axis is equivalent to a single rotation in xy plane about the coordinate origin. **10**

    b) For a triangle with coordinates (1, 1), (6, 1) and (3, 8) is translated by 5 units in x and y direction and scaled by 2 units in x and y direction and then rotated by 45 degree in clockwise. Obtain the final coordinates of the triangle. **10**

OR

14. a) Explain the Cohen Sutherland Line clipping algorithm. **10**

    b) Determine a sequence of basic transformations that is equivalent to the x – direction shearing matrix. **10**

Module – III

15. a) Derive the projection coordinates of a point (x, y, z) for both parallel projections and perspective projections. **10**

b) Discuss about various operators used for edge detection. **10**

OR

16. a) Show the region labels for the following image using 4-connected definition of adjacency for the following image matrix using region labeling algorithm. **10**

0	0	1	0	0	2	0	0
0	1	1	1	2	2	2	1
0	0	1	1	2	2	2	0
0	0	1	1	1	1	1	1

b) Explain the different methods used for equalizing an image with example. **10**

(Pages : 3) **1915**

Reg. No. : 10414006

Name : Arunal Shaji

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Compare raster scan systems and random scan system.

2. How is inside outside tests performed on a polygon ?

3. What are the steps required to fill a region using 4 connected boundary fill method ? Explain the situations where the 4 connected method fails to successfully fill the region.

4. What are the features of scan line algorithm for area filling ?

5. Explain the significance of a homogeneous coordinate system.

6. How can scaling with respect to a point P(x, y, z) be defined in terms of scaling with respect to origin ?

7. Find the transformation matrix for mirror reflection with respect to the xy plane.

8. The gray levels in an image g1(x, y) range from 10 to 100. It is desired to change it into an image g2(x, y) in which gray levels range from 0 to 255 using linear transformations of its gray levels. Write the equation for g2(x, y) as a function of g1(x, y).

P.T.O.

9. Compare Z buffer algorithm with A Buffer algorithm.

10. Explain the region labeling algorithm.

PART – B

Answer **any one** question from **each** module : **(3×20=60)**

Module – I

11. a) Illustrate the Bresenham's Line drawing algorithm by digitizing the line with end points (20, 10) and (30, 18). Determine the successive pixel positions along the line path. **10**

    b) Explain the working principle of any two graphic output devices. **10**

OR

12. a) Compare Flood fill and Boundary fill algorithms. **12**

    b) Discuss about raster scan systems and random scan systems. **8**

Module – II

13. a) Show that two successive reflections about either the x axis or y axis is equivalent to a single rotation in xy plane about the coordinate origin. **10**

    b) For a triangle with coordinates (1, 1), (6, 1) and (3, 8) is translated by 5 units in x and y direction and scaled by 2 units in x and y direction and then rotated by 45 degree in clockwise. Obtain the final coordinates of the triangle. **10**

OR

14. a) Explain the Cohen Sutherland Line clipping algorithm. **10**

    b) Determine a sequence of basic transformations that is equivalent to the x – direction shearing matrix. **10**

Module – III

15. a) Derive the projection coordinates of a point (x, y, z) for both parallel projections and perspective projections. **10**

    b) Discuss about various operators used for edge detection. **10**

OR

16. a) Show the region labels for the following image using 4-connected definition of adjacency for the following image matrix using region labeling algorithm. **10**

0	0	1	0	0	2	0	0
0	1	1	1	2	2	2	1
0	0	1	1	2	2	2	0
0	0	1	1	1	1	1	1

    b) Explain the different methods used for equalizing an image with example. **10**

Reg. No. : ....

Name : ....

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Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define time complexity and space complexity of an algorithm.
2. Show that the recurrence $T(n) = 2T\left(\left\lfloor n/2 \right\rfloor\right) + cn$ is asymptotically bound by Ω (n logn).
3. Explain how will you implement priority queue using heap data structure.
4. Show that the running time of quickesort is θ (n^2) when the array is sorted in descending order.
5. What are disjoint-set data structures ? What are the different operations supported by them ?
6. Explain the technique of relaxation.
7. Define strongly connected components of a graph.
8. How does dynamic programming differ from greedy techniques ?
9. Discuss the relationship between NP, NP-complete and NP-hand problems.
10. Explain integer multiplication problem. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** Module. **All** questions carry **equal** marks.

Module – I

11. a) Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = 3T\left(\left\lfloor \frac{n}{2} \right\rfloor\right) + n$. Use substitution method to verify your answer. 10

P.T.O.

b) Illustrate the operation of heapsort on the array
$A = \langle 5, 13, 2, 25, 7, 17, 20, 8, 4 \rangle$. 10

OR

12. a) Solve $T(n) = TT(n/2) + n^2$. 5

b) Solve $T(n) = TT(n/3) + n^2$. 5

c) Illustrate randomized quick sort with the help of an example. 10

Module – II

13. a) Explain Kruskal's algorithm to obtain a minimum spanning tree with the help of an example. 10

b) Write an algorithm to print the nodes of a directed acyclic graph in reverse topological order. 10

OR

14. a) Show the red black tree that result after successively inserting the keys 41, 38, 31, 12, 19, 8, 15, 4, 54 into an initially empty red black tree. Then delete the nodes 8, 31 and 19. 15

b) Analyse the complexity of breadth first search graph traversal algorithm. 5

Module – III

15. a) Consider the Knapserck instance
$n = 3$ $(W_1, W_2, W_3) = (2, 3, 4)$, $(P_1, P_2, P_3) = (1, 2, 5)$ $m = 5$.
Find the optimal solution. 10

b) Solve 5-Queens problem using backtracking.

OR

16. a) Find the optimal paranthesization of a matrix c
of dimension is ⟨ 5, 10, 3, 12, 5, 50, 6 ⟩

b) Explain divide and conqu

(Pages : 2) **1919**

Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.704 (2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. What are the steps involved in the media preparation phase of a multimedia application ?
2. How do you integrate the different types of media in multimedia systems ?
3. Compare workstation peers and client server models of multimedia systems.
4. Compare Entropy and source encoding.
5. What are the properties of Huffman coding ?
6. Whether JPEG image compression technique can be used for video compression. Give reason.
7. Assume a dictionary contains 20000 words. What will be the compression ratio if the word "digitization" is compressed using LZ coding ?
8. What is the principle of Adaptive Differential Pulse Code Modulation (ADPCM)?
9. What is the use of D frames in Video Compression ?
10. What are the different levels and profiles of MPEG – 2 standard ?

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) What are the issues to be considered when designing a multimedia application for transferring real time multimedia data through the existing network ? **8**

    b) Explain Data modeling in multimedia database management systems. **12**

OR

12. a) Explain the architecture of multimedia system. **10**

    b) Explain the multimedia specific properties of a multimedia database management system. **10**

Module – II

13. a) Explain JPEG image compression and decompression. **15**

    b) What are the different modes of JPEG ? **5**

OR

14. a) Explain MPEG audio coder. **12**

    b) What is the disadvantage of Dolby AC-2 ? Write any method to eliminate the disadvantage. **8**

Module – III

15. a) Explain MPEG-7 video compression standard. **12**

    b) Explain the reference model for multimedia synchronization. **8**

OR

16. a) Explain MPEG-4 video compression standard. **12**

    b) Explain the mechanisms used for video and audio synchronization in multimedia. **8**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.703 : COMPUTER NETWORKS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Compare LAN, MAN and WAN.
2. What is the main motivation in designing the internet using a layered approach ?
3. Which layer of OSI model does repeaters, switches, routers, gateways and bridges operate ?
4. What are the functions of Media Access Control ?
5. Explain hidden and exposed terminal problems.
6. What is the use of bridge ? Explain the types of bridges.
7. Distinguish between iterative and recursive DNS queries.
8. Draw ARP format and explain.
9. Explain IP addressing methods.
10. How to map logical address into physical address ?

PART – B

Answer **one** question from **each** Module. **(3×20=60 Marks)**

11. A) Explain in detail the data transmission in OSI reference model. State the functions each layer. **12**

    B) Briefly explain stop-and-wait and selective repeat ARQ method of flow control. **8**

OR

12. A) Briefly explain the High Level Data Link Control (HDLC) protocol with neat labelled diagrams. **12**

    B) Write short notes on network hardware and network software. **8**

P.T.O.

13. A) Compare distance vector routing and link state routing. Discuss how these routing techniques work. **12**

    B) Explain the frame format of IEEE 802.3 and 802.5 in detail. **8**

OR

14. A) Briefly explain the collision avoidance mechanism used in 802.11 wireless LAN. **8**

    B) Discuss RIP and OSPF routing algorithms in brief. **12**

15. A) List and discuss various transport layer services. **11**

    B) Write short note on :

    i) BOOTP

    ii) IGMP and

    iii) PGP. **9**

OR

16. A) Explain the relevance of IPv6. Explain advantages and disadvantages of IPv6. **11**

    B) Explain **each** of the following in detail :

    i) VoIP

    ii) WWW and

    iii) MIME. **9**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014

(2008 Scheme)

08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Compare the features of a biological neuron and artificial neuron.
2. Explain delta rule briefly.
3. How does a McCulloh-Pitts neuron work ?
4. Explain the advantages of using a sigmoid function over using step function.
5. Distinguish between auto associative and hetero associative memories.
6. What are the distinguishing features of a Hopfield network ?
7. What do you mean by simulated annealing in Boltzmann machine ?
8. Distinguish between supervised and unsupervised learning.
9. What do you mean by a self organizing network ?
10. Explain the stability-plasticity dilemma in neural networks. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain the structure and working of biological neuron. **10**

    b) State and explain perception learning algorithm. What are its limitations ? **10**

OR

12. a) What do you mean by linear separability ? Give examples of patterns which are linearly unseparable. **5**

    b) Give the architecture of a back propagation network. Explain the algorithm used to train the network. **15**

Module – II

13. a) Write notes on associative memory. **10**

    b) Explain the architecture and operation of a Hopfield network. **10**

OR

14. a) What is a Bidirectional associative memory ? How are the weights determined in a BAM ? **10**

    b) Explain the Boltzmann machine learning algorithm. **10**

Module – III

15. a) State and explain the algorithm for Kohonen Self organizing Networks. **10**

    b) What do you mean by learning vector quantization ? **10**

OR

16. a) Give the architecture of ART – I network and explain its operation in detail. **15**

    b) Explain any three applications of neural networks. **5**

(Pages : 2) **1917**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.703 : COMPUTER NETWORKS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Compare LAN, MAN and WAN.
2. What is the main motivation in designing the internet using a layered approach ?
3. Which layer of OSI model does repeaters, switches, routers, gateways and bridges operate ?
4. What are the functions of Media Access Control ?
5. Explain hidden and exposed terminal problems.
6. What is the use of bridge ? Explain the types of bridges.
7. Distinguish between iterative and recursive DNS queries.
8. Draw ARP format and explain.
9. Explain IP addressing methods.
10. How to map logical address into physical address ?

PART – B

Answer **one** question from **each** Module. **(3×20=60 Marks)**

11. A) Explain in detail the data transmission in OSI reference model. State the functions each layer. **12**

    B) Briefly explain stop-and-wait and selective repeat ARQ method of flow control. **8**

OR

12. A) Briefly explain the High Level Data Link Control (HDLC) protocol with neat labelled diagrams. **12**

    B) Write short notes on network hardware and network software. **8**

P.T.O.

13. A) Compare distance vector routing and link state routing. Discuss how these routing techniques work. **12**

B) Explain the frame format of IEEE 802.3 and 802.5 in detail. **8**

OR

14. A) Briefly explain the collision avoidance mechanism used in 802.11 wireless LAN. **8**

B) Discuss RIP and OSPF routing algorithms in brief. **12**

15. A) List and discuss various transport layer services. **11**

B) Write short note on :

i) BOOTP

ii) IGMP and

iii) PGP. **9**

OR

16. A) Explain the relevance of IPv6. Explain advantages and disadvantages of IPv6. **11**

B) Explain **each** of the following in detail :

i) VoIP

ii) WWW and

iii) MIME. **9**

Reg. No. : .....

Name : .....

1916

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define time complexity and space complexity of an algorithm.
2. Show that the recurrence $T(n) = 2T\left(\left\lfloor n/2 \right\rfloor\right) + cn$ is asymptotically bound by $\Omega(n \log n)$.
3. Explain how will you implement priority queue using heap data structure.
4. Show that the running time of quickesort is $\theta(n^2)$ when the array is sorted in descending order.
5. What are disjoint-set data structures ? What are the different operations supported by them ?
6. Explain the technique of relaxation.
7. Define strongly connected components of a graph.
8. How does dynamic programming differ from greedy techniques ?
9. Discuss the relationship between NP, NP-complete and NP-hand problems.
10. Explain integer multiplication problem. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** Module. **All** questions carry **equal** marks.

Module – I

11. a) Use a recursion tree to determine a good asymptotic upper bound on the recurrence $T(n) = 3T\left(\left\lfloor \frac{n}{2} \right\rfloor\right) + n$. Use substitution method to verify your answer. **10**

P.T.O.

b) Illustrate the operation of heapsort on the array
$A = \langle 5, 13, 2, 25, 7, 17, 20, 8, 4 \rangle$. **10**

OR

12. a) Solve $T(n) = TT(n/2) + n^2$. **5**

b) Solve $T(n) = TT(n/3) + n^2$. **5**

c) Illustrate randomized quick sort with the help of an example. **10**

Module – II

13. a) Explain Kruskal's algorithm to obtain a minimum spanning tree with the help of an example. **10**

b) Write an algorithm to print the nodes of a directed acyclic graph in reverse topological order. **10**

OR

14. a) Show the red black tree that result after successively inserting the keys 41, 38, 31, 12, 19, 8, 15, 4, 54 into an initially empty red black tree. Then delete the nodes 8, 31 and 19. **15**

b) Analyse the complexity of breadth first search graph traversal algorithm. **5**

Module – III

15. a) Consider the Knapserck instance
$n = 3$ $(W_1, W_2, W_3) = (2, 3, 4)$, $(P_1, P_2, P_3) = (1, 2, 5)$ $m = 5$.
Find the optimal solution. **10**

b) Solve 5-Queens problem using backtracking. **10**

OR

16. a) Find the optimal paranthesization of a matrix chain product whose sequence of dimension is $\langle 5, 10, 3, 12, 5, 50, 6 \rangle$. **15**

b) Explain divide and conquer problem solving strategy. **5**

(Pages : 2) **1925**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.705 (5) : C # AND .NET FRAMEWORK (ELECTIVE II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the use of out parameter with an example.
2. Why C # is called a type safe language ?
3. What do you mean by exclusion polymorphism ?
4. Define inter-operability. How does .NET achieve this ?
5. Write a window based application to display a message.
6. Explain the functions of a data provider.
7. What are post back events ? Give examples.
8. Differentiate between private assembly and shared assembly.
9. What is marshalling ? Explain the different types of marshalling.
10. What do you mean by foreground threads and background threads ?

(10×4=40 Marks)

PART – B

Answer **one** full question from **each** Module. **Each** question carries **20** marks.

Module – I

11. i) Describe the components of .NET framework and explain the features of each component. **12**

    ii) Explain the use of variable argument list with an appropriate programming example. **8**

OR

12. i) Explain interfaces and write a C # program for extending and combining interfaces. **10**

ii) Write a C # code to find the sum of all elements of a jagged arrays. Explain clearly the difference between jagged arrays and rectangular arrays. **10**

Module – II

13. i) Write a window based application to find the average of 5 subject marks. Assume that marks for 5 subjects are entered as textboxes and the average is also displayed in a textbox. **12**

ii) Compare ASP and ASP · net. **8**

OR

14. i) Write a database application to display the deatils of a 'student' table in a datagrid control. **10**

ii) Discuss the lifecycle of a Webform. **10**

Module – III

15. 1) What are the different types of remoting ? Explain each of them with examples. **14**

2) Explain Application domain. How do you create an application domain ? **6**

OR

16. 1) Discuss in detail about thread synchronization. **12**

2) What do you mean by reflection ? Explain its one with an example. **8**

(Pages : 2) **5609**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.705(5) C# AND .NET FRAMEWORK (Elective – II)(R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. With examples, explain boxing and unboxing ?
2. What is an interface ? Explain the need of interfaces in C#.
3. Write a C# program to find the square of a given integer value.
4. List any four string handling functions in C# with appropriate syntax.
5. What is disconnected data architecture ? Explain its advantage.
6. Define web method attributes and discuss its properties in .NET.
7. Differentiate between data reader and data set.
8. What is DLL hell ? How it is rectified in .NET ?
9. What are attributes ? Highlight the features of any two attributes.
10. Discuss the advantages of using threads. **(10×4=40 Marks)**

PART – B

Answer **any one** of the option given. **Each** question carries **20** marks.

Module – I

11. i) Draw appropriate diagrams and discuss the various components of the .NET platform and the architecture of .NETframework. **14**
    ii) Write a program to illustrate method overiding concept in C#. **6**

OR

12. i) Consider a class student with feet and inches as attributes which describes the height of the student. Write a C# program to overload the '+' operator and find the average of N students. **10**

ii) What are delegates ? Explain the process of handling events through delegates. **10**

Module – II

13. i) List out the categories of controls supported in various window based application and explain the importance of each. **8**

ii) Explain the process of creating a window based calculator with your own user interface. **12**

OR

14. i) Explain any one data bound control in a program. **10**

ii) Summarize the validation controls and their application in .NET. **10**

Module – III

15. i) What is remoting ? Explain the steps involved in the process of creating remoting applications. **14**

ii) Briefly discuss about the various types of assemblies. **6**

OR

16. i) What is a metadata ? How it is viewed in C# ? Explain with an example. **10**

ii) Explain the process of executing a thread in C#. **10**

(Pages : 4) **5605**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.704(5) : CONTROL SYSTEMS ENGINEERING (Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. State Newton's second law and D'Alemberts principle.
2. Distinguish between type and order of a control system.
3. Investigate the stability of a closed loop system characterised by $s^4 + 2s^3 + 5s^2 + 8s + 2 = 0$.
4. Draw the block diagram of a closed loop control system showing all components. Discuss.
5. Define node, loop, mixed node and forward path associated with signal flow graph.
6. A unity feedback system has $k_p = 10$. What steady state error can be expected of 10 u(t) and 10 t u(t) ?
7. Define gain margin and phase margin.
8. What are the basic components of an automatic control system ?
9. Differentiate between AC and DC potentiometers.
10. What is electrical zero of a synchro. ? **(10×4=40 Marks)**

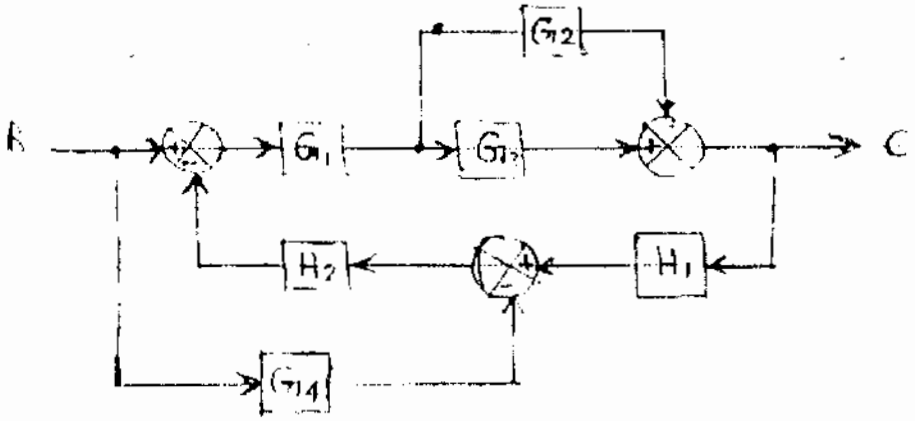
P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

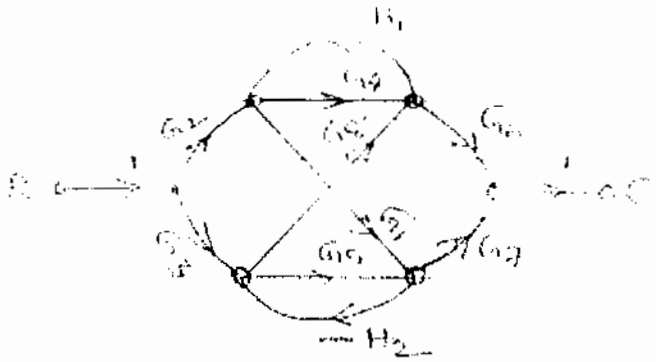
Module – I

11. Draw a signal flow graph and evaluate the closed loop transfer function of a system whose block diagram is given below. Also obtain the closed loop transfer function by block diagram reduction method.

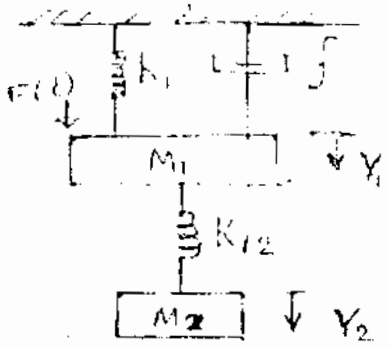


OR

12. a) Obtain the overall transfer function $\frac{C}{R}$ from the signal flow graph shown.



b) Obtain the transfer functions $\frac{Y_2(s)}{F(s)}$ and $\frac{Y_2(s)}{Y_1(s)}$ for the system shown.



Module – II

13. a) Explain Nyquist stability theorem.

    b) Sketch the Nyquist plot for a system with open loop transfer function.

$$G(s)H(s) = \frac{k(1+s)(1+0.5s)}{(1+10s)(-1+s)}$$

Determine the range of values of k for which the system is stable.

OR

14. a) Experiments conducted on a servomechanism show the system response to be $c(t) = 1 + 0.2e^{-60t} - 1.2e^{-10t}$ when subjected to a unit step input :

    i) obtain the expression for the closed loop transfer function.

    ii) determine the undamped natural frequency and damping ratio of the system.

    b) The open loop transfer function of a servo system with unity feedback is $G(s) = \frac{10}{s(1+0.1s)}$. Evaluate the static error constants of the system. Obtain the steady state error of the system when subjected to an input $r(t) = a_0 + a_1 t + \frac{a_2}{2} t^2$.

Module – III

15. a) Compare the merits and demerits of using a synchro pair versus gauged potentiometer as position error sensors. How can we improve the resolution of a potentiometer ?

    b) Derive from fundamentals the transfer function of an ac servomotor driving a load with inertia and friction.

OR

16. a) Explain the working of electromagnetic flow meter.

    b) Write notes on :

    i) LVDT

    ii) Thermistors. **(3×20=60 Marks)**

(Pages : 2) **5601**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.703 : COMPUTER NETWORKS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. What is the principal difference between connectionless communication and connection oriented communication ?
2. Generate a polynomial code checksum for the following data :
   Data Frame : 110 1011011
   Generator : 10011
3. If the bit string 01111011111101111110 is bit stuffed. What is the output string ?
4. What are the features of SLIP ?
5. What happens in a token bus, if a station accepts the token and crashes immediately ?
6. Explain the principle of traffic shaping.
7. How is CSMA/CA used in IEEE 802.11 standard ?
8. What is the significance of subnet mask in IP addressing ?
9. Describe the 2-men army problem in a context of connection release by transport layer.
10. Explain DNS.

P.T.O.

PART – B

Answer **any one** question in **each** Module.

Module – I

11. a) What are the datalink layer design issues ? **12**

    b) Explain any one error correcting codes used by the datalink layer. **8**

OR

12. a) Explain the datalink layer protocol used in the Internet-PPP. **10**

    b) Compare Go back N and Selective Repeat sliding window protocol used in DLL. **10**

Module – II

13. a) Discuss the hidden station and exposed station problem faced by IEEE 802.11 standard. **10**

    b) Explain the flow based routing algorithm with an example. **10**

OR

14. a) What are the features of Link State routing algorithm **10**

    b) How does OSPF make use of the Link State algorithm ? **10**

Module – III

15. What are the elements of transport layer ? Explain. **20**

OR

16. a) Compare ARP and RARP. **10**

    b) Explain the IGMP algorithm used for internet multicasting. **10**

(Pages : 2) 5603

Reg. No. : .....

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Seventh Semester B.Tech Degree Examination, October 2014
(2008 Scheme)
08.704 (2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. What are the characteristics of data streams of block mode media ?
2. What are the different kinds of multimedia applications ?
3. Distinguish between ISDN and PSTN.
4. What is the basic principle of ADPCM ?
5. How is Dolby audio coders better than MPEG audio coders ?
6. What is the basic principle of LZW coding ?
7. What is dynamic coding ? Where is it used ?
8. What are the different frame types in video compression ?
9. Explain inter object synchronization.
10. How is motion estimation done ?

PART – B

Answer **any one** question from **each** Module.

Module – I

11. Explain the database models associated with MMDBMS. **20**

OR

12. Explain the architecture of multimedia systems. **20**

P.T.O.

Module – II

13. a) Explain arithmetic coding. **10**

    b) Explain LZ coding. **10**

OR

14. Explain the various steps in JPEG compression. **20**

Module – III

15. Explain how video compression is carried out ? **20**

OR

16. Explain MPEG-2 standard. **20**

(Pages : 2) **5608**

Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.705 (3) NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the limitations of perceptron network.
2. What is meant by steepest-descent technique ?
3. Explain clearly the effect of including a momentum term into the weight update equation of the standard back propagation rule.
4. Explain linear separability.
5. List the applications of BAMs.
6. Define Boltzmann factor and Boltzmann constant.
7. Explain the activation function used in radial basis function network.
8. What is meant by self-organizing map ?
9. Discuss ART1 architecture.
10. Write a note on hebbian learning. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Explain the training algorithm used in counter propagation network. 12

    b) Explain least mean square training algorithm. 8

OR

P.T.O

12. a) Explain back propagation training algorithm. What are the learning factors of back propagation network ?

    b) State and explain perceptron convergence theorem.

Module – II

13. a) Explain the learning algorithm used in Boltzmann machine.

    b) Solve XOR problem using radial basis function networks.

OR

14. a) Write a note on discrete and continuous types of hopfield memory.

    b) Encode the following 3 vector associations in a BAM system.

$A_1 = (1\ 0\ 0\ 10)$ $B_1 = (0\ 0\ 0)$

$A_2 = (1\ 1\ 0\ 0\ 0)$ $B_2 = (0\ 1\ 1)$

$A_3 = (0\ 1\ 1\ 1\ 0)$ $B_3 = (1\ 1\ 1)$

Apply the probe vector A = (1 1 1 1 1). Is the vector recalled, what was expected ?

Module – III

15. a) How are competitive and self-organizing networks different from classical supervised-learning, feed forward and feedback networks ?

    b) Explain the architecture and processing of ART.

OR

16. a) Explain unsupervised vector quantization.

    b) Explain the architecture and operation of Kohonen's self organizing network.

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(Pages : 3) **5600**

Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.702 : DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Define Big-oh, Big-omega and Theta notations.
2. Identify the loop-invariant in the algorithm for insertion sort.
3. Master-method does not apply to the recurrence, $T(n) = 2T(n/2) + n \lg n$. Justify the statement.
4. Give a recurrence for merge sort algorithm and solve it.
5. Prove that Kruskal's algorithm generates a minimum weight spanning tree for every connected undirected graph G.
6. What are the various operations on disjoint sets ?
7. What do you mean by strongly connected components ? How can you find the strongly connected components of a graph by using disjoint set operations ?
8. The way we parenthesize a chain of matrices can have a dynamic impact on the cost of evaluating the product. Justify the statement with an example.
9. Explain the backtracking method.
10. What is branch and bound strategy ?

P.T.O

PART – B

Answer **one full** question from **each** module. **(20×3=60 Marks)**

MODULE – I

11. a) Write the Pseudo code for Max-heapify (A, i), which maintains the heap property. Illustrate with figures the operation of Max-heapify (A, 3) on the array.

A = ⟨ 27, 17, 3, 16, 13, 10, 1, 5, 7, 12, 4, 8, 9, 0⟩ **8**

b) What is the effect of calling Max-heapify (A, i)

i) When the element A[i] is greater than its children ?

ii) When i is greater than $(\text{heap size } [A])/2$? **4**

c) In building a heap, why is the Max-heapify procedure called for node at len. $\lfloor A \rfloor/2$ to 1, rather than from 1 to length $\lceil A \rceil/2$. **3**

d) Create a min-heap for the following list :

L = {20, 10, 1, 5, 40, 80, 60, 30}

Extract minimum element from the heap and show the resultant heap. Illustrate the various steps with figures. **5**

OR

12. a) Write an algorithm for insertion sort. Derive its worst-case and best-case running time. **10**

b) Prove that for any two functions f(n) and g(n), $f(n) = \theta(g(n))$ iff $f(n) = O(g(n))$ and $f(n) = \Omega(g(n))$. **5**

c) Using a recursion-tree get an asymptotically tight solution to the recurrence : $T(n) = T(n - a) + T(a) + cn$; $a \geq 1$, $c>0$ are constants. **5**

MODULE – II

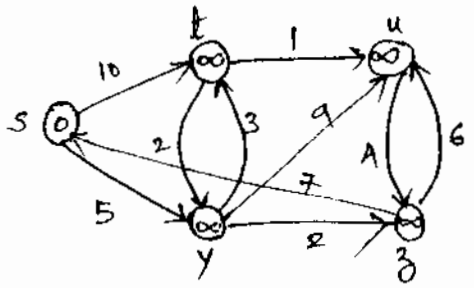
13. a) What are the different cases in insertion of a node into a RB tree ? **10**

b) Write an algorithm for building a minimum-spanning tree by Prim's method. Explain the loop invariant. **10**

OR

14. a) Prove the correctness of Dijkstra's algorithm. **7**

b) Execute Dijkstra's algorithm on graph below, with 's' as the source vertex.



5

c) Explain the double rotation operation on AVL trees with an example. **8**

MODULE – III

15. a) Give an algorithm for Knapsack problem by greedy strategy. **5**

b) Find an optimal solution to the Knapsack instance n = 3, M = 20 by greedy method : $(p_1, p_2, p_3) = (60, 100, 120)$ and $(w_1, w_2, w_3) = (10, 20, 30)$. Can 0 – 1 Knapsack problem be solved by greedy method ? Justify. **7**

c) Write short notes on NP-completeness and NP-hardness. **8**

OR

16. a) Consider the TSP instance defined by the cost matrix.

$$\begin{bmatrix} \alpha & 7 & 3 & 12 & 8 \\ 3 & \infty & 6 & 14 & 9 \\ 5 & 8 & \infty & 6 & 18 \\ 9 & 3 & 5 & \infty & 11 \\ 18 & 14 & 9 & 8 & \infty \end{bmatrix}$$

Obtain the reduced cost matrix. Also derive the state space tree generated by branch and bound method. **15**

b) Illustrate the operation of merge sort on the array.
$A = \langle 3, 41, 52, 26, 38, 57, 9, 49 \rangle$. **5**

(Pages : 2) **5599**

Reg. No. : .....

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Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. Briefly explain four applications of computer graphics.
2. Discuss shadow-mask method for colour graphics. For which type of display system it is commonly used ?
3. Consider a display system using 1-bit per pixel and a resolution of 1024 × 1024 pixels. What is the size of frame buffer (in bytes) required for the display ?
4. What is homogeneous coordinate system ? What are its advantages ?
5. The end points of a line segment are (10, 10) and (30, 30). Obtain its new end points after 30 degree rotation in counter clockwise direction.
6. Show that the composition of two rotations is additive by concatinating the matrix representations for $R(\theta_1)$ and $R(\theta_2)$ to obtain $R(\theta_1) \cdot R(\theta_2) = R(\theta_1 + \theta_2)$.
7. What are the data structures used to represent a polyhedron in a computer ?
8. Explain different types of parallel projections.
9. Distinguish between one-point perspective projection and two point perspective projection.
10. What do you understand by equilization of gray level ? Give an example having four gray levels for an image represented by 4 × 4 gray level values.

P.T.O.

PART – B

Answer **one full** question from **each** module. **Each** full question carries **20** marks.

Module – 1

11. a) Explain the components of a raster scan display system.

    b) Given a circle of radius = 10 using Mid-point circle algorithm, determine positions along the circle octant in the first quadrant from x = 0 to x = y. The initial value of decision parameter $p_0 = 1 - r = -9$. The initial point is (0, 10). Tabulate k, p_k, (x_{k+1}, y_{k+1}).

OR

12. a) What is meant by scan conversion ?

    b) Explain (with figures) Scan line polygon filling algorithm. Discuss the data structures used to make the algorithm more efficient.

Module – 2

13. a) Derive the transformation for reflecting a triangle with respect to a line with given slope and y-intercept.

    b) Explain a polygon clipping algorithm.

OR

14. a) Illustrate how shearing transformation can be used to convert a unit square into a parallelogram.

    b) Explain Cohen-Sutherland line clipping algorithm.

Module – 3

15. a) Derive transformation for perspective projection.

    b) Consider a unit cube whose one vertex situated at origin. Apply the one point perspective projection on the z = 0 plane assuming the centre of projection at $z_c = 2$ on the z-axis.

OR

16. a) Write and explain Z-buffer algorithm for hidden surface elimination.

    b) Compare Robert's edge detector with Sobel's edge detector.

(Pages : 2) **2876**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. What is called as Scan Conversion ?
2. How is inside-outside test performed as a polygon ?
3. What are random scan system ?
4. Discuss about any two input devices.
5. Derive the 2-D rotation matrix for point (x, y) rotated through an angle Q about origin.
6. How is window to viewport transformation done ?
7. How can scaling with respect to a point P(x, y, z) be defined in terms of scaling with respect to origin ?
8. Compare A-buffer and Z-buffer algorithm.
9. Explain equalization using cumulative frequency function.
10. What are cavalier and cabinet projections ?

P.T.O.

PART – B

(Answer **any one** question from **each** Module) **(3×20=60 Marks)**

Module – I

11. a) Explain midpoint circle generating algorithm. **10**

    b) Demonstrate the midpoint circle generating algorithm by determining position along the circle octants in the first quadrant from x = 0 to x = y with circle centred at origin and radius r = 10. **10**

OR

12. a) Explain the scan line polygon filling algorithm. **10**

    b) Discuss about raster scan systems and random scan systems. **10**

Module – II

13. a) Explain how polygon clipping can be done using Sutherland Hodgeman algorithm. **10**

    b) Show that two successive reflections about either the x-axis or y-axis is equivalent to a single rotation in xy plane about co-ordinate origin. **10**

OR

14. a) Explain homogeneous co-ordinate systems. **10**

    b) Perform a 45° rotation of a triangle
    A (0, 0), B (1, 1), C (5, 2)

    i) about the origin

    ii) about the point (–1, –1). **10**

Module – III

15. a) Describe how a 3D object is presented on the screen using perspective projection. **10**

    b) Explain the edge detection using Canny's operator. **10**

OR

16. a) Explain about various gray level transformations. **10**

    b) Discuss how back face detection is done using scan line algorithm. **10**

2728

(Pages : 3)

Reg. No. : .....

Name : .....

VIII Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805 (1) : FUZZY SET THEORY AND APPLICATIONS (Elective – III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Define noninteractive fuzzy set.
2. Explain the operations on fuzzy relations.
3. Define core, support and boundary of membership function for a fuzzy set.
4. What is fuzzy number ?
5. Write a note on fuzzy logic.
6. Briefly explain fuzzy rule based system.
7. Write a short note on fuzzy information retrieval systems.
8. Write a note on fuzzy clustering.
9. Explain how fuzzy inference rule is represented in neural networks.
10. Write a short note on fuzzy image processing. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module :

Module – I

11. a) Explain any three methods of membership value assignments. **10**

b) Let $\underset{\sim}{A} = \left\{\frac{0.1}{2} + \frac{0.3}{3} + \frac{0.3}{4} + \frac{0.5}{6}\right\}$ and $\underset{\sim}{B} = \left\{\frac{0.4}{2} + \frac{0.8}{4} + \frac{0.4}{5} + \frac{0.6}{6}\right\}$.

Verify De Morgan's principles. **10**

OR

12. a) Given three fuzzy sets $\underset{\sim}{B}, \underset{\sim}{T}$ and $\underset{\sim}{U}$. **10**

$$\underset{\sim}{B} = \left\{\frac{0.5}{60} + \frac{0.7}{40} + \frac{1.0}{20}\right\}, \quad \underset{\sim}{T} = \left\{\frac{0.9}{10} + \frac{0.7}{8} + \frac{0.5}{6} + \frac{0.6}{5}\right\} \text{ and}$$

$$\underset{\sim}{U} = \left\{\frac{1}{100} + \frac{0.8}{90} + \frac{0.6}{80} + \frac{0.4}{70}\right\}$$

Define the fuzzy relations as follows :

$\underset{\sim}{R} = \underset{\sim}{B} \times \underset{\sim}{T}$, $\underset{\sim}{S} = \underset{\sim}{T} \times \underset{\sim}{U}$ and compute $\underset{\sim}{W} = \underset{\sim}{R} \circ \underset{\sim}{S}$

using i) Max-min composition and ii) Max-product composition.

b) Check whether R_1 is equivalence relation or not. Is it fuzzy tolerance relation ?

$$\underset{\sim}{R_1} = \begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0.1 & 0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}.$$ **10**

Module – II

13. a) Two fuzzy sets $\underset{\sim}{A}$ and $\underset{\sim}{B}$, both defined on X, are as follows :

μ (xi)	x_1	x_2	x_3	x_4	x_5	x_6
$\underset{\sim}{A}$	0.1	0.6	0.8	0.9	0.7	0.1
$\underset{\sim}{B}$	0.9	0.7	0.5	0.2	0.1	0

Express the following λ-cut sets using Zadeh's notation :

i) $\left(\overline{\underset{\sim}{A}}\right)_{0.7}$ ii) $\left(\underset{\sim}{A} \cup \underset{\sim}{B}\right)_{0.5}$

iii) $\left(\overline{\underset{\sim}{A} \cap \underset{\sim}{B}}\right)_{0.4}$ iv) $\left(\overline{\underset{\sim}{A}} \cup \overline{\underset{\sim}{B}}\right)_{0.5}$ **10**

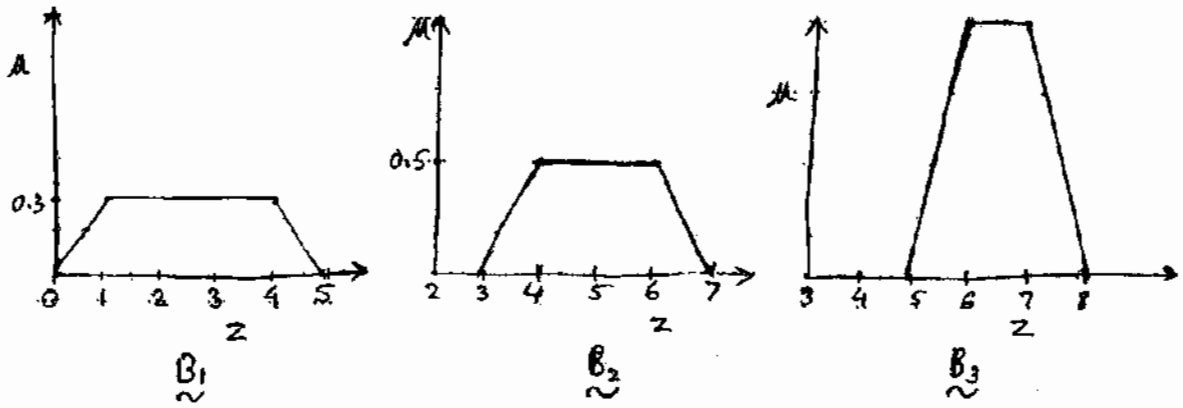
b) Explain any three defuzzification methods with examples. **10**

OR

14. a) Find the logical union of the following fuzzy sets and defuzzify using : 12

i) Max membership method ii) Weighted average method

iii) Mean max method and iv) First (and last) of maxima



b) Show that any λ-cut relation (for $\lambda > 0$) of a fuzzy tolerance relation results in a crisp tolerance relation. 8

Module – III

15. a) Write a note on fuzzy pattern recognition. 10

b) Write short notes on : 10

i) Fuzzy expert system

ii) Fuzzy neural networks.

OR

16. a) Explain the design steps of a general fuzzy controller, with a neat diagram. 15

b) Write a short note on fuzzy databases. 5

(Pages : 3) **2885**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Compare the operation of a computer with the working of human brain.
2. Describe the perceptron model of artificial neuron.
3. Implement a NAND gate and NOR gate using MP neuron model.
4. What do you mean by training a neural network ?
5. What is the significance of energy function in Hopfield network ?
6. How is an associative memory different from normal computer memory ?
7. Explain the effect of temperature parameter on Boltzmann machine learning.
8. What do you mean by learning vector quantization ?
9. Describe the training cycle for an ART network.
10. What are the applications of a self organizing network ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

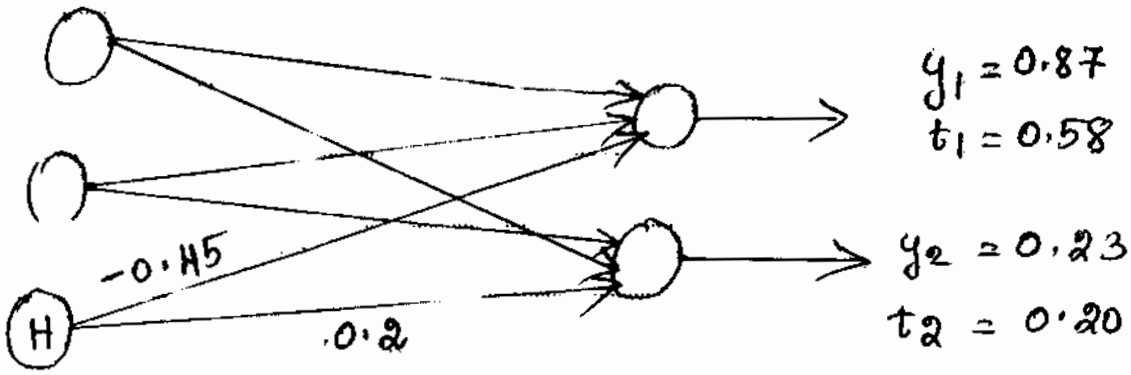
11. a) Describe the different pattern recognition tasks that can be accomplished using neural networks. **10**

    b) Why does a single perceptron cannot simulate simple XOR function ? Explain how this limitation is overcome ? **10**

OR

12. a) Give the architecture and algorithm of a counter propagation network. **10**

    b) Figure shows the hidden and output layers of a multilayer perceptron network. Calculate the error for hidden unit H given that its activation for pattern being processed is 0.64, y_1 and y_2 denote the actual outputs and t_1 and t_2 the corresponding target outputs. **10**



Module – II

13. a) Give the architecture and algorithm for a Hopfield network. Explain pattern storage and recall operations in detail. **10**

    b) Explain how patterns are stored into an associative memory. How is Bidirectional Associative Memory superior to associative memory network ? **10**

OR

14. a) Explain the architecture and operation of radial basis function network. **10**

    b) How is a Boltzmann machine different from Hopfield network ? Why do we use a probabilistic update in Boltzmann machine ? **10**

Module – III

15. a) Explain the concept of neighbourhoods in Kohonen self organizing networks. How are the neighbourhoods reduced ? **10**

    b) Write notes on Phonetic type writer. **10**

OR

16. a) Explain different phases in the learning process of an ART network. **10**

    b) State and explain the ART network algorithm. **10**

(Pages : 2) **2877**

Reg. No. : ..11414025..............

Name : ..Vanna E. ....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.702 DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain time complexity and space complexity of algorithms.
2. The iteration method to solve the recurrence relation $T(n) = 3T(\lfloor n/2 \rfloor) + n$.
3. What is the effect of calling MAX-HEAPIFY (A,i), when the element A [i] is larger than its children ? What is the effect of calling MAX-HEAPIFY (A,i) for i > n/2.
4. What are the basic properties of B-Trees ?
5. Explain topological sorting with an example.
6. Analyze the complexity of Depth First Search (DFS) algorithm.
7. Explain the heuristics used to improve the running time of disjoint set operations.
8. Briefly explain dynamic programming method of problem solving.
9. Explain optimal substructure property.
10. Define an NP-complete problem. **(10×4= 40 Marks)**

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) Discuss about the asymptotic notations used for expressing the time complexity of algorithms. **6**

P.T.O.

b) Use substitution method to solve the recurrence relation $T(n) = 2T(n/2) + n$. **8**

c) Analyze the performance of Quiksort in best care, average care and worst care. **6**

OR

12. a) What is a priority queue ? Discuss how you will implement priority queue operation using a heap data structure. **12**

b) Use Master Method to solve the recurrence relation $T(n) = 3T(n/4) + n\lg n$. **8**

Module – II

13. a) What are the basic properties of red black trees ? Discuss an algorithm to insert a new node into a red black tree ? **12**

b) Explain Prim's algorithm. Analyse its time complexity. **8**

OR

14. a) What are height balanced trees ? Discuss about the different AVL rotations. **12**

b) What are strongly connected components ? Discuss an algorithm to find strongly connected components of a graph. **8**

Module – III

15. Explain branch and bound technique used in problem solving. How will you solve travelling salesman problem (TSP) using branch and bound ? **20**

OR

16. Explain Strauseu's algorithm used for matrix multiplication. Use strauseu's algorithm to compute the matrix product of the following matrices. $\begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix}$ and $\begin{pmatrix} 8 & 4 \\ 6 & 2 \end{pmatrix}$. **20**

(Pages : 2) **2880**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.704 (2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective – I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. What are the different steps involved in the multimedia design process ?
2. What are the requirements of a media editing software ?
3. What are the steps involved in storing name of a person and his photo in a database of multimedia system ?
4. What is Psychoacoustic model ?
5. What is the use of forward and inverse discret cosine transformation in JPEG image compression ?
6. What is the basic principle of Arithmetic coding ?
7. Compare LZ and LZW coding.
8. Find out group of pictures and prediction span for the following frame sequence. IPBBPI IPBBPI IPBBPI ....
9. What is motion vector ?
10. Compare P frames and B frames in video compression.

P.T.O.

PART – B

Answer **any full** question from **each** Module.

Module – I

11. a) What are the requirements of a multimedia system ? **8**

    b) Explain the different media types and its key role in the development of a multimedia application. **12**

OR

12. a) Explain the different types of multimedia systems with advantages and disadvantages. **12**

    b) Explain the issues of data storage in multimedia database management system. **8**

Module – II

13. Consider the following character string and assume the relative probabilities of the symbols are reflected in the string : aa bbb ccc dddd eeeee ffffff ggggggg.

    a) Construct Huffman tree and write code word of each character. **10**

    b) Find out the code word of the word abcdefg using Arithmetic coding. **10**

OR

14. a) Explain Dolby audio coders. **12**

    b) Compare Dolby audio coders and MPEG audio coders. **8**

Module – III

15. a) Compare MPEG Video Compression Standards. **12**

    b) Explain the process of motion estimation and motion compensation. **8**

OR

16. a) Explain the coding of audio visual objects in MPEG 4. **10**

    b) Compare intra object synchronization and inter object synchronization. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.703 : COMPUTER NETWORKS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** the questions : **(10×4=40 Marks)**

1. Describe about the different types of network topology with a neat diagram.
2. Compare LAN, MAN and WAN.
3. Distinguish between FDDI and 802.5.
4. Discuss about congestion prevention policies.
5. Explain about Internet Protocol Header and its Parameters.
6. Explain how DNS is implemented.
7. How is multicasting done in internet ?
8. What is SNMP ? Explain.
9. What is the use of MIME in e-mail ?
10. Write a note on :
    i) ICMP
    ii) RARP.

PART – B

Answer **one** question from **each** Module : **(3×20=60 Marks)**

Module – I

11. a) Describe the ISO-OSI reference model. Discuss the functions of each layer. **10**

    b) Explain the Go back-n sliding window protocol. **10**

OR

12. a) Explain the TCP/IP reference model. **10**

    b) Why is framing required in data link layer ? Explain the HDLC protocol. **10**

Module – II

13. a) Explain the IEEE 802 standards with neat block diagram. **10**

    b) Explain the frame formats of IEEE802.3 and IEEE802.5. **5**

    c) Draw the diagram of OSPF header format and explain the functions of each field. **5**

OR

14. a) Explain any two routing algorithms. **10**

    b) Explain the different congestion control algorithms. **10**

Module – III

15. a) Write a short note on IPv6. Explain the fields in the IPv6 header format. **10**

    b) Explain the addressing scheme in IPv4 and IPv6. When IPv6 is introduced, does the ARP protocol have to be changed ? Explain. **10**

OR

16. a) What are the network number, subnet number and host number for address 135.104.192.100, mask 255.255.128.0 ? **2**

    b) Explain the TCP header format with a neat diagram. **10**

    c) Write a short note on the SIP standards. Distinguish between SIP and H.323. **8**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2015
(2008 Scheme)
08.705 (5) C# AND .NET FRAMEWORK (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the iteration constructs available in C# with suitable examples.
2. Differentiate between partial class and sealed class with suitable examples.
3. What is boxing and unboxing ?
4. Distinguish between value types and reference types with examples.
5. What is UDDI ?
6. Differentiate between Synchronous and Asynchronous delegates.
7. What is a Jagged Array ?
8. With an example explain Array and Array List.
9. What is reflection ?
10. What is the use of a conversion operator ? **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) With a neat diagram explain the .NET architecture. **14**

    b) Write a program to generate Pascals triangle up to 'n'. The value of 'n' is read from console. **6**

OR

12. a) What do you understand by events and delegates in C# ? Give example. 14

    b) Explain the features of assembles. 6

Module – II

13. Explain the SOAP message structure. Also explain the rules associated with the SOAP message structure. 20

OR

14. Explain exception handling mechanism in C#, with suitable examples. 20

Module – III

15. Explain the steps in detail to create a database application using C#. 20

OR

16. Development of E-commerce websites require three tier architectures. Using C# illustrate the development of such websites. 20

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.702 DESIGN AND ANALYSIS OF ALGORITHMS (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the significance of using order notations in analysis of algorithms.
2. Show that the recurrence $T(n) = T(n-1) + 1$ is asymptotically bound by $\theta(n)$.
3. Is an array that is in sorted order, a min-heap ? Justify.
4. What value of 'q' does the partition algorithm return when all elements in the array A[p. . r] have the same value ?
5. Given an adjacency list representation of a directed graph, how long does it take to compute the out degree of every vertex ? How long does it take to compute the indegrees ?
6. What is a minimum spanning tree ? Which data structure is used by Prim's algorithm to find the MST ?
7. Explain the properties of a red black tree.
8. What are polynomial time computable algorithms ?
9. What are the characteristic properties possessed by problems solved using greedy technique ?
10. Explain branch and bound technique of problem solving. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module. **All** questions carry **equal** marks.

MODULE – I

11. a) Draw the recursion tree for $T(n) = 4T(\lfloor n/2 \rfloor) + c_n$ where c is a constant and provide a tight asymptotic bound on its solution. **10**

b) Use iteration to solve $T(n) = T(n - a) + T(a) + n$ where $a \geq 1$ is a constant. **10**

OR

12. a) Illustrate the operation of Max-heapify $(A, 3)$ on $A = \langle 27, 17, 3, 16, 13, 10, 1, 5, 7, 12, 4, 8, 9, 0 \rangle$ **7**

b) Illustrate the operation of Quicksort on the array $A = \langle 5, 13, 2, 25, 7, 17, 20, 8, 4 \rangle$. **13**

MODULE – II

13. a) Show the results of inserting the keys F, S, Q, K, C, L, H, T, V, W, M, R, N, P in order into an empty B-Tree. **10**

b) Explain Dijkstra's algorithm to find the shortest path with the help of an example. **10**

OR

14. a) Discuss about the different cases to be considered for a red black tree insertion. **10**

b) Illustrate DFS algorithm on a complete graph with an example. **10**

MODULE – III

15. a) Solve TSP on 5 cities by branch and bound. **15**

b) Discuss about the characteristics of dynamic programming. **5**

OR

16. a) Show how the following matrices would be multiplied using Strassen's algorithm

$$A = \begin{bmatrix} 7 & 9 \\ 2 & 5 \end{bmatrix} B = \begin{bmatrix} 3 & 2 \\ 6 & 5 \end{bmatrix}.$$ **10**

b) Discuss greedy approach to solve fractional knapsack problem. **10**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.704 (2) : MULTIMEDIA SYSTEMS AND DATA COMPRESSION
(Elective I) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Distinguish between MOD and NMOD.
2. Distinguish between broadcasting and multicasting.
3. Explain the different ways of storing multimedia data in data bases.
4. How is entropy encoding different from source encoding ?
5. Distinguish between static and dynamic coding. Where are they used ?
6. What is the basic principle of LZ algorithm ?
7. What is prefix property ? Where is it used ?
8. Explain the basic principle of video compression.
9. What is intra object synchronization ?
10. What is an I frame ?

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) Explain the different kinds of multimedia applications. **10**

    b) Discuss about different types of multimedia systems. **10**

OR

12. Explain the characteristics of Multimedia Database Management Systems. **20**

Module – II

13. a) Explain static Huffman coding. **10**

    b) Explain LZW coding. **10**

OR

14. Discuss about different audio compression techniques. **20**

Module – III

15. How is motion estimation and compensation done in video compression ? **20**

OR

16. a) Explain MPEG-4 standard. **10**

    b) How synchronization is achieved in multimedia system ? **10**

(Pages : 2) **7788**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.705(5)C# AND .NET FRAMEWORK (Elective – II) (R)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are events and delegates in C# ?
2. Differentiate between Indexers and Interfaces.
3. What is the use of data adapter in ADO.NET ?
4. What is a Dataset Object ?
5. Differentiate between Array and Arraylist in C#.
6. What is a shared assembly ?
7. Briefly explain Web Request and Web Response.
8. What is boxing and unboxing ?
9. What is method overloading ?
10. Can a private virtual method be overridden.

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. Write short notes on :

    a) Shared assemblies

    b) Indexers

    c) Interfaces of system collection **20**

OR

12. With a neat diagram explain the ADO.NET architecture. **20**

Module – II

13. Explain the following terms with an example with reference to C# : **20**

    i) for each ii) ref

    iii) params iv) enum

OR

14. Write a C# program to sort an array of employees object having EmpId, Name and Salary.

    – display the array sorted on names

    – display the array based on salary. **20**

Module – III

15. Write short notes on : **20**

    a) Reflection b) Remoting

    c) Marshelling d) Versioning

OR

16. Briefly define the steps involved in ADO.NET for establishing a database connections with C#. **20**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.705 (3) : NEURAL COMPUTING (Elective – II) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain delta learning rule.
2. State and explain perceptron convergence theorem.
3. Compare feed forward and feedback networks.
4. XOR function is non-linearly separable by a single decision boundary line. Justify.
5. What is meant by simulated annealing ?
6. Write a note on the energy function used in BAM.
7. Explain the training algorithm used in heteroassociative network.
8. Discuss any one application of self-organizing map.
9. Write a note on competitive learning.
10. Explain vector quantization. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Explain back propagation training algorithm. What are the limitations of back propagation network ? **15**

    b) Explain the architecture of multilayer perceptron network. **5**

OR

12. a) Explain the training algorithm used in counter propagation network. **12**

    b) Comment on the following :

    i) How long should a network be trained ?

    ii) How many hidden layers are necessary to approximate a continuous function ? **8**

P.T.O.

Module – II

13. a) Explain the learning algorithm used in radial basis function networks. **10**

    b) Explain the architecture and processing of BAM. **10**

OR

14. a) Explain the architecture and processing of Boltzmann machine. **10**

    b) Explain Hopfield network and the training algorithm used. **10**

Module – III

15. a) Explain supervised vector quantization. **8**

    b) Explain the architecture and processing of ART1. **12**

OR

16. a) Explain the architecture and operation of Kohonen's self organizing network. **12**

    b) Explain the difference between ART1 and ART2 network. **8**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.805 (1) : FUZZY SET THEORY AND APPLICATIONS
(Elective III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Write short note on fuzzification.
2. List the properties of classical sets.
3. Discuss fuzzy composition techniques.
4. Explain how membership assignment is performed using intuition.
5. How is a fuzzy relation converted into a crisp relation using lambda-cut process ?
6. What are the basic logic operations performed over the propositions ?
7. Differentiate between center of sum and weighted average method.
8. How is fuzzy clustering done ?
9. Explain the application of fuzzy logic systems to image processing.
10. What are information retrieval systems ? Explain.

PART – B

Answer **any one** question from **each** Module : **(3×20=60 Marks)**

Module – I

11. a) Discuss in detail the operations and properties of fuzzy sets.
    b) Explain the different methods used for membership value assignment.

OR

P.T.O.

12. a) Using your own intuition, plot the fuzzy membership function for the age of people very young, young, middle age, old, very old.

    b) How is rank ordering used to define membership function based on polling concept ?

Module – II

13. a) What are the different methods of defuzzification process ?

    b) Explain in detail the methods employed for converting fuzzy form to crisp form.

OR

14. a) Explain about fuzzy rule based system.

    b) Differentiate between center of sum and weighted average method.

Module – III

15. a) How is fuzzy database different from traditional database ?

    b) List and explain various applications of fuzzy logic controllers.

OR

16. Explain the organization of fuzzy neural network. List any one application of fuzzy neural network.

(Pages : 2) **7779**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.701 : COMPUTER GRAPHICS (R)

Time: 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. What is interlaced scanning ? How does it improve display process ?
2. Briefly explain beam-penetration method used for displaying colour pictures. In which display system it is commonly used ?
3. When a light pen is used to select a screen position, where does the light come from ? Will it detect screen position correctly if the pen is held on a blank screen ?
4. A graphic display system with a resolution of 1024 x 1024 pixels allows 256 colours. What is the size of RAM (in bytes) required for the frame buffer ?
5. Obtain the transformation matrix for rotation of a point (x, y) through an angle θ degree in counter clockwise direction.
6. Draw the two-dimensional viewing transformation pipeline. What are the steps involved in transforming viewing coordinate frame into world coordinate frame.
7. Distinguish between window and view port. What happens if window is charged when the view port is kept the same ?
8. Give the transformation matrix for rotating an object around Y-axis.
9. It is required to display an image with gray levels ranging from 10 to 50 on a device that has a gray level range of 0 to 255. Obtain the linear transformation that will accomplish this.
10. Explain back face removal algorithm.

P.T.O.

PART – B

Answer **one full** question from **each** module. **Each full** question carries **20** marks.

Module – 1

11. a) Explain the working and composition of a typical plasma display system.

    b) Write and explain Bresenham's line drawing algorithm. What modifications are needed for lines with m > 1 and lines with negative slope ?

OR

12. a) Explain the architecture of Raster graphics system.

    b) Explain boundary fill algorithm. If you are using a recursive algorithm, how will you handle the possibility of stack overflow ? How does flood fill differ from boundary fill ?

Module – 2

13. a) Explain the steps involved in rotating a triangle if the reference point is other than origin.

    b) Write and explain polygon chipping algorithm. Illustrate the steps of the algorithm using an example.

OR

14. Derive the transformation matrix for rotating a 3-D object about an arbitrary line whose direction is given by two points $P_1(x_1, y_1, z_1)$ and $P_2(x_2, y_2, z_2)$.

Module – 3

15. a) Write a general purpose, efficient algorithm for hidden surface elimination.

    b) Write and explain a region labelling algorithm.

OR

16. a) Derive transformation matrix for parallel projection.

    b) Explain issues in measuring perimeter of images and discuss methods used to overcome them.

(Pages : 2) **7656**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.845 : ARTIFICIAL INTELLIGENCE & ROBOTICS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Give an example for Heuristic search.
2. Explain how quantifiers are represented in predicate calculus.
3. Describe dynamic Bayesian networks.
4. Describe decision tree learning.
5. Write the four applications of robot.
6. What are the subsystems of the robot ?
7. List of the sensors used in the robot and explain.
8. Explain how binary image is obtained from the gray image ?
9. Write down the transformation matrix for 3D scaling.
10. Compute the pseudo inverse of the matrix $\begin{matrix} 1 & 0 & 2 \\ 1 & -1 & 0 \end{matrix}$.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Given the function f(x, y, z) = 0, subject to the constraint g(x, y, z) = 0. Explain how to obtain the solution to the problem using Heuristic search algorithm.

P.T.O.

2. Write down the steps involved in Inference based decision rule with an example.

3. Explain how the knowledge is represented using predicate calculus ?

Module – II

4. Given the prior probability density function $\omega(\theta)$, likelihood function $f(\theta / y)$, obtain the posterior density function $\omega(\theta / y)$. Given the observation of y, how the random variable θ is estimated using Bayes technique.

5. Describe the process of automation in robotics.

6. Describe the process of "learning by example" with an example.

Module – III

7. Explain how the Jacobian matrix if formulated that relates joint space velocity with task space velocity ?

8. Write the short notes on the following a) Gears b) Sensors c) Materials used in the robotics.

9. Write the short notes on the following :
   a) Dynamic stabilization
   b) Position control
   c) Force control.

(10×6=60 Marks)

(Pages : 2) **2707**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.816 : BIOMEDICAL ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part **A** and **two full** questions from **each** Module in Part **B**.*

PART – A

1. What are the characteristics of biopotential electrodes ?
2. What are the four valves in the human heart ?
3. How are skeletal muscles activated ? Explain EMG.
4. Define the imp lung capacities and explain them.
5. Explain the process of blood purification.
6. With the help of a diagram explain the Lown defibrillator.
7. Explain the working of a sphygmomanometer.
8. What are the advantages and disadvantages of PET scan ?
9. What are the basic modes of ultrasound transmission ?
10. Differentiate between microshock and macroshock. **(10×4=40 Marks)**

PART – B

Module – I

11. What are bioelectric potentials ? Discuss the frequency and voltage range of ECG, EEG and EMG signals.
12. Describe the ultrasonic and electromagnetic blood flow meters.
13. Explain the electro conduction system of the heart.

P.T.O.

Module – II

14. With the help of a neat diagram explain the working of a heart lung machine.

15. Describe the physiological effects of electricity. Explain the various methods of preventing electrical accidents.

16. Explain the structure of a neuron. Write notes on neuronal communication.

Module – III

17. Explain the principle and technique of producing CT images.

18. Draw the block diagram of an X-ray image intensifier system and explain its constructional details.

19. Draw the block diagram of a biotelemetry system and explain each component in detail. Explain any two applications of biotelemetry. **(6×10=60 Marks)**

30

(Pages : 2) 2698

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.802 : RADAR AND TELEVISION ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. What is CW Radar ? Explain.
2. Explain the use of delay line canceller in Radar systems.
3. How do you provide a low noise front-end in radar receivers ?
4. What are marker beacons in navigation systems ?
5. Draw the frequency spectrum for VSB signal.
6. What is AGC ? In which part of the TV receiver, it is used ?
7. Briefly explain about SECAM.
8. How do you digitize a video signal ?
9. What is digital TV over IP ?
10. Compare the performance of LCD and LED TV.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks :

Module – 1

11. Derive an expression for the Radar equation with suitable assumptions.
12. Draw the block diagram of a Radar receiver and explain the functions of each block.
13. With an appropriate diagram, explain the working principle of an ILS for an air craft.

P.T.O.

Module – 2

14. With neat sketch explain about the composite video signal for the Indian standard for TV broadcasting and mark the time periods.
15. Draw the block diagram of a PAL receiver and explain about each subsection.
16. a) Briefly explain about the sync separation circuit in a TV receiver.
    b) Explain how you separate sound in a TV receiver.

Module – 3

17. With a block diagram, explain how a digital TV signal is received through satellites.
18. Explain how OFDM technique is used for terrestrial digital TV. Illustrate with an appropriate diagram.
19. Write short notes on :
    a) Compression of frames
    b) Plasma TV
    c) QAM.

(Pages : 3) 2708

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.804 : SATELLITE AND MOBILE COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Why uplink and downlink frequencies made different in satellite communication ? Why uplink is made higher than downlink ? Give the typical frequencies.

2. Differentiate geostationary and geosynchronous orbits. State atleast three advantages of geostationary orbit.

3. For a satellite circuit the individual carrier to noise spectral density ratios are $(C/N)_{uplink} = 23dBHz$ $(C/N)_{downlink} = 20dBHz$, intermodulation 24dBHz. Calculate the overall carrier to noise ratio in decibels.

4. Briefly describe the mobile satellite networks.

5. If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses

   a) 4 cell reuse

   b) 7 cell reuse.

6. State and briefly explain the four factors that influence small-scale fading.

7. State and explain the multiple access technique used in GSM. Also differentiate FDD and TDD.

P.T.O.

8. Briefly describe the Ultra Wide band communication system giving emphasis to its application and multiple access technique.

9. State atleast four advantage of CDMA system.

10. Define relative other - cell interference factor in a CDMA cell. What is its range and what are the factors that affect the value of it ? **(10×4=40 Marks)**

PART – B

Answer **any two** questions from **each** Module.

Module – 1

11. a) Describe a transmit receive type earth station with a block diagram.
    b) Compare the performance of high power amplifiers used in earth station.

12. a) Define
        a) Antenna look angles
        b) Coverage angle and slant range.
    b) A geostationary satellite is located at 90°W. Calculate the
        a) Azimuth angle
        b) Elevation angle and
        c) Range for an earth station antenna at latitude 35°N and longitude 100° W.

13. a) Explain how a satellite is placed into geostationary orbit from earth.
    b) What is meant by the earth eclipse of an earth-orbiting satellite ? Why is it preferable to operate with a satellite positioned west, rather than east of earth station longitude.

Module – 2

14. A transmitter produces 50W of power, express the transmit power in :
    a) dBm
    b) dBW

    If 50W is applied to a unity gain antenna with a 900 MHz carrier frequency find the power received in dBm at free space distance of 100 m from the antenna. What is P_r (10 km) ?

    Hint : Gain of Receiving antenna is unity.

15. Explain any one of the outdoor propagation models ? State the advantage and disadvantage of Lorzely– Rice and Okamura models.

16. a) With a block diagram explain GSM architecture.
    b) Briefly describe the GSM channel types.

Module – 3

17. State the four diversity combining techniques. Explain atleast two of them.

18. A CDMA system has an information rate R_b = 4800 bps and spreading rate is 32. The system in error protected by a $-1/2$ convolutional code. Compare the degradation with and without FEC coding at BER of 10^{-5} and when there are seven interfering uses. With FEC what is the spreading factor ? Given E_b/N_o for BER 10^{-5} = 9.6dB.

19. a) What is meant by space division multiple access ? State atleast four advantages. How SDMA improve the system capacity.
    b) Briefly explain smart antennas used for mobile application. **(6×10=60 Marks)**

(Pages : 2) **7654**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.825 : MICROWAVE DEVICES AND CIRCUITS (T)
(Elective – V)

Time : 3 Hours Max. Marks : 100

***Instruction : Provide** Smith Chart to students on their **request**.*

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the need for S parameters in the analysis of microwave networks.
2. Prove that the ABCD matrix of two 2-port network in cascade can be obtained by multiplying the ABCD matrix of the individual networks.
3. Explain how impedance matching is done using lumped elements.
4. Explain how microwave BJT and FET are biased.
5. Explain High Field Domain formation in a GUNN Diode.
6. Derive expressions for the power output of an IMPATT diode.
7. What do you mean by unconditional stability ? State the conditions for unconditional stability.
8. What do you mean by Stripline ? What are its disadvantages ?
9. Write a brief note on print capacitors.
10. Explain how attenuators are implemented in MIC's. **(4×10=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Explain how equivalent voltages and currents are defined for waveguide modes.

12. Derive expressions for Z parameters in terms of S parameters for a 2-port network.

13. Design an L-section matching network to match a series RC load with an impedance of $Z_L = 200\text{-}100\,j\Omega$, to a $100\,\Omega$ line at a frequency of 500 MHz.

Module – II

14. Explain the two valley theory for GUNN diode operation. With the help of appropriate derivations, deduce the condition to be satisfied by a semiconductor material to exhibit negative resistance.

15. Explain the structure and operation of a TRAPATT diode.

16. Explain the steps involved in the design of a one port negative resistance microwave oscillator.

Module – III

17. Explain the even and odd mode of operation of a coupled stripline ? Draw its equivalent circuit and obtain expression for mutual capacitance.

18. Write short note on the following :

    a) Resonators in MICs

    b) Low Pass Filter implementation in MICs.

19. Explain the structure, field configuration and different types of losses in a Microstrip line.

(6×10=60 Marks)

(Pages : 2) **2699**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.803 : COMPUTER COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(4×10=40 Marks)**

1. Distinguish between bit oriented protocols and byte oriented protocols.
2. State the advantages of 'SONET'.
3. Write a note on coaxial cables.
4. Enumerate on CSMA/CD.
5. Explain graph theory approach for network.
6. What is meant by hierarchical routing ?
7. Describe Address Resolution Protocol (ARP).
8. How the firewall ensures security for network computer ?
9. Explain the working of SSL.
10. What is subnetting ?

PART – B

Answer **any two** questions from **each** Module : **(6×10=60 Marks)**

Module – I

11. Explain the CSMA/CD protocol.
12. Describe the wireless LAN (IEEE 802.11) Standard.
13. Briefly explain the sliding window protocol.

Module – II

14. Explain the scheme of IP addressing.
15. Discuss and ICMP messages and frame formats.
16. What are the reasons for congestion in a network ? How it is eliminated ?

P.T.O.

Module – III

17. Write notes on:
    i) Fire walls
    ii) Packet filtering.
18. Explain the cryptographic tools for network security.
19. Describe the security issues in network layer.

(Pages : 3) **2703**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.825 (Elective – V) : MICROWAVE DEVICES AND CIRCUITS (T)

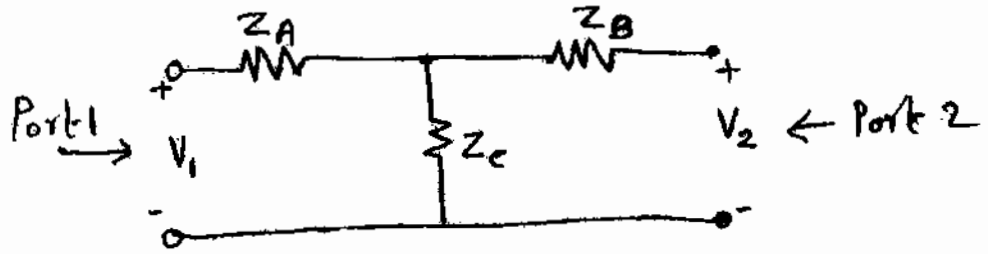
Time : 3 Hours Max. Marks : 100

***Instruction** : Provide **Smith** charts to students on their **request**.*

PART – A

Answer **all** questions.

1. Find the Z parameters of the T-Network given below



2. Find the S-matrix of an inductor whose insertion loss is 0.3 dB and isolation 40 dB. Assume that points are well matched.

3. Explain the theory of small reflections.

4. An n-type Ga As diode has the parameters.
   Electron drift velocity, $V_d = 2.5 \times 10^5$ m/s;
   Negative electron mobility, $|\mu_n| = 0.015$ m^2/V.S.
   Relative dielectric constant, $\varepsilon_r = 13.1$.
   Determine the criterion for classifying modes of operation.

5. List the applications of IMPATT and TRAPATT diodes.

P.T.O.

6. The S parameters for the HP HFET – 102 Ga As FET at 2 GHz with a bias voltage $V_{gs} = 0$ are given as ($z_0 = 50\,\Omega$)
   $S_{11} = 0.894 < -60.6°$; $S_{21} = 3.122 < 123.6°$
   $S_{12} = 0.020 < 62.4°$; $S_{22} = 0.781 < -27.6°$
   Determine the stability of transistor using K-Δ test and μ-test.

7. Find the width for a $50\,\Omega$ copper stripline conductor with b = 0.32 cm and $\varepsilon_r = 2.20$. If the dielectric loss tangent is 0.001 and operating frequency 10 GHz. Calculate attenuation in dB/λ. Assume a conductor thickness of t = 0.01 mm.

8. Differentiate phase and group velocity.

9. Show that a 3 port circulator can function as an isolator.

10. Write note on PIN diode switches. **(10×4=40 Marks)**

PART – B

Answer **any 2** questions from **each** Module.

Module – I

11. a) Consider a rectangular waveguide with a = 2.286 cm and b = 1.016 cm air filled for z < 0 and Rexolite filled for ($\varepsilon_r = 2.54$) z > 0. If operating frequency is 10 GHz. Use an equivalent transmission line model to compute reflection coefficient of a TE_{10} wave incident on the interface from z < 0.

    b) Design a single section quarter wave matching transformer to match a $10\,\Omega$ load to a $50\,\Omega$ line at $f_o = 3$ GHz. Determine the percent bandwidth for which the SWR $\leq$ 1.5. **5**

12. Design a double stub tuner to match a load $Z_L = 60 - j\,80\ \Omega$ to a 50 Ω line. The stubs are to be open circuited stubs and are spaced $\lambda/8$ apart. Assuming that this load consists of a series resistor and capacitor and that match frequency is 2 GHz. **10**

13. Explain the principle of operation of MESFET. Draw the equivalent circuit of MESFET. **10**

Module – II

lain the different modes of Gunn diode in detail based on the product of ing and length (n_0L) **10**

microwave transistor has the following S parameters at 10 GHz with 50Ω erence impedance.

$_{11} = 0.45 < 150°$; $S_{12} = 0.01 < -10°$; $S_{21} = 2.05 < 10°$

$_{22} = 0.40 < -150°$. The source impedance is $Z_S = 20\Omega$ and load impedance is $_L = 30\Omega$. Compute power gain, available gain and the transducer power gain. **10**

Design an amplifier for a maximum gain at 4 GHz using single stub matching sections. The GaAs has the S parameters ($Z_0 = 50\Omega$). **10**

fGHz	S_{11}	S_{21}	S_{12}	S_{22}
3.0	$0.80 < -89°$	$2.86 < 99°$	$0.03 < 56°$	$0.76 < -41°$
4.0	$0.72 < -116°$	$2.60 < 76°$	$0.03 < 57°$	$0.73 < -54°$
5.0	$0.66 < -142°$	$2.39 < 54°$	$0.03 < 62°$	$0.72 < -68°$

Module – III

7. Explain in detail coupled stripline theory include even and odd mode analysis. **10**

18. a) Design a low pass composite filter with a cut off frequency of 2 MHz and impedance of 75Ω. Place the infinite attenuation pole at 2.05 MHz. **7**

    b) Write note on attenuators. **3**

19. Write notes on microwave integrated circuits and hybrid microwave integrated circuits. **10**

Module – II

14. Explain the different modes of Gunn diode in detail based on the product of doping and length (n_0L) **10**

15. A microwave transistor has the following S parameters at 10 GHz with 50Ω reference impedance.

    $S_{11} = 0.45 < 150°$; $S_{12} = 0.01 < -10°$; $S_{21} = 2.05 < 10°$

    $S_{22} = 0.40 < -150°$. The source impedance is $Z_S = 20\Omega$ and load impedance is $Z_L = 30\Omega$. Compute power gain, available gain and the transducer power gain. **10**

16. Design an amplifier for a maximum gain at 4 GHz using single stub matching sections. The GaAs has the S parameters ($Z_0 = 50\Omega$).

fGHz	S_{11}	S_{21}	S_{12}	S_{22}
3.0	$0.80 < -89°$	$2.86 < 99°$	$0.03 < 56°$	$0.76 < -41°$
4.0	$0.72 < -116°$	$2.60 < 76°$	$0.03 < 57°$	$0.73 < -54°$
5.0	$0.66 < -142°$	$2.39 < 54°$	$0.03 < 62°$	$0.72 < -68°$

10

Module – III

17. Explain in detail coupled stripline theory include even and odd mode analysis. **10**

18. a) Design a low pass composite filter with a cut off frequency of 2 MHz and impedance of 75Ω. Place the infinite attenuation pole at 2.05 MHz. **7**

    b) Write note on attenuators. **3**

19. Write notes on microwave integrated circuits and hybrid microwave integrated circuits. **10**

(Pages : 3) **2700**

Reg. No. : 11414044

Name : Poornima

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.804 : SATELLITE AND MOBILE COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Why uplink and downlink frequencies made different in satellite communication ? Why uplink is made higher than downlink ? Give the typical frequencies.

2. Differentiate geostationary and geosynchronous orbits. State atleast three advantages of geostationary orbit.

3. For a satellite circuit the individual carrier to noise spectral density ratios are $(C/N)_{uplink}$ = 23dBHz $(C/N)_{downlink}$ = 20dBHz, intermodulation 24dBHz. Calculate the overall carrier to noise ratio in decibels.

4. Briefly describe the mobile satellite networks.

5. If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses

   a) 4 cell reuse

   b) 7 cell reuse.

6. State and briefly explain the four factors that influence small-scale fading.

7. State and explain the multiple access technique used in GSM. Also differentiate FDD and TDD.

P.T.O.

8. Briefly describe the Ultra Wide band communication system giving emphasis to its application and multiple access technique.

9. State atleast four advantage of CDMA system.

10. Define relative other - cell interference factor in a CDMA cell. What is its range and what are the factors that affect the value of it ? **(10×4=40 Marks)**

PART – B

Answer **any two** questions from **each** Module.

Module – 1

11. a) Describe a transmit receive type earth station with a block diagram.
    b) Compare the performance of high power amplifiers used in earth station.

12. a) Define
        a) Antenna look angles
        b) Coverage angle and slant range.
    b) A geostationary satellite is located at 90°W. Calculate the
        a) Azimuth angle
        b) Elevation angle and
        c) Range for an earth station antenna at latitude 35°N and longitude 100° W.

13. a) Explain how a satellite is placed into geostationary orbit from earth.
    b) What is meant by the earth eclipse of an earth-orbiting satellite ? Why is it preferable to operate with a satellite positioned west, rather than east of earth station longitude.

Module – 2

14. A transmitter produces 50W of power, express the transmit power in :
    a) dBm
    b) dBW

    If 50W is applied to a unity gain antenna with a 900 MHz carrier frequency find the power received in dBm at free space distance of 100 m from the antenna. What is P_r (10 km) ?

    Hint : Gain of Receiving antenna is unity.

15. Explain any one of the outdoor propagation models ? State the advantage and disadvantage of Lorzely– Rice and Okamura models.

16. a) With a block diagram explain GSM architecture.
    b) Briefly describe the GSM channel types.

Module – 3

17. State the four diversity combining techniques. Explain atleast two of them.

18. A CDMA system has an information rate $R_b = 4800$ bps and spreading rate is 32. The system in error protected by a $-1/2$ convolutional code. Compare the degradation with and without FEC coding at BER of 10^{-5} and when there are seven interfering uses. With FEC what is the spreading factor ? Given E_b/N_o for BER $10^{-5} = 9.6$dB.

19. a) What is meant by space division multiple access ? State atleast four advantages. How SDMA improve the system capacity.
    b) Briefly explain smart antennas used for mobile application. **(6×10=60 Marks)**

5.

(Pages : 2) 7650

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.803 : COMPUTER COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Compare OSI Reference layering with TCP/IP layering.
2. Consider sending a packet of F bits over a path of Q links. Each link transmit a R bps. The network is packet switched datagram network and assumed to be lightly loaded so that queuing delay is negligible. Propagation delay = 0. If each packet has 2h bits of header, then estimate how long it take to send the packet ?
3. Explain the structure of MAC address.
4. Briefly explain salient features of broadcast and multicast routing.
5. Compare and contrast link state and distance vector routing algorithms.
6. Distinguish between congestion control and flow control.
7. Explain ICMP. What are the different ICMP message types ?
8. What do you mean by packet filtering ? What are the different filtering policies ?
9. Explain the need for network intrusion detection systems.
10. Explain how integrity of message can be ensured using digital signatures.

(10×4 = 40 Marks)

P.T.O.

PART B

Answer **any two** questions from **each** Module.

Module – I

11. Explain how reliable data transfer can be achieved using stop and wait protocol.

12. Explain CSMA/CD as a multiple access protocol for Ethernet.

13. Discuss spanning tree based broadcast routing strategies. What are the limitations of this method ?

Module – II

14. Discuss the important differences between IPv6 and IPv4 datagram formats.

15. Explain TCP congestion control algorithm.

16. Explain how MPLS improve the speed of IP routers.

Module – III

17. Discuss confidentiality and authentication associated with secure communication.

18. Explain DOS attacks.

19. Briefly explain the features provided by IPSec protocol suite. **(6×10=60 Marks)**

(Pages : 2) **7676**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
Computer Science & Engineering
08.805 (3) MOBILE AND WIRELESS NETWORKS (Elective – III) (R)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Discuss different types of antennas and its signal propagation ranges of radio communication.
2. Give the significance of modulation in data transmission. Give any two reasons why baseband signal cannot be directly transmitted in a wireless system.
3. If the transmitter and receiver in a WLAN operating at 2.4 GHz are separated by a distance of 50 m and the power transmitted by the transmitter is 10 dBm, what is the received power considering free space propagation and Omni-directional antennas at both ends ? [1dBm = 0.0013 W]
4. Explain different types of handoff mechanism used in mobile communication.
5. What are hidden/exposed terminals and Near-far terminal of wireless communication.
6. Give significance of MOT protocol used in Digital Audio broadcasting.
7. Compare Infrared transmission with Radio transmission.
8. Describe classification of satellite based on their orbits.
9. What are different requirements of Mobile IP ? Explain.
10. Explain dynamic host configuration protocol (DHCP). **(10×4 = 40 Marks)**

P.T.O.

(Pages : 2) **2705**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015

(2008 Scheme)

Elective – V 08.845 : ARTIFICIAL INTELLIGENCE AND ROBOTICS (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **All** questions carry **equal** marks. **(10×4=40 Marks)**

1. Draw the general model of an AI system.
2. What are inference rules with respect to AI ?
3. Explain the concept of induction learning.
4. What is logic programming ?
5. List the major languages used for Robot programming.
6. Draw the layout of an industrial automation system using robots.
7. How electric drives do helps in building a robot system ?
8. Explain how three dimensional transformation matrixes help in robot design.
9. What types of sensors are used for robotic vision ?
10. What are end-effectors in robots ?

P.T.O.

PART – B

(Answer **any two** questions from **each** Module. **Each** question carries **10** marks)

Module – 1

11. Briefly explain about the informed search strategies in AI problem solving by taking a suitable example.

12. Explain about the various knowledge representation schemes available for AI. Indicate clearly the procedure versus declarative knowledge in such cases.

13. With a suitable schematic, explain the different kinds of agent programs used for intelligent system design.

Module – 2

14. Briefly explain about the three types of clauses in Prolog. With a simple program, illustrate how prolog programing can derive answers to an expert system problem.

15. With a suitable diagram, explain the structure of a SCARA manipulator.

16. With a schematic, explain in detail about an automated manufacturing system which you are familiar.

Module – 3

17. Explain how a microcontroller could be used for the control of a robotic arm, with a pick and place action. Draw the flow chart and develop the program for the same.

18. Explain how kinematics helps in path planning in a three dimensional environment. Discuss the same with suitable examples.

19. Write short notes on :
    a) Pneumatic drives
    b) Jacobian matrix
    c) User interface.

(3×20=60 Marks)

(Pages : 2) **5802**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.803 : COMPUTER COMMUNICATION (T)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. Mention the advantages of a layered network model.
2. Differentiate between packet switching and circuit switching.
3. What is meant by SONET ? Explain.
4. How is error detection done in the Data Link Layer ?
5. Explain Multi Protocol Label Switching.
6. How is Packet forwarding done at the Network Layer ?
7. How is Flow control done in the transport layer ?
8. What is Message Integrity Protocol ? Explain.
9. Discuss in detail about Virtual Private Networks.
10. Explain the need of Intrusion Detection System in a network.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Describe the OSI network reference model in detail.
12. Explain in detail the sliding window protocols.
13. Explain the functions of various inter networking devices.

P.T.O.

Module – II

14. a) What are the different IP address classes ? Explain.
    b) Explain the need for subnetting.

15. Explain in detail the various routing algorithms.

16. Differentiate between TCP and UDP protocols. Draw the header structure of each and explain the purpose of the individual fields.

Module – III

17. Discuss about the security issues in the application layer.

18. Differentiate the need of firewalls and network intrusion detection systems on a network.

19. Write short notes on :
    a) SSH
    b) TLS
    c) IPSec.

(Pages : 2) **5803**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.804 : SATELLITE AND MOBILE COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the terms :
   a) Prograde orbit
   b) True anomaly.
2. Describe antenna look angles. Which are the three parameters required to determine the look angles for geostationary orbit ?
3. Explain what is meant by geostationary orbit. How do it differ from a geo-synchronous orbit ?
4. Explain what is meant by effective path length in connection with rain attenuation.
5. Write short notes on "umbrella-cell" approach.
6. What do you mean by cell sectioning ?
7. What are the three basic propagation mechanisms ?
8. Explain Walsh Hadamard sequence.
9. Explain the advantages and disadvantages of frequency hopped spread spectrum.
10. Describe eye pattern. **(4×10=40 Marks)**

P.T.O.

PART – B

Answer **any 2** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. a) Briefly explain the relation between noise factor and noise temperature.
    b) An LNA is connected to a receiver which has a noise Figure of 12dB. The gain of LNA is 40dB and its noise temperature is 120 K. Calculate the overall noise temperature referred to the LNA input.

12. Write short notes on power amplifiers used in the space segment of satellite.

13. Explain the link power budget equation. A satellite link operating at 14 GHz has receiver feeder losses of 1.5 dB and a free space loss of 207 dB. The atmospheric loss is 0.5 dB and the antenna pointing loss is 0.5 dB. Depolarization losses may be neglected calculate the total link noise for clear sky conditions.

Module – II

14. Explain the GSM system architecture.

15. Compare SDMA, FDMA and FHMA.

16. Explain the following terms :
    a) Co-channel interference
    b) Adjacent channel interference.

Module – III

17. Derive the expression for SNR of Rake receiver.

18. Describe the concept of CDMA in Cellular environment.

19. Explain code synchronization with suitable block diagram. **(6×10=60 Marks)**

(Pages : 2) **5810**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.816 : BIOMEDICAL ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. With relevant figures, define absolute refractory period and relative refractory period in an action potential.
2. Write brief notes on any two types of electrodes used in ECG measurement.
3. Draw the circuit of a bioelectric amplifier.
4. How blood pressure is measured with a sphygmo manometer ?
5. Differentiate between micro and macro shock hazards.
6. What do you understand by multiple sequence alignment ?
7. Define the terms :
   a) Tidal volume
   b) Inspiratory reserve volume
   c) Residual volume
   d) Vital capacity.
8. Write notes on attenuation of ultrasound by different parts of human body, with the aid of a frequency response.
9. Discuss the merits of MRI imaging.
10. Explain a pulse modulation system used in biotelemetry.

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **All** questions carry **equal** marks.

Module – I

11. Explain synchronous and standby pacemaker, with the aid of block schematics. **10**

12. a) Illustrate engineering model of electrode skin interface. **4**

    b) Draw typical ECG and EEG waveforms, clearly marking the amplitude and durations. **6**

13. a) Explain the principle of operation of transit time and doppler effect methods of blood flow measurement. **5**

    b) Derive the expressions for velocity of blood in the two methods mentioned in a). **5**

Module – II

14. a) How action potentials propagate through nerves ? **4**

    b) Explain block schematic of an EEG machine. **6**

15. a) Explain the importance of DNA protein sequence alignment. **5**

    b) Discuss the significance of electrical safety of biomedical equipments, defining the relevant standards. **5**

16. What do you understand by 'Dialysis' ? Explain the block schematic of an instrument used for dialysis. **10**

Module – III

17. With a block schematic, explain a typical MRI system. **10**

18. What are the three modes of scanning in ultrasound imaging ? Explain each. **10**

19. a) With a schematic, explain an exciter transmitter unit for blood pressure telemetry. **5**

    b) Explain the block schematic of a CT machine. **5**

(Pages : 2) **6844**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.845 (Elective – V)
ARTIFICIAL INTELLIGENCE AND ROBOTICS (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Explain the algorithms for 'the generate and test method'.
2. Explain the 'breadth first search' algorithm.
3. Represent the following knowledge base using semantic nets'.
   Knowledge base : A bird can fly with wings.
   A bird has wings. A bird has legs. A bird can walk with legs.
4. Explain Horn clause with an example.
5. Explain the process of inverse resolution.
6. Differentiate between SCARA and gantry robot.
7. List the advantages of AC servomotors over DC servomotors.
8. Explain adaptive control of robots.
9. Differentiate between the terms accuracy and repeatability of a robotic manipulator.
10. Describe the functioning of vacuum cup gripper.

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **(20×3=60 Marks)**

MODULE – I

11. Prove that
    a) for every reactive agent, there is a behaviorally equivalent standard agent.
    b) there exist standard agents that have no behaviourally equivalent purely reactive agent.

12. Explain and compare advisory search and heuristic search techniques to solve search problem.

13. Draw a script to represent a restaurant, explaining the entry at restaurant, ordering of items, waiting for the items, serving the items, enjoying the meals, collecting the bills for payment and exiting from the site.

MODULE – II

14. Using principle of inductive logic programming, determine the clause C_2 when C = Son (lob, ram) and $C_1 = \neg$ Daughter (lob, ram).

15. What are tactile sensors ? What are different categories of tactile sensors used in robotic systems ?

16. Explain classifications and applications of robots.

MODULE – III

17. Describe pneumatic and electric drives used in robots.

18. Derive the general form of a Jacobian manipulator. Give an example of the Jacobian matrix of a two link planar revolute manipulator.

19. Draw the diagram of a simple three link planar manipulator and derive the forward kinematic equations using the D-H conventions (Assume and specify the required parameters).

(Pages : 2) **6838**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.803 : COMPUTER COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Compare the features of circuit switching and packet switching.
2. What do you mean by end-to-end delay ? If there are N routers between source and defination hosts, R is the transmission rate in bits/sec and L is the packet size, estimate the end-to-end delay. State your assumptions.
3. Compare co-axial cable with fiber optic cable. What type of physical media is suitable for long distance communications ?
4. Briefly explain CSMA/CD as multiple access protocol for Ethernet.
5. What do you mean by flow control in a network ? How it is different from congestion control ?
6. Draw the structure of IPv6 datagram format. Discuss the important differences with IPv4 datagram format.
7. Briefly explain the need for routing algorithms. How routing algorithms are classified ?
8. Explain the need for authentication .
9. Explain the features provided by SSL.
10. Describe salient features of firewalls. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module.

MODULE – I

11. Explain how reliable data transfer can be achieved using sliding window protocol.

12. Briefly explain different broadcast routing algorithms.

13. Compare OSI reference layering with TCP/IP layering.

MODULE – II

14. Explain TCP congestion control algorithm.

15. Explain link-state routing algorithm with an illustrative example.

16. Explain how OSPF can be effectively used as a routing strategy within an autonomous system in the Internet.

MODULE – III

17. What are the desired properties of secure communication ? Explain any two in detail.

18. What do you mean by digital signature ? Explain how to create a digital signature for a document.

19. Write a short note on VPN. **(6×10=60 Marks)**

(Pages : 2) **1802**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.845 : ARTIFICIAL INTELLIGENCE AND ROBOTICS (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions: **(10×4=40 Marks)**

1. Define AI and describe the areas of application.
2. List and describe the agent types and functions.
3. Name and describe the uninformed search strategies ?
4. Compare the different search algorithms.
5. List and describe the computational models in knowledge representation.
6. Compare between procedural and declarative knowledge.
7. What is Jacobian ? Describe the significance in the analysis of robotic motion ?
8. Describe the basic components of a robotic system.
9. Describe the common kinematic arrangements with examples.
10. What is conditional planning and how it can be implemented ?

PART – B

Answer **any two** questions from **each** Module. **(20×3=60 Marks)**

Module – I

11. Describe the importance of search in AI and explain the classes of search with examples.

P.T.O.

12. Define the queuing structures used in DFS and BFS algorithms and explain the usage with examples.

13. a) List and describe the requirements of a knowledge representation system.

    b) Differentiate between propositional and predictive logic with examples.

(10×2=20 Marks)

Module – II

14. List and describe the different data and program components of prolog with examples.

15. Explain how angular position of a robotic arm is sensed and represented.

16. a) List and explain the applications of robots.

    b) List and describe the end effectors used in robots. **(10×2=20 Marks)**

Module – III

17. a) List and explain the various transmission elements used in robots.

    b) List and describe the various types of sensors used in robots.

18. a) Explain the importance of dynamic stabilization in robots and list the properties of dynamic equation.

    b) Describe the rotational transformation mechanism with example.

19. List the general procedure for deriving the forward kinematics for a manipulator and write the forward kinematic representation for a plannar elbow manipulator, by suitably assuming the link parameters. **(10×2=20 Marks)**

(Pages : 2) 6058

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.845 : ARTIFICIAL INTELLIGENCE & ROBOTICS (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Describe the important approaches to knowledge representation.
2. Compare at least four uninformed search strategies in terms of any four evaluation criteria.
3. Describe the structure of a simple problem-solving agent.
4. What is PEAS description ? Describe it with examples.
5. List and describe the specifications/characteristics of an industrial robot.
6. List and describe the errors associated with mechanical components of a robot.
7. List and describe the different robotic languages in use.
8. Describe the terms frame and degree of freedom with examples.
9. Describe, how the angular position of a robotic arm is sensed at its joint ?
10. Describe the methods for the edge detection of an object in a binary image.

PART – B

Answer **any two** questions from **each** Module. **(20×3=60 Marks)**

MODULE – I

11. List and explain the informed search strategies with examples.

P.T.O.

12. a) Represent a simple blocks world problem and construct an algorithm for solving the same.

    b) Compare the procedural versus declarative knowledge.

13. List and explain the different kinds of agent programs used in intelligent systems with schematic diagrams.

MODULE – II

14. a) List and explain the three types of clauses in Prolog.

    b) Explain with derivation diagrams to show, how prolog derive answers to questions.

15. Draw the structure of a SCARA manipulator and explain the dynamics.

16. List and explain the different types of wrists and related end-effectors used in robots.

MODULE – III

17. Discuss the procedure for deriving the forward kinematics for a manipulator and derive the equation for a simple two link planar manipulator (Assume and specify the required parameters).

18. Derive the Jacobian matrix for a simple two link planar manipulator by first deriving the different transmission matrix of each link using D-H convention (Assume and specify the required parameters)

19. Describe the following related to robotics.

    a) Machine Vision

    b) Industrial controllers

    c) Optical position sensors.

(Pages : 2) **1796**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.803 : COMPUTER COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions in Part **A**. **Each** question carries **4** marks.*

*2) Answer **any two** questions from **each** Module in Part **B**. **Each** question carries **10** marks.*

PART – A

1. What is Framing ? What are different types of Framing ?
2. Explain HDLC Protocol.
3. Write notes on TCP and UDP. Explain Sliding window Protocol.
4. Differentiate between Switch and Bridge.
5. Explain
   a) ICMP b) BGP
6. Explain shortest path algorithm.
7. How does a network intrusion detection system operate ?
8. Explain the concept of Virtual Private Network (VPN). Where it is being used ?
9. Explain how a firewall does function.
10. Explain CIDR.

PART – B

MODULE – I

11. a) Explain SONET

    b) Assuming a framing protocol that uses bit stuffing, the bit sequence before bit stuffing is shown below. What will be bit sequence in the frame that will be transmitted over the link ? Mark the stuffed bits.

    1101011111010111111010111111010

P.T.O.

12. Explain the following with necessary timeline diagrams
    a) Stop and Wait ARQ
    b) Go back N ARQ
    c) Selective Reject ARQ

13. Differentiate between circuit switching and packet switching.

MODULE – II

14. a) Explain IPV4

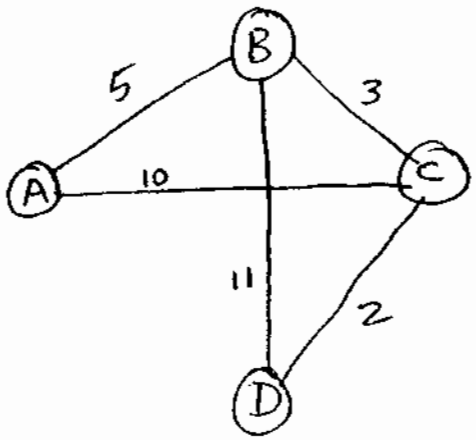
    b) Find network id and host id for the following IP addresses.

    100.0.0.1 190.100.0.2 250.100.4.5 200.150.4.10 227.227.15.16 4.5.5.3

15. Discuss TCP based congestion control and congestion avoidance techniques.

16. Explain Link State Routing.

    Create routing table at node D for the following network graph and explain the procedure. Use Link state algorithm.



MODULE – III

17. Explain Message Digest Algorithm.

18. Discuss any two Authentication protocols.

19. Write notes on the following :
    a) IPSec b) TLS

(Pages : 2) **6060**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.816 : BIOMEDICAL ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain human electrode interface with an equivalent circuit.
2. What are the advantages of thermistors over thermocouple in biomedical applications ?
3. Write down the normal values of the following in ECG waveform.
   P-R interval, Q-T interval, ST interval and QRS interval.
4. What are the factors to be taken care while selecting a transducer for a specific measurement in Biomedical instrumentation ?
5. Write note on electrode system used for EEG measurement.
6. Draw the structure of a neuron and clearly mark the parts.
7. Write notes on EMI in medical electronic equipments.
8. List out the design considerations in a telemetry system.
9. What are the limitations of MRI ?
10. What are the merits of Positron Emission Tomography scan ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **All** questions carry **equal** marks.

Module – I

11. Discuss various types of transducers used in ECG and EMG measurements.

12. Explain invasive and non invasive techniques in pressure measurements.

13. Design an instrumentation amplifier with a gain of 40 and very high CMRR, for using in a biomedical measurement set up.

Module – II

14. Discuss the principle and operation of pressure cycled and volume cycled ventilators.

15. With schematics, explain the EEG measurement set up, with specific description on the electrode system used.

16. Explain the principle and working of a hemodialysis machine.

Module – III

17. Describe a Positron Emission Tomography (PET) instrumentation system, with a neat diagrams.

18. Portray the principle and applications of biotelemetry system.

19. With a block schematic, explain an ultrasonic imaging instrumentation.

(6×10=60 Marks)

(Pages : 2) **1797**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.804 – SATELLITE AND MOBILE COMMUNICATION (T)

Time: 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define the Kepler's laws for planetary motion.
2. Explain what is meant by ascending and descending nodes.
3. What do you mean by antenna look angles ?
4. Define EIRP.
5. Determine the number of cells in clusters for the following values.
   a) j = 4 and i = 2 b) j = 3 and i = 3
6. Explain the two most prevalent types of interference in cellular telephone system.
7. Explain the factors influencing small scale fading.
8. What are the major user services offered by GSM ?
9. Explain near-far-effect.
10. What is smart antenna ? **(10×4=40 Marks)**

PART – B

Answer **any 2** questions from **each** module. **Each** question carries **10** marks.

Module – I

11. Find out the expression for (C/N) for uplink and downlink of a satellite communication system.

P.T.O.

12. Write short notes on the following :

    a) Attitude control

    b) TT and C

    c) Transponders

13. An earth station at latitude 35° N, longitude 35° W is receiving from a geostationary satellite at longitude 25° W. Determine the range and the look angles.

Module – II

14. Explain the channel assignment and hand off strategies.

15. Prove that for a hexagonal geometry, the co-channel reuse ratio is given by $Q = \sqrt{3N}$, where $N = i^2 + ij + j^2$.

16. Explain the architecture and frame structure of GSM.

Module – III

17. With block schematic, explain the principle of Direct Sequence Spread Spectrum Modulation.

18. Explain different types of space diversity reception techniques used in wireless systems.

19. Explain the working of MIMO. Give the relation for MIMO ergodic capacity.

(6×10=60 Marks)

[redacted] (Pages : 3) 6052

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.803 : COMPUTER COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

Instructions *: Answer **all** questions in Part **A**. **Each** question carries **4** marks.*
*Answer **any two** questions from **each** Module in Part **B**. **Each** question carries **10** marks.*

PART – A

1. Draw layers of OSI and TCP/IP reference models.
2. How internet checksum is used for error detection ?
3. What is virtual LAN ?
4. What is reliable flooding in Linked State Routing ?
5. Differentiate between IPv4 and IPv6.
6. Show that two dimensional parity provides the receiver enough information to detect any 1 bit error but not any 2 bit error.
7. Explain the concept of Virtual Private Network (VPN). Where it is being used ?
8. Discuss the functions of Firewall.
9. Discuss TCP based congestion control techniques.
10. What is the significance of Ethernet Passive Optical Networks ?

P.T.O.

PART – B

Module – I

11. With the help of an example explain Sliding window protocol. Draw timeline diagram.

12. a) Explain character based framing.

    b) Assuming a framing protocol that uses bit stuffing, the bit sequence that reaches the receiver through the link is shown below. What will be bit sequences after removing the stuffed bits if any ? Mark the removed bits.

    01111110011010111110101001111101100111101111101001111110

13. Explain the following :

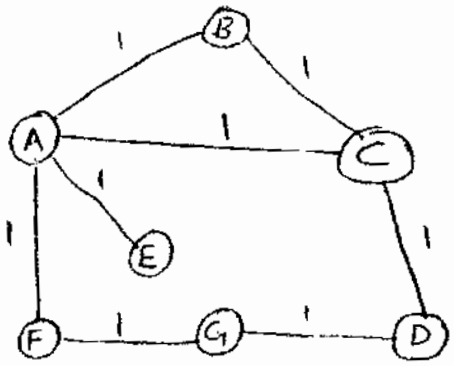
    a) SONET

    b) CSMA/CD.

Module – II

14. Explain Distance Vector routing Algorithm

    Create routing table for all the nodes for the following network graph and explain the procedure. Use Distance vector algorithm.



15. a) Explain the classification of IP addresses.

    b) Find the classes to which the following addresses belong to

    242.200.200.100 150.100.3.1 200.100.147.2 127.255.255.2 238.200.159.4

16. a) Explain subnetting.

    b) Find the sub-network address for the following.

IP Address	MASK
139.12.40.23	255.255.255.0
110.10.40.20	255.255.128.0
140.182.16.14	255.255.224.0
126.35.57.12	255.255.0.0
201.39.22.157	255.255.255.240

Module – III

17. Explain MD5 Algorithm.

18. Discuss any two message integrity protocols.

19. Write notes on the following :

    a) IPSec

    b) SSH.

PART – B

Module – I

11. With the help of an example explain Sliding window protocol. Draw timeline diagram.

12. a) Explain character based framing.

    b) Assuming a framing protocol that uses bit stuffing, the bit sequence that reaches the receiver through the link is shown below. What will be bit sequences after removing the stuffed bits if any ? Mark the removed bits.

    01111110011010111110101001111101100111101111101001111110

13. Explain the following :

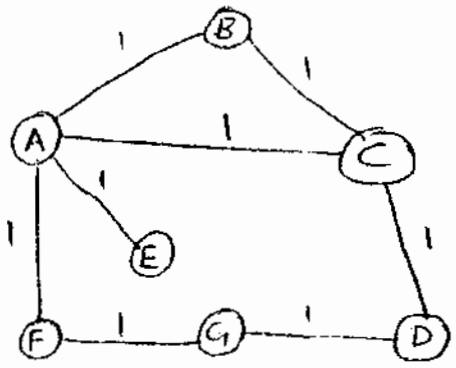
    a) SONET

    b) CSMA/CD.

Module – II

14. Explain Distance Vector routing Algorithm

    Create routing table for all the nodes for the following network graph and explain the procedure. Use Distance vector algorithm.



15. a) Explain the classification of IP addresses.

    b) Find the classes to which the following addresses belong to

    242.200.200.100 150.100.3.1 200.100.147.2 127.255.255.2 238.200.159.4

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.804 : SATELLITE AND MOBILE COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define :
   a) Angle of elevation
   b) Azimuth
2. With block schematic describe satellite transponder.
3. For an earth station transmitter with an antenna output power of 40 dBW, a back off loss of 3dB, a total branching and feeder loss of 3 dB and transmit antenna gain of 40 dB, determine the EIRP.
4. What do you mean by single channel per carrier ?
5. Explain the concept of frequency reuse.
6. Compare fixed channel assignment and dynamic channel assignment strategies.
7. Discuss different types of small scale fading.
8. Explain the properties of PN sequence.
9. Define near far problem. How it can be remedied ?
10. Explain the concept of Microcell. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any 2** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. With the aid of block schematic, describe the functioning of a transmit-receive earth station used for telephone traffic.

12. Explain TDMA frame structure.

13. A satellite circuit has an uplink C/N ratio of 28 dB and a downlink C/N ratio of 20 dB. Calculate the overall C/N ratio at the destination earth station.

Module – II

14. Describe the methods of improving coverage and capacity in cellular system.

15. Explain GSM network architecture.

16. If a signal-to-interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system. What is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is a) n = 4 b) n = 3 ? Assume that there are six co-channel cells in the first tier and all of them are at the same distance from the mobile.

Module – III

17. Explain different types of spreading codes used in direct sequence modulation.

18. Explain different types of space diversity reception methods.

19. Explain the parallel decomposition of MIMO channel in detail. **(6x10=60 Marks)**

(Pages : 2) **1804**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.816 : BIOMEDICAL ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. List and explain the different types of EEG waves.
2. Explain the construction of any two types of electrodes used for measuring EMG.
3. Draw and explain a typical ECG waveform.
4. List the desirable characteristics of an implantable pacemaker.
5. With schematic explain the structure of a neuron.
6. State and explain Beer's law.
7. List any four applications of bioinformatics.
8. What are the advantages of PET.
9. Explain the biological effects of NMR imaging.
10. Distinguish between A-scan and B-scan of ultrasonic imaging. **(10×4=40 Marks)**

PART – B

Answer **any 2** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. What is fibrillation ? With circuit diagram explain the working of a DC defibrillator.
12. Explain the terms :
    a) resting membrane potential
    b) action potential.
13. With schematic explain the principle of ultrasonic blood flow meter.

(2×10=20 Marks)

P.T.O.

Module – II

14. With block schematic explain the working of pH meter. What are the different types of electrodes used in a pH meter ?

15. Explain any two types of instruments used for measuring brain function.

16. With schematic explain the principle of Hemodialysis machine. **(2×10=20 Marks)**

Module – III

17. With block schematic explain a pulse echo system.

18. Explain the applications of telemetry in patient care.

19. With block diagram explain the principle of operation of X-ray machine.

(2×10=20 Marks)

(Pages : 2) **6053**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.804 : SATELLITE AND MOBILE COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define :
   a) Angle of elevation
   b) Azimuth
2. With block schematic describe satellite transponder.
3. For an earth station transmitter with an antenna output power of 40 dBW, a back off loss of 3dB, a total branching and feeder loss of 3 dB and transmit antenna gain of 40 dB, determine the EIRP.
4. What do you mean by single channel per carrier ?
5. Explain the concept of frequency reuse.
6. Compare fixed channel assignment and dynamic channel assignment strategies.
7. Discuss different types of small scale fading.
8. Explain the properties of PN sequence.
9. Define near far problem. How it can be remedied ?
10. Explain the concept of Microcell. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any 2** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. With the aid of block schematic, describe the functioning of a transmit-receive earth station used for telephone traffic.

12. Explain TDMA frame structure.

13. A satellite circuit has an uplink C/N ratio of 28 dB and a downlink C/N ratio of 20 dB. Calculate the overall C/N ratio at the destination earth station.

Module – II

14. Describe the methods of improving coverage and capacity in cellular system.

15. Explain GSM network architecture.

16. If a signal-to-interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system. What is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is a) n = 4 b) n = 3 ? Assume that there are six co-channel cells in the first tier and all of them are at the same distance from the mobile.

Module – III

17. Explain different types of spreading codes used in direct sequence modulation.

18. Explain different types of space diversity reception methods.

19. Explain the parallel decomposition of MIMO channel in detail. **(6×10=60 Marks)**

(Pages : 2) **6221**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.735 : OPTOELECTRONIC DEVICES (TA)

Time : 3 Hours Max. Marks : 100

PART – I

Answer **all** questions.

1. Briefly explain radiative and non radiative recombination in semiconductors.
2. Explain responsivity and quantum efficiency.
3. Calculate momentum change due to phonon absorption in InP having band gap energy of 1.35eV.
4. What are the unique features of laser beam ?
5. Discuss the detection process in APD.
6. Differentiate electrical bandwidth, optical bandwidth and modulation bandwidth of an LED.
7. For a planar LED device fabricated from GaAs is which has a refractive index of 3.6, Calculate the conversion efficiency if electrical power is 5W and optical output is 50 μW where as the device current is 10 μA.
8. Compare the performance characteristics of a p-i-n photodiode and a p-n photo diode.
9. Briefly explain the Electro-optic measurement technique.
10. Calculate the value of reflectance if the refractive index of silicon is 3.5 for an uncoated silicon photodiode at a wavelength of 800nm, the other surface is air interface. **(10×4=40 Marks)**

P.T.O.

PART – II

Answer **any 2** from **each** Module.

Module – I

11. Describe the Absorption in Quantum wells and the Quantum confined stark effect.
12. What is Auger Recombination ? Derive the equation for absorption coefficient of a semiconductor.
13. Draw the layer diagram and operation of a p-i-n diode. Calculate the responsivity of the device if the number of incident photons are 800 and the corresponding electron generation in photodiode is 500 at a wavelength of 1300nm.

(2×10=20 Marks)

Module – II

14. What is quantum efficiency ? Discuss the techniques and parameters need to be optimized to maximize quantum efficiency of an LED.
15. What is meant by acousto-optic effect ? Explain Raman-Nath modulator.
16. Discuss the characteristics of solar cell. A $5cm^2$ Ge solar cell with a dark reverse saturation current of 2nA has AM1 radiation incident up on it producing 4×10^{17} electron-hole pairs per second. The electron and hole diffusion lengths may be assumed to be 5 micro m. Calculate the short circuit current and open circuit voltage of the cell. **(2×10=20 Marks)**

Module – III

17. With the aid of suitable diagrams, discuss the principles of operation of the injection laser. Compare its ideal light output against current characteristics.
18. A gallium Arsenide injection laser with a cavity of length 500 micro meters has a loss coefficient of $20cm^{-1}$. The measured differential external quantum efficiency of the device is 45%. Calculate the internal quantum efficiency of the laser. The refractive index of GaAs is 3.6.
19. Write short notes :
    a) Relaxation oscillations
    b) Frequency chirp
    c) Partition noise
    d) Mode hopping.

(2×10=20 Marks)

(Pages : 4) **6216**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.703 : MICROWAVE ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What do you mean by space charge effects in electron beams ?

2. For $4\frac{3}{4}$ mode repeller voltage is 125V. Find the repeller voltage for $5\frac{3}{4}$ mode $\left(5\frac{3}{4}\right)$, if the anode voltage $V_o = 300V$.

3. Why conventional tubes can't be operated at high frequencies and how these effects are taken cared in travelling wave tube ?

4. List the applications of Magnetron and travelling wave tubes.

5. Write note on switching speed and power handling capability of p-i-n diode.

6. Discuss the factors that limit high frequency response of BJT's.

7. A certain halts MESFET has the following parameters :

   $R_g = 3\Omega$; $R_i = 2.5\Omega$; $g_m = 50m\mho$

   $R_d = 450\Omega$; $R_s = 2.5\Omega$; $C_{gs} = 0.6$ pF

   a) Determine the cut off frequency

   b) Find the maximum operating frequency.

8. List the differences between transistors and TED's.

9. Write note on waveguide corners, bends and twists.

10. Define diversity. List the three commonly used diversity schemes. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any 2** questions from **each** Module.

Module – I

11. A 2-cavity Klystron amplifier has the following parameters :

V_0 = 1000V; R_0 = 40 kΩ

I_0 = 25mA; f = 3GHz

Gap spacing in either cavity : d = 1 mm

Spacing between the 2 cavities : L = 4 cm

Effective shunt impedance,

excluding beam loading : R_{sh} = 30 kΩ

a) Find the input gap voltage to give maximum voltage V_2

b) Find the voltage gain, neglecting the beam loading in the output cavity

c) Find the efficiency of amplifier, neglecting beam loading

d) Calculate the beam loading conductance and show that neglecting it was justified in the proceeding calculations. **10**

12. A reflex Klystron operates under the following conditions :

V_0 = 600V; L = 1 mm; R_{sh} = 15 kΩ

e/m = 1.759×10^{11} (M.K.S. system)

fr = 9GHz. The tube is oscillating at fr at the peak of $1\frac{3}{4}$ mode. Assume that the transit time through the gap and beam loading can be neglected

a) Find the value of repeller voltage V_r

b) Find the direct current necessary to give a microwave gap voltage of 200V

c) What is the electronic efficiency under this condition ? **10**

13. With diagram explain the amplification process in travelling wave tube. What is the significance of electronic and circuit equations ? **10**

Module – II

14. An X-band pulsed conventional magnetron has the following operating parameters :

Anode voltage : V_0 = 5.5 kV; Beam current : I_0 = 4.5A; Operating frequency : f = 9 GHz

Resonator conductance : $G_r = 2\times10^{-4}$ ℧

Loaded conductance : $G_l = 2.5\times10^{-5}$ ℧

Vane capacitance : C = 2.5 pF; Duly cycle : DC = 0.002; Power loss : P_{loss} = 18.5 kW, compute :

a) The angular resonant frequency

b) The unloaded quality factor

c) The loaded quality factor

d) The external quality factor

e) The circuit efficiency

f) The electronic efficiency. **10**

15. a) Draw the small signal equivalent circuit of MESFET. Also comment on drain current and transconductance gm. **6**

b) Arrive at the cut off frequency and maximum oscillating frequency of MESFET. **4**

16. a) Discuss the power-frequency limitations of bipolar transistors. **7**

b) A certain transistor has the following parameters :

Reactance : $X_c = 1\,\Omega$; Transit time cut off

Frequency : fr = 4 GHz; Maximum electric Field : Em = 1.6×10^5 V/cm and saturation drift velocity : $V_s = 4\times10^5$ cm/s.

Determine the maximum allowable power that the transistor can carry. **3**

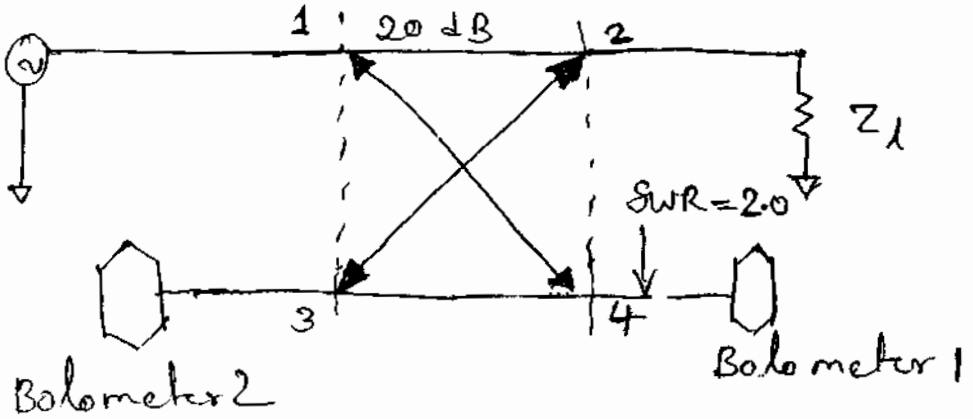
Module – III

17. A symmetric directional coupler with infinite directivity and a forward attenuation of 20dB is used to monitor the power delivered to a load Z_l in fig. 1. Bolometer 1 introduces a VSWR of 2.0 on arm 4; bolometer 2 is matched to arm 3. If bolometer 1 reads 8 mW and bolometer 2 reads 2 mW.

Find :

a) amount of power dissipated in the load Z_l

b) the VSWR on arm 2. **10**



18. a) With simple laboratory microwave bench setup; how frequency of a wave is measured at microwave frequency range. **4**

b) With diagram explain the working of faraday rotation isolator. **6**

19. a) With diagrams explain FM microwave radio transceiver system. **6**

b) Write short note on radio repeaters. **4**

6217

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(4×10=40 Marks)**

1. Consider a discrete memory less source with alphabets $\{S_0, S_1, S_2\}$ with respective probabilities {0.7, 0.15, 0.15}. Apply Huffman algorithm to this source and find out the code words for each symbol. What is the average codeword length ?

2. Explain Mutual information. Give its properties.

3. A voice grade channel of the telephone network has a bandwidth of 3.4 kHz.
   a) Calculate the information capacity of the telephone channel for a signal to noise ratio of 30dB.
   b) Calculate the minimum signal to noise ratio required to support information transmission through the telephone channel at the rate of 9600 bps.

4. Define ring with necessary properties. Give an example for a ring and justify your answer.

5. If C is a linear code with both even and odd weight codewords. Show that the number of even weight code word is equal to the number of odd weight code words. Show that even weight codeword forms a linear code.

6. Define standard array. Prove that any two n-tuples in the same row of a standard array add to produce a valid codeword.

7. Explain BCH codes.

8. Distinguish between a commutative ring and a division ring.

9. Explain the term 'Catastrophic Code'. Give the condition required for a non catastrophic code.

10. Distinguish between block and stream ciphers.

P.T.O.

PART – B

Answer **two** questions from **each** Module.

MODULE – I

11. For a binary symmetric channel whose input source is the alphabet X = {0, 1} with probabilities {0.5, 0.5} and whose output alphabet is Y = {0, 1} having the following channel matrix

$$\begin{array}{c|cc} X \backslash Y & 0 & 1 \\ 0 & 1-\varepsilon & \varepsilon \\ 1 & \varepsilon & 1-\varepsilon \end{array}$$

where ε is the probability of transmission error.

i) How much uncertainty is there about the symbol once an output symbol has be received ? **4**

ii) What is the Mutual Information I(X : Y) of the channel ? **3**

iii) What value of ε maximises the uncertainty H(X/Y) about the input symbol given an output symbol ? **3**

12. Consider a digital communication system that uses a repetition code for channel encoding/decoding. In particular, each transmission is repeated n times, where n = 2m +1 is an odd integer. A decoder operates as follows. " If in a block of 'n' received bits, the number of 'O's exceeds the number of 'Is', decoder decides in favour of a 'O', otherwise it decides in favour of 'I'. An error occurs when 'm+1' or more transmission bit out of n = 2m + 1 are incorrect. Assume a binary symmetric channel.

a) For n = 3, show that average probability of is given by $Pe=3P^2(1 - P) + P^3$ where 'P' is the transition probability of the channel. **3**

b) For n = 5, show that average probability of error is given by

$Pe = 10P^3 (1 - P)^2 + 5P^4 (1 - P) + P^5$. **4**

c) Hence, for general case deduce that the average probability of error is given by $Pe = \sum_{i=m+1}^{n} \binom{n}{i} P^i (1-P)^{n-i}$. **3**

13. Prove the following :

a) I(X : Y) = I(Y : X) **4**

b) I(X : Y) = H(X) + H(Y) – H(X, Y). **4**

c) H(X, Y) = H(X) + H(Y/X). **2**

MODULE – II

14. A linear block code is defined by the following generator matrix :

$$G: \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

a) Find n and k for the code.

b) List all code words.

c) Find minimum distance of the code. **10**

15. A systematic (6, 3) code has the following generator matrix

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 \end{bmatrix}$$

Construct the standard array and determine the correctable error pattern. **10**

16. Write short notes on :

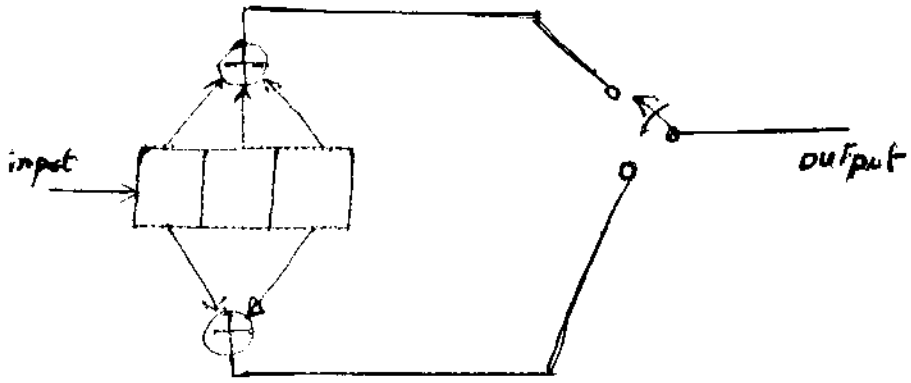
a) BCH code

b) Reed Solomon code

c) Hamming code. **10**

MODULE – III

17. A rate $\frac{1}{2}$ k = 3 binary convolutional encoder is shown in the figure below.



a) Draw the state diagram for the code.

b) Find the transfer function of the code, T(D).

c) Find the minimum free distance, d_{free} of the code. **10**

18. a) Distinguish between a Trellis diagram and a tree diagram.

b) Maximum likelihood decoding. **10**

19. a) Explain DES algorithm with a neat block diagram.

b) Explain Avalanche effect in DES algorithm. **1(**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April/May 2011
03.705 Elective – III : IMAGE PROCESSING (TA)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part **A**.*
*2) Answer **any two** questions from **each** Module in Part **B**.*

PART – A **(10×4=40 Marks)**

1. a) Discuss the convolution of 2 dimensional sequences.

   b) Compare 2 dimensional Fourier transform and Cosine transforms.

   c) Briefly explain how we can convert RGB in to HSV model.

   d) Define sampling theorem for random fields.

   e) Explain contrast stretching.

   f) Discuss Median filtering technique.

   g) Briefly explain false colouring.

   h) Define pseudo and inverse pseudo filter transfer function.

   i) Discuss the algorithm to find the global threshold.

   j) What are the lossy compression methods ?

PART – B **(6×10=60 Marks)**

Module – I

2. Explain the perspective projection system and its properties.
3. Explain the two dimensional DFT and its properties.
4. Explain two dimensional sampling and reconstruction.

P.T.O.

Module – II

5. Show that subtracting the Laplacian from an image is proportional to unsharp marking.
6. Suppose that you form a low pass spatial filter that averages the four immediate neighbours of a point (x, y) but excludes the point itself. Find the equivalent filter H (u, v) in the frequency domain.
7. Prove that the gradient of an image intensity due to sobel operator along horizontal direction can be obtained by convolving the image by [1 1] followed by [1 1] followed by $[-1\ 0\ 1]^T$ and then sealing the result by 1/4.

Module – III

8. Describe the digital implementation of the Wiener filter with necessary diagram.
9. Describe the region growing technique for image segmentation and mention the problems associated with it.
10. Briefly explain coding redundancy, Inter pixel redundancy and Psycho visual redundancy.

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08-716 : EMBEDDED SYSTEMS (TA)

Time : 3 Hours Max. Marks : 100

***Instructions** : 1) In Part **A** **each** question carries **4** marks. Answer **all** questions.*

*2) Each question in Part **B** carries **10** marks. Answer **any two** questions from **each** Module.*

PART – A

1. Give the components of embedded system hardware.
2. What is retargetable compiler ?
3. Give the components of a SoC.
4. What is the use of a PMA ?
5. What are the advantages of using C programming for embedded system programming ?
6. What is the purpose of using # include "semLib.h" in a C program ?
7. What is the need of cross compiler ?
8. How hardware interrupts are handled in RTOS environment ?
9. Explain the use of semaphores.
10. Compare the interrupt latencies for pre-emptive and co-operative scheduling models.

P.T.O.

PART – B

MODULE – I

11. Explain the stages of converting an assembly language program into final machine implementable software for a product.

12. Compare serial communication using the buses
    a) I^2C b) CAN

13. Explain the following :
    a) GPIB
    b) Glue Logic Circuit
    c) PCI and PCI/X buses.

MODULE – II

14. Explain how functions are queued by Interrupt Service Routine.

15. Explain the concepts of
    a) Process b) Task c) Thread

16. Explain the following in the context of OS :
    a) Process Management
    b) Memory Management
    c) Device Management.

MODULE – III

17. Explain the following scheduling models.
    a) Cyclic scheduling with Time slicing
    b) Preemptive scheduling.

18. Explain the different methods for Inter Process Communication.

19. Explain the use of µC/OS – II.

(Pages : 2) **6215**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.702 – OPTICAL COMMUNICATION (T)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. What is intramodal dispersion ?
2. What are the different types of scattering losses ?
3. Explain briefly about Relative Intensity Noise (RIN).
4. What are the different types of doped fiber amplifiers ?
5. What are the different types of noises in EDFA ?
6. What is GH effect ?
7. What are the different optical windows ?
8. What is numerical aperture of a fiber ? What is its relationship with V-parameter ?
9. What is DWDM ?
10. A multimode step index fibre with a core diameter of 60 μm and a relative refractive index difference of 1 % is operating at a wavelength of 0.80 μm. If the refractive index of the core is 1.5. Determine the :

    a) Normalised frequency of the fiber

    b) Approximate number of modes it will support.

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **All** questions carry **equal** marks.

Module – I

11. With neat sketches explain the vapour phase oxidation process in fiber manufacture.

12. a) Explain the principle and working of DFB laser.

    b) What are the different sources of noise in photodetectors ?

13. What is intermodal dispersion ? Show that the total broadening of a light pulse ΔT due to intermodal dispersion in a multimode step index fiber may be given by

    $\Delta T = \frac{l(NA)^2}{2n_1C}$ where l is the fiber length, NA is the numerical aperture of the fiber n_1 is the core refractive index, C is the velocity of light in vaccum.

Module – II

14. Explain the working of an optical receiver with block diagram and also explain the term quantum limit of detection.

15. Explain with neat sketches the working of EDFA and also explain its technical characteristics.

16. Explain the working of ASK Heterodyne detection system and derive an expression for the Bit Error Rate (BER).

Module – III

17. Discuss the system design constraints in soleton light wave transmission s/m.

18. Discuss the importance of ADM and wave length tunable sources is WDM systems

19. Explain briefly :

    a) Light wave networks.

    b) Soliton Lasers.

(Pages : 2) **1605**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.702 : OPTICAL COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***all*** *questions in Part – **A**. **Each** question carries **4** marks.*
2) Answer ***any two*** *questions from* ***each*** *Module in Part – **B**. **Each** question carries **10** marks.*

PART – A

1. When is an optical source said to be spatially and temporally coherent ?
2. Compare avalanche photodiodes and PIN diodes as optical detectors.
3. Distinguish between material and modal dispersion.
4. Derive an expression for rise time of an optical fiber.
5. Define quantum efficiency and responsivity of a photodetector.
6. What is Gordon Haus effect ?
7. An erbium-doped fiber amplifier has a noise figure of 6 and a gain of 100. The input signal has a 30-dB signal-to-noise ratio and a signal power of 10 μW. Compute the signal power (in dBm) and signal-to-noise ratio (in dB) at the amplifier output.
8. What are the advantages of DFB Laser and Tunable Laser ?
9. What are the disadvantages of a soliton based communication system ?
10. Find the percentage of optical power injected to a step index fiber from an LED. The V-parameter of the fiber is 2.4 and radius of the core a = 5 μm operating at 1300 nm. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Derive the expression for group delay and show that the group velocity dispersion is absent if refractive index is a linear function of wavelength.

    b) A graded index fiber has a core with a parabolic refractive index profile which has a diameter of 50 μm. The fiber has a numerical aperture of 0.2. Estimate the total number of guided modes propagating in the fiber when it is operating at a wavelength of 1 μm.

P.T.O.

12. a) Explain the fiber cabling methods.

    b) Write the modal equation of a graded index fiber and explain briefly.

13. a) Describe the techniques employed and the fiber structures utilized to provide dispersion shifted single-mode fibers and dispersion flattened single-mode fibers.

    b) Write notes on bending loss and scattering loss in optical fibers. **(10×2=20 Marks)**

Module – II

14. a) What is the noise present in EDFAs ? How it is minimized ?

    b) How does the signal gain of EDFA vary with Erbium Doped Fiber Length ?

    c) Define the threshold pump power in EDFAs. When an EDFA is said to be transparent ?

15. a) Explain the working of PSK heterodyne detection systems and derive an expression for bit error rate.

    b) An APD has a quantum efficiency of 45% at 0.85 μm. When illuminated with radiation of this wave length it produces an output photocurrent of 10 μA after avalanche gain with a multiplication factor of 250. Calculate the received optical power to the device. How many photons per second does this correspond to ?

16. Describe what is meant by optical time domain reflectometry. Discuss how the technique may be used to take field measurements on optical fibers. Indicate the advantage of this technique over other measurement methods to determine attenuation in optical fibers. **(10×2=20 Marks)**

Module – III

17. Explain the architecture of WDM system and explain the different components of WDM.

18. Draw the structure of soliton link and derive an expression for bit error rate.

19. Explain briefly :

    a) Light wave networks

    b) Soliton Lasers. **(10×2=20 Marks)**

(Pages : 2) 6050

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, Nov. 2012
(2008 Scheme)
08.801 : NANOELECTRONICS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the basic differences between a PVD and CVD process.
2. "Bottom-up techniques is more convenient for nano fabrication". Explain.
3. What are the basic differences between SEM and TEM ?
4. Explain the term quantum size effect.
5. Explain real space transfer in nanostructures.
6. Draw the equilibrium condition of the RTD.
7. List different types of nanoparticles according to shapes and compositions.
8. Explain the Debye-Scherr equation in the calculation of nanoparticle size.
9. Explain coloumb blockade effect.
10. Determine the value of capacitance for a spherical shaped QD capacitor. Given $\varepsilon 0 = 8.8542 \times 10^{-12}$ F/m, $\varepsilon/\varepsilon 0 = 13.2$ and radius of the QD is 10 nm.

(10×4= 40 Marks)

PART – B

Answer **any two** questions from each Module. **Each** question carries **10** marks.

Module – I

11. Describe pulsed laser deposition process for the synthesis of nanolayers with suitable diagram.
12. Draw the structure of a UV instrument and explain its principle of operation.
13. What is self-assembly ? Explain general scheme for the formation of self-assembly process.

P.T.O.

Module – II

14. Explain the differences between quantum well, quantum wire and quantum dot with figures.

15. a) Explain the difference between Mott Wannier excitons and frenkel excitons.

    b) State and explain two results of using kronig-Penny model with Schrodinger's wave equation.

16. A cubic quantum dot of GaAs has a = 7nm. Calculate the lowest three energy levels. Calculate the same if the dimensions of QD are a = 10 nw, b = 8 nm and c = 12 nm and $m^* = 0.067$ mo.

Module – III

17. Draw the I-V Characteristics of resonant tuneling diode. Explain the working of it using energy band diagram.

18. Draw the schematic diagram of QD laser and explain its working. Also draw the characteristics of light power output and current.

19. Explain the fabrication principle of NEMS. Explain the features of quantum corral.

(6×10= 60 Marks)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.801 : NANOELECTRONICS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What are excitons ? Why are excitonic effects more important in nanostructures than in bulk material ?
2. What is the difference between resolution and magnification of TEM instrument ?
3. State and explain Aharnov Bohm effect.
4. How does resonant tunneling take place through quantum wells ?
5. State and explain Moore's law.
6. What are the diameter-dependent properties of carbon nano tube ?
7. What is Kubo gap ? Explain its importance in the size of the nano material.
8. Describe the features of surface atom effect.
9. State the merits and demerits of solution based nanofabrication techniques.
10. An electron travelling at a velocity of 10^5 m/s. Calculate the de-Broglie wavelength of the particle. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Draw the structure of a pulsed Laser instrument and explain its principle of operation.

12. Explain the Sol-Gel process of producing SiO_2.

13. Calculate the irradiation time of an ion implantation process, for an ion current of $1\,\mu A$, a substrate surface of 100 cm^2 and a dose of $10^{13}/cm^2$.

Module – II

14. Explain density of states in 2D, 1D and 0D materials.

15. What is Coulomb blockade ? Draw the IV characteristics in QD showing Coulomb blockade effect.

16. An $AlGa_{1-x}As/GaAs$ superlattice with $x \simeq 0.3$, a well width $a = 10$ nm and barrier width $b = 2.2$ nm and barrier height of $Vo = 0.25$ eV. Find the widths of the minibands and minigaps that can exist within the barrier using Kronig-Penny models.

Module – III

17. a) Draw the structure of infrared detector.

    b) Why do MQW laser have a narrower emission line width than that of conventional laser ?

18. Explain the principle of operation of nanoelectronic switch made of a conducting molecule.

19. Explain the principle of single electron tunneling process with figure. Explain the two tunneling conditions. **(6×10=60 Marks)**

(Pages : 2) **2090**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April/May 2012
03.705 Elective – III : IMAGE PROCESSING (TA)

Time: 3 Hours Max. Marks: 100

Instruction : *Answer **all** questions from Part **I** and from Part **II**. Answer **any two** questions from **each** module.*

PART – I

1. Sketch the following sequences :
   a) $\delta (n_1 + 1, n_2 - 3) + 3 \delta (n_1, -n_2 + 4)$
   b) $\delta_T (n_2)\, u (n_1, n_2)$.
2. Describe the RGB colour model.
3. Explain Mach-band effect.
4. Describe the properties of ROC obtained from 2D-Z transform definition.
5. What are Order-Statistics Filters ? Explain any one.
6. Explain any two gray level transformations used in image enhancement.
7. What are smoothing spatial filters ?
8. How do you segment an image by global thresholding .
9. What is lossy compression ? Give an example for a lossy compression standard.
10. What are pseudo inverse filters ? Explain. **(10×4=40 Marks)**

P.T.O.

PART – II

Module – I

11. a) What are the properties of unitary transformers ? Explain.

    b) For the 2 × 2 transform A and the image U

$$A = \frac{1}{2}\begin{bmatrix} \sqrt{3} & 1 \\ -1 & \sqrt{3} \end{bmatrix} \qquad U = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$$

    calculate the transformed image V and the basis images. **10**

12. a) Derive and explain the 2 D sampling theorem.

    b) What are the practical limitations in sampling and reconstruction. **10**

13. a) What is perspective projection in geometric model of image formation ? Explain.

    b) Explain the properties of perspective projection. **10**

Module – II

14. Explain the techniques for detecting gray level discontinuities in a digital image. **10**

15. a) What is histogram of a digital image ? Explain.

    b) How do you generate a processed image that has a specified histogram. **10**

16. The basic approach used to approximate a discrete derivative involves taking differences of the form f (x + 1, y) – f (x, y).

    1) Obtain the filter transfer function H (u, v) for performing the equivalent process in frequency domain.

    2) Show that H (u, v) is a high pass filter. **10**

Module – III

17. Prove that the Fourier-Wiener Filter is completely determined by the power spectra of the object and the noise and the frequency response of the imaging system. **10**

18. Discuss a method for estimating thresholds that produce the minimum segmentation error. **10**

19. Explain DCT based JPEG encoder with block diagram. **10**

(Pages : 3) **1607**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours Max. Marks: 100

Instruction : *Answer **all** questions from Part **A** and **2** questions from **each** Module of Part **B**. For Part **A each** question carries **4** marks. Part **A** total marks **10×4=40** Marks. For Part **B**, **each** question of Module carries **10** marks. Total marks of Part **B** is **6×10=60** Marks.*

PART – A

1. Define information with different units. Compare the different units of information.
2. Derive relations among entropies for transmitting a message X and receiving it as Y.
3. Write the properties of instantaneous code with examples.
4. Explain the construction of code tree in Huffman coding.
5. Prove the relation $VH^T = 0$.
6. Discuss the properties of the standard Array.
7. Write notes on Burst error correction codes.
8. Compare convolutional codes with block codes. Draw the (2, 1, 2) convolutional encoder. Given $g^{(1)} = (111)$, $g^{(2)} = (101)$.
9. With the help of diagram explain how authentication can be achieved in Public key cryptography.
10. Draw the state diagram for a (2, 1, 2) convolutional encoder. Given $g^{(1)} = (111)$, $g^{(2)} = (101)$.

(10×4=40 Marks)

P.T.O.

PART – B

Module – 1

11. Consider 2 sources S_1 and S_2 emit messages (x_1, x_2, x_3) and (y_1, y_2, y_3) with joint probability P(X,Y) as given in matrix from below. Calculate H(X), H(Y), H(X/Y), H(Y/X), H(X,Y) and I(X,Y). Draw the P(Y/X) matrix.

$$P(X_1\ Y) = \begin{bmatrix} \frac{3}{40} & \frac{1}{40} & 1/40 \\ \frac{1}{20} & \frac{3}{20} & 1/20 \\ \frac{1}{8} & \frac{1}{8} & \frac{3}{8} \end{bmatrix}$$

12. State and prove Shannon's first theorem. Discuss its limitations.

13. A black and white TV picture may be viewed as consisting of approximately 3×10^5 elements, each one of which occupy one of the 10 distinct brightness levels with equal probability. Rate of transmission is 30 picture frames/sec. SNR is 30 db. Calculate the maximum band width required to support the transmission of the resultant video signal. **(2×10=20 Marks)**

Module – 2

14. State and prove the properties of syndrome.

15. a) With the help of diagrams explain the working of a general decoding scheme for (n, k) block code.

    b) For a binary symmetric channel, find the probability of decoding error for a (6, 3) block code, with error probability 1.37×10^{-3}.

16. For a (7, 4) cyclic code obtain. Now systematic and systematic form of codes for input sequences

    a) u = (1011)

    b) u = (1111)

    c) u = (0011)

    d) u = (1101).

(2×10=20 Marks)

Module – 3

17. Explain the maximum likelihood decoding of convolutional codes.

18. For (3, 2, 1) encoder, $g_1^{(1)} = (11)$, $g_1^{(2)} = (10)$, $g_1^{(3)} = (10)$

    $g_2^{(1)} = (01)$, $g_2^{(2)} = (11)$, $g_2^{(3)} = (00)$. Draw the convolutional encoder. If $u^{(1)} = (101)$, $u^{(2)} = (110)$ find the coded sequence.

19. With the help of diagram, explain the working of DES. **(2×10=20 Marks)**

(Pages : 2) 5861

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part **A** and **2** questions from **each** Module of Part **B**.*

*2) For Part **A**, **each** question carries **4** marks. Part **A** total marks 10×4=40 marks.*

*3) For Part **B**, **each** question of **each** Module carries **10** marks. Total marks of Part **B** 6×10=60 marks.*

PART – A

1. Derive a relation for joint entropy for transmitting a message of X and receiving it as Y.

2. Derive a relation for mutual information for a binary erasure channel.

3. Compare different types of source codes.

4. State Shannon-Hartley theorem and discuss Bandwidth – SNR trade off.

5. How parity check codes can be used for error detection and correction ?

6. Discuss the properties of syndrome.

7. Write notes on Reed Solomon Codes.

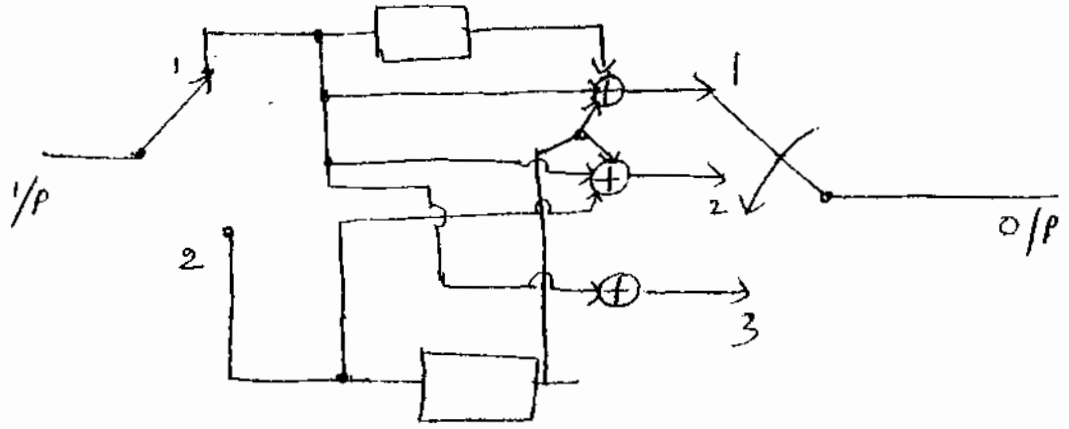
8. Explain the basic principle of maximum likelihood decoding.

9. Discuss the objectives of cryptography.

P.T.O.

10. For the (3, 2, 1) convolutional encoder find the transfer function matrix. **(10×4=40 Marks)**

Given



PART – B

Module – 1

11. Construct a trinary coding using Shannon-Fano Coding Procedure. The source $S = \{S_1, S_2, S_3, S_4, S_5, S_6, S_7\}$ with probability $P = \{0.3, 0.3, .09, 0.09, 0.09, .09, 0.04\}$. Calculate average length, variance and efficiency.

12. a) Derive a relation for Shannon Limit.
    b) Discuss its importance in communication.
    c) Derive a relation for BW – efficiency.

13. State and prove Kraft's inequality. **(2×10=20 Marks)**

Module – 2

14. Obtain the following for a (6, 3) linear block code (a) encoding circuit (b) syndrome circuit (c) standard array.

15. Show that for cyclic code $x^i T(x) = q(x) [x^n + 1] + T^i (x)$.

16. Explain coding and decoding of BCH codes. **(2×10=20 Marks)**

Module – 3

17. Draw the code tree for a (2, 1, 2) convolutional encoder with $g^{①} = (111)$, $g^{②} = (101)$, $L = 5$.

18. Explain the principle of block and stream ciphers.

19. With the help of flow charts explain Fano-Algorithm used for decoding of convolutional codes. **(2×10=20 Marks)**

(Pages : 2) **5870**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.716 : EMBEDDED SYSTEMS (TA)

Time : 3 Hours Max. Marks : 100

***Instructions** : 1) Answer **all** questions in Part – **A**. **Each** carries **4** marks.*
*2) Answer **any two** questions from **each** Module in Part – **B**. **Each** carries **10** marks.*

PART – A

1. Give the 3 main classification of embedded systems with examples.
2. Explain the different programming layers in typical embedded system software.
3. Give the handshaking signals used in parallel port device interfacing.
4. How can devices communicate serially using I^2C protocol ?
5. Explain the concept of Embedded C++.
6. What is the purpose of using # include "net Drv config.h" in C program ?
7. Differentiate between Block file and Byte stream file system.
8. Explain the need for scheduling in RTOS.
9. What is POSIX ?
10. What is the purpose of message queues and message pipe ?

PART – B

Module – I

11. Explain the hardware units in an embedded system.
12. Explain the functions of :
    a) Watch Dog Timer
    b) Device Driver
13. Write a note on USB communication.

P.T.O.

Module – II

14. Compare the use of coding in assembly language and in high level language for embedded application program development.

15. Give the layered model in the OS structure and services of each layer.

16. a) Explain what is preprocessor macro and how does a macro differ from function.

    b) Explain the use of null pointer.

Module – III

17. Explain the following scheduling models.

    a) Cooperative Round Robin Scheduling.

    b) Preemptive Scheduling.

18. Explain the following :

    a) Priority inversion problem

    b) Deadlock condition

19. Explain the following used by μC / OS – II.

    a) Time Delay function prototypes

    b) Semaphore Related Functions.

(Pages : 2) **2088**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April/May 2012
MICROWAVE ENGINEERING (T)

Time: 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part **A** and **two** questions from **each** Module in Part **B**.*

PART – A

1. Derive the expression for Q factor of a cavity resonator.
2. Explain the physical structure of Hetrojunction Bipolar transistor with the help of diagram.
3. Explain the principle of operation of MESFET.
4. Compare microwave tube and solid state sources.
5. Working principle of Microwave Isolator.
6. Define out-put power, efficiency and tuning range of reflex klystron.
7. List the microwave bands and their applications.
8. Write short note on diversity reception.
9. How is microwave power measured ? Name different techniques.
10. Write short note on microwave repeaters. **(10×4=40 Marks)**

PART – B

Module – I

11. Draw the structure of a klystron depicting the buncher cavity and catcher cavity. Derive the equation for velocity modulation and the phase angle of the wave. **10**
12. Explain how amplification is achieved in TWT amplifier ? Why Helix is preferred ? **10**

P.T.O.

13. A two cavity klystron amplifier has the following parameters, $V_o = 1000$ V, $R_o = 40\,k\Omega$ $I_o = 25$ mA, f = 3 GHz, Gap spacing in either cavity (d) = 1mm, spacing between two cavities (L) = 4 cm, effective shunt impedance, excluding beam loading $R_{sh} = 30\,k\Omega$.
    1) Find the input gap voltage to give max. voltage V_2.
    2) Find the voltage gain and efficiency of the amplifier, neglecting beam loading. **10**

Module – II

14. What are crossed field devices ? How does a magnetron sustain its oscillation using this crossfield. **10**

15. Explain the Guneffect using two valley theory. **10**

16. Explain the principle of operation of tunnel diode. **10**

Module – III

17. Explain two hole directional coupler and obtain its s-matrix. **10**

18. Explain FM microwave radio system. **10**

19. Explain microwave protection switching arrangements. **10**

(6×10=60)

(Pages : 2) 1611

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.735 : OPTOELECTRONIC DEVICES (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Draw the equivalent circuit of a solar cell and explain the parameters.
2. Determine the bandwidth of an LED source with a rise time equivalent to 10 ns.
3. Draw the current/optical power output curve of a Fabry-Perot laser and explain the relationship.
4. Calculate the wavelength of the photon absorbed or radiated for a two level system having Ec = 1.4 eV and Ev = OeV.
5. On the current-voltage characteristics of a solar cell, show why the power Vm Im is smaller than Voc Isc.
6. A LED device fabricated using GaAs material is emitting at a wave length of 650 nm. Calculate the bandgap energy for the material.
7. What two conditions must be met for recombination to be labeled radiative ?
8. A semiconductor sample has a donor-ion concentration ND = $10^{15}/cm^3$ and minority – carrier life time = 10×10^{-6} s. Compute the generation and recombination rates of EHPs.
9. Describe the relationship between LED bandwidth and carrier recombination.
10. What are the techniques used for determining the life time of an optical source ?

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. a) Define and explain the quantum efficiency and responsivity of a photodiode. How are the two related to each other ?

    b) What are the principal noises associated with photo detectors ?

12. Photon of wavelength 0.90 μm are incident on a Pn Photodiode at a rate of 5×10^{10}/S and, on an average, the electrons are collected at the terminals of the diode at the rate of 2×10^{10}/ S. Calculate:

    a) The quantum efficiency and

    b) The responsivity of the diode at this wavelength.

13. a) The energy gap of GaAs is 1.42 eV. Determine, the minimum frequency of light that will cause the transition of an electron from the valence band to the conduction band.

    b) Describe a method through which the available bandwidth of an APD can be enhanced.

Module – II

14. a) What is electro-optic effect ?

    b) How can this effect be used for modulating the phase of an optical signal ? How can the amplitude of the optical signal be modulated ?

15. A certain solar cell has a saturation current of 5 nA and when it is subjected to optical radiation it has a short-circuit current Isc = 40 mA. Determine the open circuit voltage and maximum power available.

16. Estimate the electrical modulation bandwidth for an LED with carrier recombination life time of 8 ns. The frequency response of the device is assumed to be Gaussian.

Module – III

17. Derive E instein relationship connecting absorption, stimulated emission and spontaneous emission coefficients.

18. A laser is emitting a spectral line centered at 632.8 nm whose gain curve has a half-width of 3.003×10^{-3} nm. If the cavity length of the laser is 20 cm, calculate the number of longitudinal modes excited. Tahe the refractive index of the medium to be 1.2.

19. List and explain the performance characteristics of VCSEL laser diode.

(6×10=60 Marks)

(Pages : 2) **5865**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.735 : OPTOELECTRONIC DEVICES (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define and explain the term Fill Factor (FF) of a solar cell.
2. Explain the difference between surface emitting LED and edge emitting LED.
3. Calculate the slope efficiency of a laser diode operating at $\lambda = 1300$ nm if its external quantum efficiency is $\eta_{ex} = 0.1$.
4. What are the parameters that determine the reliability factor of LEDs ?
5. Compute the response time of PIN photo detector composed of InGaAs with 5 μm of absorption layer thickness.
6. In a semiconductor (Eg = 1.78 eV) laser, the bandwidth of the emission spectrum is approximately 0.01 eV. Determine the frequency bandwidth of the light.
7. Describe the relationship between the threshold current and operating temperature of laser.
8. The responsivity of a diode is 0.85 A/W and the input power saturation is 1.5 mW. What is the photocurrent if the incident light power is 1 mW ?
9. Explain the need for external modulation in optical communication system.
10. Obtain the ratio of the stimulated emission rate to the spontaneous emission rate of white light source operating at 900 k, whose average emission wavelength is 0.6 μm. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Distinguish between a pn diode, a pin diode and an APD. Is it possible to make these three types of photodiode using the same semiconductor ?

12. An APD has a quantum efficiency of 40% at 1.3μm. When illuminated with optical power of 0.3μW at this wavelength, it produces an output photocurrent of 6 μA, after avalanche gain. Calculate the multiplication factor of the diode.

13. Explain different models applied to the optical and transport properties of semiconductor.

Module – II

14. Derive an expression for the short circuit current of a solar cell.

15. a) What is the acousto-optic effect ?
    b) Distinguish between modulators based on this effect and operating in the Raman-Nath and Bragg regime.

16. A solar cell has a I_{ph} = 35 mA, Is = 5×10^{-11} A and area = 2 cm^2. Determine
    a) open - circuit voltage and
    b) the power delivered by the cell if the fill factor is 80%.

Module – III

17. a) Derive the threshold condition for laser action.
    b) On what factors does the gain coefficient of a semi conductor laser depends ?

18. Calculate the maximum allowed length of the active region for the single-mode operation of a laser emitting at 1.3μm. Assume that the refractive index of the active region is 3.5.

19. a) What is the critical relationship which must be satisfied in order for a laser to operate as DFB ?
    b) What are kinks of a laser diode ? Explain. **(6×10=60 Marks)**

(Pages : 4) **1606**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.703 : MICROWAVE ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. a) Give some applications of cavity resonators.
   b) Calculate the resonant frequency of a circular resonator for the following dimensions : diameter = 12.5 cm, length = 5 cm for TM_{012} mode.
2. Show that coaxial cavity can support infinite number of modes of oscillation.
3. List the differences between TWT and Klystron tube.
4. Why strapping is employed in magnetron ? In which all cases strapping fails ?
5. An n-type GaAs Gunn diode has the following parameters :
   Electron drift velocity : $V_d = 2.5 \times 10^5$ m/s
   Negative electron mobility : $|\mu_n| = 0.015\ m^2 / V.s$
   Relative dielectric constant : $\varepsilon_r = 13.1$.
   Determine the criterion for classifying the modes of operation.
6. Describe the physical structure of HBT.
7. Give reasons why Ga As MESFET performs better than Si MESFET.
8. Why S parameters are considered in high frequency applications ?
9. Write note on reliability in connection with protection switching arrangement.
10. List the system gain and losses associated with microwave link. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module.

MODULE – I

11. A 2- cavity Klystron has the following parameters; Beam voltage : $V_0 = 20$ kV; Beam current : $I_o = 2$ A; Operating frequency : f = 8 GHz; Beam coupling coefficient : $\beta_i = \beta_o = 1$; dc electron beam current density : $\rho_0 = 10^{-6}$ C/m^3; signal voltage : V_1 = 10 V (rms); shunt resistance of the cavity : R_{sh} = 10 kΩ; Total shunt resistance including load : R = 30 kΩ

    Calculate

    a) The plasma frequency

    b) The reduced plasma frequency for R = 0.5

    c) The induced current in the output cavity.

    d) The induced voltage in the output cavity

    e) The output power delivered to the load.

    f) The power gain.

    g) The electronic efficiency. 1

12. With diagram explain the working of reflex Klystron. Derive the round trip transit time angle for reflex Klystron. Also draw applegate diagram for 1¾ mode. **10**

13. a) A helix travelling wave tube operates at 4 GHz under a beam voltage $V_0 = 4$ KV **10**

    and a beam current I_0 = 20 mA. If the helix impedance is (zo) 100 Ω and circuit length N = 30, find

    a) the gain parameter C.

    b) Output power gain in dB and

    c) all four propagation constants.

MODULE – II

14. With diagram explain the working of cylindrical magnetron oscillator or operation mechanism of such oscillator. Also explain how phase focussed bunching occurs in such system. **10**

15. a) A typical n-type Ga As Gunn diode has the following parameters.

Threshold field, $E_{th} = 2800$ V/cm; applied field: E = 3200 V/cm; device length : L = 10 μm. Doping concentration : $n_0 = 2 \times 10^{14}$ /cm^3 ; operating frequency : f = 10 GHz

a) Compute the electron drift velocity

b) Calculate the current density

c) Estimate the negative electron mobility. **5**

b) A typical n-channel GaAs MESFET has the following parameters :

Electron concentration : $N_d = 8 \times 10^{17}$/cm^3

Channel height : a = 0.1 μm

Relative dielectric constant : $\varepsilon_r = 13.1$

Channel length : L = 14 μm

Channel width : Z = 36 μm

Electron mobility : $\mu = 0.08$ m^2/V.S

Drain voltage : $V_d = 5$ V

Gate voltage : $V_g = -2$V

Saturation drift velocity : $V_s = 2 \times 10^5$ m/s

a) Calculate the pinch off voltage

b) Compute the velocity ratio

c) Determine the saturation current at $V_g = 0$

d) Find the drain current I_d. **5**

16. Discuss p-i-n diode structure and its operation. Also draw its high frequency equivalent circuit at on state and off state. **10**

MODULE – III

17. a) Derive the S-matrix of 3 port circulator . **4**

    b) With suitable bench setup how microwave power is measured. **6**

18. Explain in detail the line of sight path characteristics associated with microwave radio system. **10**

19. a) Briefly describe the 4 major sections of a terminal station. **7**

    b) Define term ring around associated with microwave communication system. **3**

(Pages : 2) **5860**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.703 : MICROWAVE ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part – **A** and **two** questions from **each** Module in Part – **B**.*

PART – A

1. Discuss the advantages of microwaves over low frequency signals.
2. Derive an expression for the resonance of a rectangular cavity resonator.
3. What are slow-wave structures ? Give some typical structures which support slow waves.
4. Explain the phase-focusing effect in magnetrons.
5. Differentiate between transferred electron devices and transistors.
6. Describe the structure of a microwave bipolar transistor.
7. List the characteristics of magnetic tees. Mention their applications.
8. Give the working principle of microwave frequency meter.
9. Derive the s-matrix of a 2-port directional coupler.
10. Discuss about the diversity reception in Microwave Communication.

(10×4=40 Marks)

P.T.O.

PART – B

Module – I

11. Describe the operation of a reflex klystron, oscillator and derive the expressions for the transit-time and bunching parameter. **10**

12. Explain the process of velocity modulation in klystrons. Derive expression for the same. **10**

13. A two cavity klystron has the following specifications.

    Beam voltage Vo = 900 V Beam current = 30 mA frequency = 8 GHz
    Gap spacing d = 1 mm spacing between centers of cavities L = 4 cm
    Effective shunt impedance = 49 GΩ (giga Ω)
    Determine : a) the ē velocity b) dc transit-time of electrons c) the i/p voltage for max. o/p voltage and d) the voltage gain in dB. **10**

Module – II

14. Derive the following expression for a magnetron.

    a) Cyclotron angular frequency

    b) Power output and

    c) Efficiency. **10**

15. Describe the working of a tunnel diode in detail. **10**

16. a) Explain how a PIN diode can be used as a SPDT switch. **5**

    b) Write down the expression for the drain current of a Schottkey barrier gate MESFET and describe the terms. **5**

Module – III

17. Draw the block diagram of a two-way digital microwave system and explain. **10**

18. Explain the different methods of microwave impedance measurement. **10**

19. With the help of a block diagram explain the working of a microwave repeater. **10**

(Pages : 2) **6836**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
08.801 : NANOELECTRONICS (TA)
(2008 Scheme)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define any three characteristic lengths associated with nanoelectronic devices.
2. What are the differences between evaporation and sputtering ?
3. Explain TEOS technique of SiO_2 deposition.
4. What are the merits of AFM over STM ?
5. With doping profile and energy band diagrams explain ni pi super lattice.
6. Explain the principle of resonant tunnelling. How is it different from Esaki tunnelling ?
7. Why are quantum dots considered as artificial atoms ?
8. With diagram explain how the threshold current and gain of a multiple quantum well laser depends on the number of wells.
9. Derive expression for the voltage required for tunnelling through a nanocapacitor.
10. Explain with reasons the difference in mobility of electrons in MOSFETS and MODFETS.

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. With a simple schematic diagram explain the principle of Molecular Beam Epitaxy for fabricating nanolayers. What are its advantages and disadvantages ?

12. Explain the principles involved in fabricating different types of nanomaterials using sol-gel technique.

13. What are the different types of electron microscopes ? With diagrams explain the principle of Scanning Electron Microscope.

Module – II

14. Compare the energy distribution and density of states in 3D, 2D, 1D and 0D materials.

15. What are the differences in the distribution of energy of electrons in multiple quantum well and superlattice ? Explain any one application of each.

16. Explain integer quantum Hall effect.

Module – III

17. With energy band diagrams explain the principle of operation of a heterojunction BJT.

18. Explain the principle of operation and characteristics of a quantum dot based, single electron transistor.

19. With structural details explain the principle of operation of a quantum dot laser. What are its advantages and disadvantages ?

(Pages : 3) **5939**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.703 : MICROWAVE ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Describe phase, velocity and group velocity. Mention the relation between them.
2. Write an expression for maximum power that can be handled by a rectangular wave guide. Explain the various terms. What is the dominant mode in the rectangular waveguide ?
3. Compare klystron and TWT amplifiers.
4. A TWT has a beam voltage of 3 kV and beam current 30 mA. The helix has a characteristics impedance 10Ω and the circuit length is 30. Find the gain parameter and o/p power gain.
5. List the conditions the semi conductor structure should satisfy in order to exhibit negative resistance.
6. Write an expression for the drain current in the Schottky barrier gate FET and explain the terms.
7. Describe the principle of operation of tunnel diode.
8. List the properties of directional couples. Explain them.
9. With a simple laboratory setup, explain how microwave power is measured.
10. Describe the applications of microwave circulators and isolators. **(4×10=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module.

Module – I

11. a) Explain bunching in a two cavity klystron with the help of apple gate diagram.

    b) Derive an expression for the bunching parameter. **10**

12. a) Describe the properties of slow wave structures.

    b) With a neat diagram explain the amplification process in the TWT amplifier. **10**

13. A two cavity klystron amplifier has the following parameters.

    V_0 = 1200 V, I_0 = 28 mA, f = 8 GHz. Gap spacing in either cavity d = 1 mm spacing between two cavities L = 4 cm, Effective shunt resistance $R_{sh} = 40\,k\Omega$, excluding beam loading. **10**

    a) Find the i/p gap voltage to give maximum o/p voltage.

    b) Determine the voltage gain neglecting beam loading in the o/p cavity.

    c) Calculate the efficiency of amplifier neglecting beam loading.

    d) Calculate the beam loading conductance.

Module – II

14. Derive the Hull cut off voltage equal for a cylindrical magnetron. **10**

15. a) Define negative differential resistivity.

    b) Explain J-E characteristics of Gunn diode.

c) An n-type Ga As Gunn diode has the following parameters.

Threshold field E_{th} = 2800 V/cm

Applied field E = 3200 V/cm

Device length L = 10 μm

Doping concentration no = $2x10^{14}/cm^3$

Operating frequency f = 10 GHz

Calculate :

a) Electron drift velocity

b) Current density

c) Negative electron mobility. **10**

16. a) Describe the working of a common source amplifier using MESFET.

b) How a tunnel diode can be used as a circulator. **10**

Module – III

17. a) Explain the properties of s-matrix .

b) Derive the scattering matrix of a magic tee. **10**

18. a) Explain the construction and working of microwave isolator.

b) Explain Faraday rotators in ferrites. **10**

19. Explain the basic digital microwave communication system. Mention some of its applications. **10**

(Pages : 2) 5944

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.735 : OPTOELECTRONIC DEVICES (TA)

Time : 3 Hours Max. Marks : 100

PART – I

Answer **all** questions. **Each** question carries 4 marks.

1. Compute radiative recombination time (τ_r) in GaAs having $n_o = 10^{14}cm^{-3}$ under high injection of $10^{18}cm^{-3}$. Given that $B_r = 7\times10^{-10}cm^3/s$.
2. What do you understand by Stark Effect ?
3. Draw the noise equivalent circuit of a photodiode and name the components.
4. Explain 'Avalanche multiplication' and write an expression for Avalanche multiplication coefficient.
5. Explain energy band diagram of a Schottky barrier cell.
6. τ_r and τ_{nr} (Radiative and non radiative life times) of a LED are 60 ns and 100 ns respectively. Compute total recombination life time. Given that peak emission wavelength is 0.87 μm at a drive current of 40 mA.
7. Draw the structure of a planar LED.
8. Write down threshold condition for Laser Oscillation.
9. The total efficiency of an injection laser with a GaAs active region is 18%. Voltage applied to the device is 2.5 V and band gap energy is 1.43 eV. Calculate external power efficiency of the device.
10. Write notes on Rare-Earth Doped Lasers.

P.T.O.

PART – II

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Explain different types of absorption of photons in semiconductors (with neat figures). **10**

12. a) Derive the relation between quantum efficiency and responsivity of a photo diode. **5**

    b) A photo diode has a quantum efficiency of 65% when photons of energy 1.5×10^{-19} J are incident on it.

    i) At what wavelength is the photo diode operating ?

    ii) Compute the incident optical power required to obtain a photo current of 2.5 μA at this wavelength. **5**

13. Explain the structure of SAGM APD. How grading improves the performance ? **10**

Module – II

14. a) Define injection efficiency and recombination efficiency of a light emitting diode with sufficient Mathematical support. **3**

    b) Explain the structures of Heterojunction LED and surface emitting LED. **7**

15. a) What is image force lowering effect in MSM photodiode ? Explain with sketches. **5**

    b) What is the effect of bias on barrier heights in a triangular barrier diode ? **5**

16. Describe the principle and operation of Electro-optic and acousto-optic modulators. **10**

Module – III

17. a) Compare the ratio of threshold current densities at 20°C and 80°C for AlGaAs injection laser with T_0 = 180 K. 4

    b) Write notes on Axial and Transverse Laser Modes. 6

18. a) Derive an expression for gain in a two level lasing medium. 5

    b) Calculate the number of modes of an AlGaAs laser supported by the gain spectrum which has a bandwidth of 6nm. Cavity length of the laser is 200 μm and emission wavelength is 800 nm. 5

19. Write notes on :

    a) DFB lasers. 5

    b) Quantum well lasers. 5

(Pages : 2) **5940**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part **A** and **2** questions from **each** Module of Part **B**. For Part **A** **each** question carries **4** marks. For Part **B**, **each** question of **each** Module carries **10** marks. Total marks of Part **B** is **6×10=60** marks and total marks of Part **A** is **10×4=40** marks.*

PART – A

1. Derive a relation for entropy. Find the optimum entropy for a binary source.
2. Explain different source codes. Write the condition for the code to be optimal.
3. State and explain noiseless coding theorem. Narrate its limitations.
4. Compare the different channels (analytically) used in communication.
5. Compare hamming distance, minimum distance and weight of a code.
6. Why decoding based on standard array is maximum likelihood decoding or minimum distance decoding ?
7. Construct H^T from G matrix for a (6, 3) code. Given $G = \begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$.
8. Write the viterbi algorithm for decoding of a convolutional code.
9. Discuss the security attacks in cryptography.
10. Write the G matrix for (2, 1, 3) convolutional encoder $g^{(1)} = (1011)$ $g^{(2)} = (1111)$.

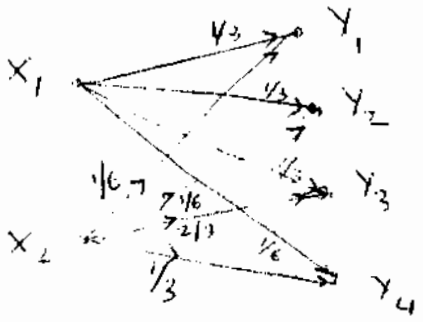
(10×4= 40 Marks)

P.T.O.

PART – B

Module – 1

11. Find the channel capacity for the following channel.



12. Prove the following relations

    a) $H(x, y) \leq H(x) + H(y)$

    b) $H(y/x) = -\sum_{i=1}^{m}\sum_{j=1}^{n} p(x_i y_j)\log p(y_j \mid x_i)$.

13. State and prove Shannon-Hartley theorem. **(2×10= 20 Marks)**

Module – 2

14. Construct the following for a Non-systematic Hamming codes
    a) Parity check matrix
    b) Generator matrix
    c) Code words for messages from 0001 to 1100.

15. Construct systematic and non systematic cyclic codes for a (7, 4) cyclic code for messages 1011, 1111, 0011, 1000, 1100.

16. Write notes on a) Burst error correction codes and b) Reed Solomon codes. **(2×10= 20 Marks)**

Module – 3

17. For a (2, 1, 2) convolutional encoder with $g^{①} = (111), g^{②} = 101$, draw the trellis for L = 5.

18. With the help of diagram explain DES.

19. For a (2, 1, 3) encoder with $g^{①} = (1011)$ $g^{②} = (1111)$, obtain the output sequence for input u = (10111) using time domain approach. **(2×10= 20 Marks)**

(Pages : 2) **5949**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.716 : EMBEDDED SYSTEMS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions, **each** question carries **4** marks.

1. Draw the basic block diagram of an embedded system and explain its components.
2. What is ASIP ? Compare it with a general purpose processor (GPP).
3. What is UART ? Explain the data frame for UART.
4. How does a counter performs a timer function ? Why do we need atleast one timer device in embedded system ?
5. What are the criteria by which an appropriate programming language is chosen to embedded software of a given system ?
6. List out the functions of a kernel. What can be the functions outside the kernel ?
7. Explain the need of cross compiler.
8. What are the advantages of time slice scheduling by an RTOS ?
9. List out the system level functions for Micro C/OS II.
10. Explain Remote Procedure Calls (RPC) in distributed environment of embedded systems.

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Explain the software modules and tools for the designing of an embedded system.

12. What is SoC (System on Chip) ? Draw the block diagram of a contact less smart card and explain its components.

13. Explain the various interconnection buses for communication between the host system and the networked I/O devices.

Module – II

14. Explain the organization of file system in RTOS.

15. Explain the creation of processes and its management.

16. Explain the optimization of memory codes in RTOS.

Module – III

17. Explain the handling of interrupt source call by the RTOS.

18. Explain co-operative Round Robin Scheduling.

19. Explain the uses of Semaphores for the critical section of a task.

(Pages : 2) **5938**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.702 OPTICAL COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Define numerical aperture of a step index fiber and explain.
2. What is single mode fiber and multimode fiber ?
3. Photons of 1300 nm wavelength are incident on a photodiode at a rate of 5×10^{10} s and the electrons are collected at a rate of 2×10^{10}/s. Calculate the quantum efficiency and responsivity of the diode.
4. The refrative index of a material used for fabricating an LED is 3.5. Calculate its external quantum efficiency.
5. List the requirements of a photodetector.
6. Draw different receiver amplifier configurations.
7. Explain the convenient budget analysis for determining the dispersion limitations of an optical fiber link.
8. Explain the concept of WDM and hence explain key system features.
9. What is soliton ? Describe the soliton formation in brief.
10. Define MFD. How is it related to V number ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. The relative refractive index difference between of a fiber is 0.7% and its core refractive index is 1.45. Calculate the values of NA of the fiber when (a) index profile is not taken into consideration (b) index profile is triangular.

12. For a step index fiber $n_1 = 1.465$ and $n_2 = 1.46$, normalized frequency is 2.4. Calculate the core radius and numerical aperature at 800 nm.

13. Explain the principle of working of a semiconductor Laser using suitable diagram.

Module – II

14. Explain the point to point link design with reference to the choice of components and their associated characteristics.

15. Draw the equivalent circuit of optical receiver and explain the related terms.

16. For an EDFA to be used as a power amplifier, what should be minimum pump power required to obtain 12 dBm output at 1540 nm, if the amplifier input is 0 dBm and the pump wavelength is 980 nm.

Module – III

17. Briefly describe the communication applications of optical fiber gratings (FBG).

18. List and explain the functions of fiber-optic network management.

19. Explain the design steps of soliton based optical link. **(6×10=60 Marks)**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.801 : NANOELECTRONICS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain the technique of fabricating xevogel.
2. With diagram explain the principle of laser ablation for fabricating nanolayers.
3. What are the merits of molecular beam epitaxy in fabricating nanolayers ?
4. Explain any two methods of fabricating quantum dots.
5. What are the different scattering mechanisms in a nano material ? How do they affect carrier mobility ?
6. Derive expression for quantum mechanical resistance. What is its numerical value ?
7. What are the differences between multiple quantum wells and superlattices ?
8. Explain Aharnov Bohm effect.
9. What is meant by real space transfer in quantum heterostructures ?
10. Explain the principle of a single electron transistor.

P.T.O.

PART – B

Answer **any two** questions from **each Module**. **Each** question carries **10** marks.

Module – I

11. With schematic diagram explain the principle of ion implantation. How can the dose and range of implantation be controlled ? What are the merits and demerits of ion implantation with respect to fabrication of nanolayers or nanodevices ?

12. With schematic diagram explain the principle of atomic force microscope ? What are its advantages and disadvantages over STM and SEM ?

13. Explain the principle of thermal CVD and plasma enhanced CVD with diagrams compare them.

Module – II

14. Derive Landauer formula for the conductance of a nanowire.

15. Compare the distribution of energy and the wave functions in two dimensional square, parabolic and triangular potential wells.

16. Explain the effect of lattice mismatch on the energy band diagram of a strained layer. How do the mismatch between the layers affect the degeneracy of holes?

Module – III

17. Explain the principle of operation of hot electron transistor and resonant tunnelling transistor, with structure and energy band diagrams.

18. With structural details explain the principle of operation of a Vertical Cavity Surface Emitting Laser.

19. Explain the principle of operation of a carbon nanotube transistor (CNT transistor) with its strcture equivalent circuit.

(Pages : 2) **5581**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part – **A** and **2** questions from **each** Module from Part – **B**.*

PART – A

Each question carries **4** marks. **(10×4=40 Marks)**

1. Prove that maximum entropy for M messages can be obtained when messages are equally probable.
2. Obtain the relation for H(Y/X) of a communication channel.
3. Calculate the channel capacity for a Binary Erasure channel.
4. State and explain the necessary and sufficient condition for the code to be instantaneous.
5. Explain how error detection is possible with even parity bits.
6. Discuss the properties of cyclic codes.
7. Define rings with necessary properties.
8. Compare convolutional codes with block codes. Draw a (2,1,2) convolutional encoder and write the generating sequences.
9. Define transfer function of (n,k,m) convolutional encoder.
10. Draw the flow chart of Fano Algorithm for decoding.

P.T.O.

PART – B

Each question carries **10** marks. **(10×6=60 Marks)**

Module – 1

11. Compare analytically the different channels available for communication. **10**

12. Compare Shanon Fano coding with Huffman coding. Construct optimum code using Huffman coding with following datas. Let $S = \{S_1, S_2, S_3, S_4, S_5\}$ occur with Probability $P = \{.55, .15, .15, .10, .05\}$, $X = \{0,1\}$. Draw the code tree. **10**

13. State and prove Shannon's first theorem. **10**

Module – 2

14. For a (6,3) linear block code, construct the standard array. What are the importance of coset leaders in the standard array ? **10**

15. Obtain systematic generator and Parity check matrix for (7,4) cyclic codes. Draw the general decoder scheme for (n, k) cyclic codes. **10**

16. Explain encoding and decoding schemes using BCH codes. **10**

Module – 3

17. Obtain coded output sequence for (3, 2, 1) convolutional encoder after drawing the encoder with $g_1^{(1)} = (11)$ $g_1^{(2)} = (10), g_1^{(3)} = (10), g_2^{(1)} = (01), g_2^{(2)} = (11), g_2^{(3)} = (00)$. Message sequences are $u^{(1)} = (101), u^{(2)} = (110)$. Obtain the Generator matrix. **10**

18. How the structural properties of convolutional encoder can be analysed ? Explain. Draw the state diagram of a (2,1,3) encoder with $g^{(1)} = (1111), g^{(2)} = (1011)$. **10**

19. Explain with the help of diagrams DES cryptography. **10**

(Pages : 3) **5580**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.703 : MICROWAVE ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***all*** *questions in Part – **A**. **Each** question carries **4** marks.*
*2) Answer **any two** questions from **each** Module in Part – **B**. **Each** question carries **10** marks.*

PART – A

1. Define phase velocity and group velocity. Derive the relation between them.
2. Find the cut-off frequency and guided wavelength of a rectangular waveguide with dimensions 7×3.5 cm operates in TE_{10} mode at a frequency of 3.5 GHz.
3. How does reflex klystron differ from amplifier klystron ?
4. What is a slow wave structure ? Give some typical structures which support slow waves.
5. Describe the rising sun magnetron oscillator.
6. Write down the power frequency limitation equations of microwave power transistors with descriptions.
7. Describe mode jumping in magnetrons. How it can be avoided ?
8. Briefly describe any two applications of PIN diode.
9. Describe the working of a two hole directional coupler.

   Calculate the coupling factor if the power in the primary waveguide is 72 mW and the power delivered to the directional coupler is 8 mW.
10. Draw the block diagram of a non-demodulating type microwave repeater with IF amplification and explain briefly. **(4×10=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) What are reentrant cavities ? Explain.

    b) In a reflex klystron, show that the sound trip-transit-time is given by

$$tr = \frac{2md V_0}{e(V_r + V_0)}$$

charge of electrons

V_0 – initial velocity

V_0 – beam voltage

V_r – repeller voltage

12. How the amplification in a TWT amplifier differs from that of a klystron ? Compare their performance . Mention typical applications of each.

13. A two cavity klystron amplifier has the following specifications.

Beam voltage = V_0 = 900 V

Beam current I_0= 30 mA

Frequency f_0 = 8 GHz

Gap spacing in either cavity d = 1mm

Spacing between centers of cavities L = 4 cm

Effective shunt impedance Rsh = 40 GΩ

Determine :

a) The electron velocity

b) The dc transit time of electrons

c) The i/p voltage for maximum o/p voltage

d) The voltage gain in decibels. **(10×2=20 Marks)**

Module – II

14. a) What is meant by strapping in magnetrons ?

    b) Describe the technology used in magnetrons for mode separation and for tuning its output frequency.

15. a) List the properties of the high field domain of a gunn diode.

    b) Derive the criterion for classifying the modes of operation.

    c) An n-type Ga As Gunn diode has the following parameters :

    Electron drift velocity = 2.5×10^5m/s

    Negative electron mobility = $0.015 m^2/V$

    Relative dielectric constant = 1.31

    Determine the criterion for classifying the modes of operation.

16. a) Explain the construction and working of a PIN diode.

    b) How it can be used as an amplitude modulator and a phase shifter ?

(10×2=20 Marks)

Module – III

17. Describe the S-matrix of a directional coupler.

18. Explain the working of a microwave isolator.

19. a) Briefly describe about the different types of fading in microwave communication.

    b) Draw the block diagram of the basic microwave transmission system and explain. **(10×2=20 Marks)**

(Pages : 2) **5585**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

08.735 Elective – III : OPTOELECTRONIC DEVICES (TA)

Time : 3 Hours . Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Distinguish between absorption and radiation in semiconductor devices. How it is related to energy band structures ?
2. What is responsivity of a optical debtor diode ? Give expression.
3. Draw V-I characteristics of a solar cell. Explain briefly.
4. What is a Quantum Well (QW) structure ? What is the merit of QW structure ?
5. Explain the working principle of FP Laser.
6. Compare APD and PIN detectors.
7. A LED fabricated from Ga As draws a current of 20 μ A. It is supplied with 5 Watts of electrical power and it delivers 50 μW optical power. If refractive index of material used is 3.6, Calculate the conversion efficiency.
8. Give two merits of coherent detection.
9. Explain the working principle of an acousto-optic modulator.
10. What is population inversion in a lasing medium? How it is affected by temperature ?

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Explain with neat sketches, the working of a PIN Diode. Calculate responsivity at 1300 nm of 600 electrons are generated for every 800 photons. Also calculate number of photons/bit required for binary detection for bit error probability of 10^{-9}, if dark current is zero.

12. What are the features of hetero junction structures ? Distinguish between carrier confinement and optical confinement in hetero junction structures. Use neat sketches.

13. Explain in detail, classification of semiconductors based on band gap structures. Explain why a direct gap semiconductor is preferred to indirect gap semi conductor for fabricating LEDs.

Module – II

14. Explain V – I characteristics and spectral response of a solar cell. Give its design considerations.

15. Explain the working of acousto optic modulator, using neat diagrams.

16. Explain structure, principle of operation and frequency response of a LED.

Module – III

17. Deduce expression for gain in a two level lasing medium.

18. What are QW Lasers ? Explain its the constructional features.

19. Write short notes on :
    a) Mode locking in semiconductor lasers.
    b) DFB laser
    c) Rare earth doped lasers.
    d) FP laser.

(Pages : 2) **5590**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08-716 : EMBEDDED SYSTEMS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is DSP (Digital Signal Processor) ? Compare it with a General Purpose Processor (GPP).
2. What is HDLC ? Explain the data frame for HDLC.
3. Give the advantages and disadvantages of data transfers using serial and parallel parts/devices.
4. Explain the different program layers in embedded software.
5. Give the programming model for multiple function calls in the main ( ) functions. What are its advantages ?
6. What are the functions of a device manager ?
7. What are the memory managing strategy for a system ?
8. When do you use co-operative scheduling and pre-emptive scheduling ?
9. What are the parameters of a TCB of a task ? Why should each task have distinct TCB ?
10. What are the features of Micro C/OS II ?

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Draw the detailed block diagram of an embedded system and explain its components.

12. What is SoC (System on Chip) ? Explain the components of SoC with the block diagram of a cellphone.

13. What do you mean by Software Times (SWT) ? How do SWT help in scheduling multiple tasks in real time ?

Module – II

14. Explain the various data structures in a program element.

15. Explain the source code engineering tools for embedded C / C++.

16. Explain the structure of an operating system.

Module – III

17. Explain rate monotonic co-operative scheduling.

18. Explain the various semaphores related functions in Micro C/OS II.

19. Explain the various methods of Inter Process Communication (IPC) in RTOS.

(Pages : 2) **5579**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.702 : OPTICAL COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** carries **4** marks.

1. Differentiate between material and modal dispersion.
2. List the merits of soliton communication systems.
3. What is meant by Relative Intensity Noise (RIN) ?
4. What are the challenges in DWDM ?
5. What are the different types of Optical Amplifiers ?
6. Compare coherent and IMDD systems.
7. What is numerical aperture of a fiber ? What is its relationship with V-parameter ?
8. Briefly explain polarization mode dispersion.
9. What are the different optical windows ?
10. The quantum efficiency of a particular Silicon RAPD is 80% for the detection of radiation at a wavelength of 0.9 μm when the incident optical power is 0.5 μw, the output current from the device is 11 μA. Determine the responsivity and multiplication factor of the photodiode under these conditions.

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **All** questions carry **equal** marks.

Module – I

11. Explain the vapour phase oxidation process of fiber fabrication with suitable figures.

12. Explain the structure and working APD, and compare its performance with PIN photodiode.

13. a) A 6 km optical link consists of multimode step index fiber with a core refractive index of 1.5 and relative refractive index difference of 1%. Estimate
    a) the delay difference between the slowest and fastest modes at the fiber output.
    b) the rms pulse broadening due to intermodal dispersion on the link.

    b) Write notes on bending loss and scattering loss in optical fibers.

Module – II

14. Explain the working of PSK heterodyne detection systems and derive an expression for bit error rate.

15. Explain the working principle of EDFA and what are the noises present in EDFA and how they are minimised.

16. a) An analog optical fiber system operating at a wavelength of 1 μm has a post detection bandwidth of 5 MHz. Assuming an ideal detector and considering only quantum noise on the signal. Calculate the incident optical power necessary to achieve an SNR of 50 dB at the receiver.

    b) What are the different types of pre-amplifiers in optical receivers ?

Module – III

17. Explain the architecture of WDM system with block diagram and also explain the add/drop procedure in WDM system.

18. Explain briefly :
    a) GH effect
    b) Light wave networks.

19. Draw the structure of soliton link and derive an expn. for bit error rate.

(Pages : 2) **2868**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.716 : EMBEDDED SYSTEMS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the concept of SoC with figures.
2. List four key features of embedded hardware.
3. Compare between UART and HDLC (four relevant points).
4. What are the requirements of embedded software ? State its key features.
5. Explain the use of function queues in embedded software.
6. State the memory management functions of an operating system with relevance to embedded systems.
7. What is shared data problem in embedded software ? State two ways to overcome it.
8. What are the uses of virtual sockets in embedded software ?
9. What is the need for IPC in embedded software ? List the main methods used for IPC.
10. List two Advantages and two Disadvantages of use of RTOS in an embedded system. **(4×10 = 40 Marks)**

PART – B

Answer **two** questions from **each** Module.

Module – I

Describe the key features of CAN bus protocol.

12. Explain the following :

    a) PCI

    b) ISA.

13. Describe Synchronous, iso-synchronous and asynchronous communications from serial devices with examples.

Module – II

14. Explain the concepts of Process, Tasks and Threads with reference to embedded software.

15. Explain the following with code snippets.

    a) Multiple function calls in a cyclic order.

    b) Function queues.

16. Explain the following function of operating systems.

    a) Device management.

    b) File system organization and implementation.

Module – III

17. Explain the priority inversion problem and deadlock situations in embedded software. How are they resolved ?

18. Explain the task service functions of Micro C/OS-II.

19. Explain the following scheduling models.

    a) Rate monotonics co-operative scheduling.

    b) Preemptive scheduling model. **(10×6 = 60 Marks)**

(Pages : 2) 7759

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.702 : OPTICAL COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries 4 marks.

1. Describe an optical fiber with diagram.
2. What do you mean by the numerical aperature ? Write an expression for it.
3. Explain with diagram a loose tube optical fiber cable.
4. A multimade stepindex fiber is provided with the following data; diameter of fiber = 52 μm, numerical aperature = 0.25 and operating wavelength = 1.2 μm. Determine total number of guided modes propagated and total number of guided modes if the same is multimode graded index fiber.
5. A optical system is provided with following (i) Bias current of optical source = 25 mA (ii) forward voltage = 1.6 V (iii) internal efficiency of the source = 3% and (iv) fiber acceptance angle = 25°. Determine the optical power coupled into the fiber.
6. What do you mean by modes of laser diode ? Explain.
7. A detector is provided with the following data (i) operating wavelength = 850 nm (ii) output current = 85 μA (iii) power of light beam = 850 μW. Determine responsivity.
8. What are the performance criteria of WDM system ?
9. What do you mean by the term rise time budget of optical system ?
10. What techniques are used to fabricate couplers ? Explain. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. With neat sketch describe double crucible method for producing optical fiber.

12. With neat sketches explain LED characteristics and derive the expression for internal and external quantum efficiencies.

13. Describe the intermodal and intramodal dispersion in optical fiber with diagram.

Module – II

14. With neat sketches explain different receiver amplifier configuration.

15. With the help of neat sketch describe EDFA architecture.

16. Make a rise time budget for a 0.85 μ m, 10 Km fiber link designed to operate at 50 Mbps. The LED transmitter and the Si PIN receiver have rise time of 10 ns and 15 ns respectively. The graded index fiber has a core index of 1.46, D = 0.01 and D = 80 ps/km-nm. The LED spectral width is 50 nm. Can the system be designed to operate with NRZ format ?

Module – III

17. What is WDM ? How is it implemented? Briefly explain WDM standards.

18. What is tunable optical filters ? Explain with structure. What major parameters are used to characterize tunable filters.

19. Explain five system design constraints of soliton light wave system.

(6×10=60 Marks)

(Pages : 2) **2857**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.702 : OPTICAL COMMUNICATION (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. What is V number of fiber or normalized frequency of fiber ?
2. List the requirements of LED materials.
3. Find the multiplication factor for silicon APD having quantum efficiency of 72% at 890 nm, and 0.75 μW optical power produces a multiplied photocurrent of 15 μA.
4. The light output from GaAs LED is coupled into a step index fiber having NA of 0.22 and core refractive index of 1.42. Calculate coupling efficiency.
5. Define the quantum efficiency and responsivity of a photodetector.
6. Explain the basic principle of operation of semiconductor optical amplifier.
7. Explain the effect of noise in EDFA.
8. What are the two analyses usually carried out to ensure the desired performance of optical fiber transmission link ?
9. What is DWDM ? Compare WDM and DWDM.
10. Explain the principle of add/drop multiplexer. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Describe the construction of optical fiber cable with figure.

12. A step index fiber has a core radius of 8 microns. The core and cladding indices are 1.458 and 1.44 respectively. What is the V number of the fiber if the operating wavelength is 1300 nm ? How many modes will be supported in the fiber ?

13. Give the definition of the bandwidth at a photodiode. What are the factors that restrict the bandwidth of a photodiode ?

Module – II

14. Draw the block diagram of optical receiver and explain. Explain the meaning of quantum limit of detection.

15. Draw the block diagram of coherent light wave system and explain. How will you improve the sensitivity of the system ?

16. A semiconductor optical amplifier has facet reflectivities of 30% and a single pass gain of 5dB. The device has an active region length 350 μm, a mode spacing of 1 nm, peach gain wave length is 1550 μm. Calculate the refractive index of active region.

Module – III

17. Explain the layer structure of a fiber optic network including optical layers and explain.

18. Explain the following terms related to optical coupler.
    a) Splitting ratio
    b) Cross talk
    c) Insertion loss
    d) Excess loss.

19. Calculate the number of inline EDFA repeater amplifiers for a system having a span length of 100km, G= 2dB and α = 0.2 dB/km. **(6×10=60 Marks)**

(Pages : 2) **7761**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. Show that the mutual information is always positive.
2. Define channel capacity. Write the expression.
3. Explain the significance of Shannon limit.
4. What is syndrome ? List the properties of syndrome.
5. Explain the error correcting and detecting capability of a linear block code.
6. Define cyclic code.
7. Write short notes on BCH codes.
8. Write short notes on burst error correcting codes.
9. Describe stream ciphers.
10. Describe various techniques used for representing convolutional codes.

(4×10=40 Marks)

PART – B

Answer **two** questions from **each** Module. **Each** question carries **10** marks :

Module – I

11. State and prove source coding theorem. **10**

P.T.O.

12. For the channel matrix

$$P(Y/X) = \begin{bmatrix} 0.6 & 0.2 & 0.2 \\ 0.5 & 0.2 & 0.3 \\ 0.0 & 0.6 & 0.4 \end{bmatrix}$$

Compute H(X), H(Y), H(X/Y), H(Y/X), H(X, Y) and channel capacity. **10**

13. Write notes on :

a) Huffman coding. **5**

b) Capacity of band limited Gaussian channels. **5**

Module – II

14. For a linear (n, k) block code, prove that $CH^T = 0$ where H is the parity check matrix and C the code matrix. **10**

15. The generator polynomial for a cyclic code is $g(x) = 1 + x + x^3$.

a) Find the code vector in systematic form for the message vector = [1 1 0 0]. **4**

b) Design an encoder for the code. **6**

16. Write short notes on :

a) Reed-Solomon codes. **5**

b) Hamming codes. **5**

Module – III

17. A rate $^1/_3$ non-systematic code has generator sequence as given below :

a) Construct the encoder. **4**

b) Draw the code tree for the convolutional code. **6**

$g^{11} = (1101)$ $g^{12} = (1001)$ $g^{13} = (1110)$.

18. Explain maximum likelihood decoding for a convolutional code. **10**

19. Briefly explain the following :

a) Trellis coded modulation. **5**

b) Diffic Hellman Public Key Distribution. **5**

(6×10=60 Marks)

(Pages : 3) 2659

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.704 : INFORMATION THEORY AND CODING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(4×10=40 Marks)**

1. Define entropy and explain its properties.
2. Prove that a zero memory source has maximum entropy when it is equiprobable.
3. What are the properties of a source code ?
4. Obtain the channel capacity of a noiseless channel.
5. Define :
   a) Group
   b) Vector space. Give two examples for each.
6. Explain the error detecting and error correcting properties of a linear block code.
7. Find the parity check polynomial of a (7, 4) cyclic code with generator polynomial $g(x) = 1 + x + x^4$.
8. Draw the encoder block diagram of a (3, 1, 2) convolutional code with $g^{(0)} = (1\ 1\ 0)$, $g^{(1)} = (1\ 0\ 1)$ and $g^{(2)} = (1\ 1\ 1)$.
9. Differentiate between maximum likelihood decoding and sequential decoding.
10. Compare symmetric key cryptography and asymmetric key cryptography.

P.T.O.

PART – B

Answer **any two** questions from **each** Module.

Module – I

11. Consider a source s = {s_1, s_2, s_3, s_4, s_5, s_6, s_7, s_8} with probabilities of occurrence p = {0.1, 0.1, 0.2, 0.1, 0.1, 0.2, 0.1, 0.1}.

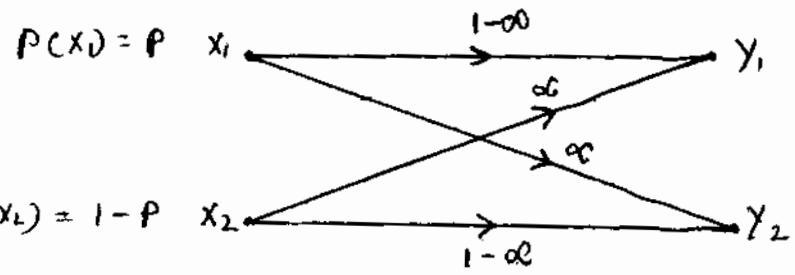
    a) Construct a Huffman code for this source. **5**

    b) Find the average code word length. **2**

    c) Find the variance and entropy of the code. **3**

12. State and prove the source coding theorem. **10**

13. Consider the binary symmetric channel shown in figure.



    Calculate : H(X), H(Y), H(Y|X), I(X, Y), H(X|Y), H(X, Y). **10**

Module – II

14. Consider a systematic (8, 4) linear block code with parity check equations as given below :

    $v_0 = u_1 + u_2 + u_3$

    $v_1 = u_0 + u_1 + u_2$

    $v_2 = u_0 + u_1 + u_3$

    $v_3 = u_0 + u_2 + u_3$,

    Where u_0, u_1, u_2 and u_3 are message bits and v_0, v_1, v_2 and v_3 are parity check bits.

    a) Find the generator and parity check matrix. **5**

    b) Find the error detecting and error correcting property of the code. **5**

15. A binary linear cyclic code with n = 7 and generator polynomial $g(x) = 1 + x^2 + x^3 + x^4$.
    a) Draw the hardware realization circuit for the encoder. **5**
    b) Find the minimum distance of the code. **2**
    c) Find the code vector corresponding to a message vector with all 1's. **3**

16. Write short notes on :
    a) Burst error correction codes. **5**
    b) Self dual codes. **5**

Module – III

17. Construct a convolutional encoder whose constraint length is 3 and the generator sequences of the encoder are
    $g^{(1)} = (1\ 0\ 1)$, $g^{(2)} = (1\ 1\ 0)$, $g^{(3)} = (1\ 1\ 1)$. Find the encoder output produced by the message sequence 10111. **10**

18. Explain the viterbi algorithm for decoding convolutional codes with suitable example. **10**

19. Describe data encryption standard with neat diagram. **10**

(Pages : 2) **7770**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.716 : EMBEDDED SYSTEMS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Write short notes on UART.
2. Explain the functions of an Embedded System.
3. Discuss about synchronous communication from serial devices.
4. Write notes on cross compiler.
5. Distinguish between preemptive and non preemptive kernel.
6. Discuss about priority inversion problem.
7. Explain remote procedure calls.
8. What is shared data problem ?
9. Discuss the features of an RTOS.
10. Illustrate the use of a semaphore. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module.

Module – I

11. Discuss about the different Device I/O types with eg.

12. Write notes on HDLC protocol.

13. Briefly discuss about the different high speed buses.

Module – II

14. Write brief notes on macros, functions and pointers.

15. Discuss about memory management and device management.

16. Explain about nested and non-nested ISRS.

Module – III

17. Discuss about semaphores, events and message queues.

18. Explain about any two scheduling models.

19. Describe the use of mailboxes and remote procedure calls. **(6×10=60 Marks)**

2 Copy

(Pages : 3) **2858**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.703 : MICROWAVE ENGINEERING (T)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Derive the resonant frequency of rectangular cavity.

2. A reflex klystron operates under the following conditions $V_0 = 500$ V, L = 1 mm, $R_{sh} = 20\ K\Omega$, $\frac{e}{m} = 1.759 \times 10^{11}$ (MKS system), $f_r = 8$ GHz. Assume $\beta = 1$.

   The tube is oscillating at f_r at the peak of the n = 2 mode or $1\frac{3}{4}$ mode. Neglecting the transit time through the gap and beam loading effect, find

   a) Value of repeller voltage V_r

   b) Direct current necessary to give microwave gap voltage of 200 v.

3. How does signal amplification take place in Helix TWT and list out the characteristics of TWT tube ?

4. Draw the equivalent circuit for a resonator of a magnetron and derive the electronic efficiency.

5. A certain silicon bipolar transistor has a maximum electric field intensity E_m of 3×10^5 cm/sec., and its carrier has a saturated drift velocity V_s of 4×10^6 cm/sec. The emitter-collector length L is 4 microns. Calculate

   a) The maximum allowable applied voltage.

   b) Transit time for a charge to traverse the emitter-collector length L.

   c) The maximum possible transit frequency.

P.T.O.

6. Draw the cross section and small signal equivalent circuit for a MESFET. List the intrinsic and extrinsic elements.

7. Explain the principle of operation of a Gunn diode.

8. List out the characteristics of a magic tree and write its S matrix.

9. With diagram, explain frequency diversity.

10. Explain the working of a IF microwave radio repeater with block diagram.

(10x4=40 Marks)

PART – B

Answer **any 2** questions from **each** Module.

Module – I

11. With diagram explain the working of a two cavity klystron amplifier. Derive the expression for velocity modulation. **10**

12. A two cavity klystron amplifier has the following parameters.

    Beam voltage $V_0 = 1200$ V, Beam current $I_0 = 28$ mA, frequency f = 8 GHz, Gap spacing in either cavity d = 1 mm, spacing between the two cavities L = 4 cm, effective shunt impedance excluding beam loading $R_{sh} = 40\ k\Omega$. Calculate

    a) The input microwave voltage V_1 in order to generate a maximum output voltage V_2.

    b) The voltage gain

    c) Efficiency of the amplifier

    d) Beam loading conductance. **10**

13. Derive the equation for convection current and axial electric field in a TWT. **10**

Module – II

14. Derive the hull cut-off voltage equation for cylindrical magnetron. **10**

15. State all assumptions and deduce the basic equations for the power frequency limitations on microwave power transistors. **10**

16. a) A microwave tunnel diode has a negative resistance $-R_n = -30\ \Omega$, other parameters are $R_s = 1\ \Omega$, $L_s = 5$ nH, $C = 20$ pF. Find resistive cut off frequency and self resonance frequency of the diode. **5**

    b) A GaAs MESFET has the following parameters. $R_g = 3\Omega$, $R_i = 2.5\Omega$, $g_m = 50$ m υ, $R_d = 450\ \Omega$, $R_s = 2.5\ \Omega$, $C_{gs} = 0.60$ PF.

    i) Determine the cut off frequency

    ii) Find the maximum operating frequency. **5**

Module – III

17. With diagram explain the principle and characteristics of a directional coupler. If p and q are positive real quantities, such that $p^2 + q^2 = 1$, obtain the expression for s matrix of a 2 hole directional coupler. **10**

18. What is Smith chart ? With the aid of Smith chart, explain how impedance is measured at microwave frequency range. **10**

19. With block diagram, explain a FM microwave radio system. **10**

(Pages : 2) **7765**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.735 : OPTO ELECTRONIC DEVICES (TA)
(Elective – III)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions **each** carries **4** marks.

1. Briefly explain exciton recombination.
2. Mention the optical properties of photonic band gap materials.
3. Compare the performance of characteristics of p-i-n diode and pn photodiode.
4. The quantum efficiency of an InGaAsP/InP avalanche photodiode is 80% when detecting 1.3 μm radiation with an incident optical power of 1 μW, the output current of device is 20 μA. Calculate the avalanche gain or current multiplication factor of the device.
5. What are the important factors to be considered white designing a solar cell ?
6. Explain the operation of thin film solar cells.
7. What is the significance of balanced modulator in coherent detection ?
8. Could a quantum well be used to fabricate a very far IR laser. If so what would be principle of operation.
9. Describe the process of spontaneous emission, super radiance and stimulated emission.
10. Describe the basic requirements for lasing and how they are achieved in a semiconductor laser. **(10×4=40Marks)**

P.T.O.

PART – B

Answer **two** questions from **each** module. **Each** question carries **10** marks.

Module – I

11. How can we measure absorption and luminescence spectra of a semi conductor and explain time resolved photo luminescence ?

12. Briefly explain the absorption and radiation mechanisms in a semi conductor.

13. Explain the operation of avalanche photodiodes in detail with necessary equation.

Module – II

14. Explain the operation of solar cell with its construction, V-I characteristics and its spectral response.

15. Briefly explain about micro cavity photodiode and hetero junction photodiode.

16. Explain the frequency response, defects and reliability of LED.

Module – III

17. Derive the Einstein's relation and population inversion.

18. Explain the operating principles of friction laser and its threshold current with all necessary equation.

19. Explain in detail the lasing condition and gain in a semiconductor. **(6×10=60Marks)**

(Pages : 2)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.801 : NANOELECTRONICS (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. Mention three applications of nanotechnology.
2. What is self assembly ?
3. Give the principle of photoluminescence spectroscopy.
4. Draw the bandstructures of npn homojunction and heterojunction transistors.
5. Compare SETs and MOSFETs.
6. Discuss the principle of stimulated emission.
7. What is microlaser ? Explain its principle.
8. What are the possible energy levels in a quantum wire ?
9. What is Bloch oscillation ? Give an expression for the period of Bloch oscillation.
10. What is quantum Hall effect ? What are its applications ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module. **Each** question carries **10** marks :

Module – I

11. Explain the limitations of conventional microelectronics in detail.

12. Explain any one chemical vapour deposition method.

13. With a suitable schematic, explain the operation of atomic force microscope.

Module – II

14. Explain the theory involved in integer quantum Hall effect.

15. Draw the density of states for a ID and OD electron system and explain.

16. Briefly discuss about modulation – doped quantum and multiple quantum wells.

Module – III

17. Explain the principle of operation of MODFET and mention its few advantages.

18. Explain in detail device structure and characteristics of resonant tunneling transistor.

19. Describe the working principle of heterojunction semiconductor laser.

(6×10=60 Marks)

(Pages : 3) **1776**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is the role of National Electric Code (NEC) in system design ?
2. What are the standard values of voltages and the permitted tolerances as specified by NEC ?
3. How are building services classified ?
4. Mention some energy conservation techniques commonly adopted.
5. Why is it necessary to provide earthing in an electrical installation ? State the IE Rules regarding the points to be earthed in an electrical installation.
6. Calculate the size of the conductor to be used for wiring of a 20 hp, 3-phase 415 V, 50 Hz induction motor.
7. Explain briefly the pre-commissioning test of transformers.
8. Give a brief account of different types of artificial hight sources with specific reference to their colour rendering properties.
9. What are the characteristic features of a high rise building ?
10. Explain Kerala Cinema Regulation Act relating to electrical systems in a cinema theatre. **(10×4=40 Marks)**

P.T.O.

(Pages : 3) **1776**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is the role of National Electric Code (NEC) in system design ?
2. What are the standard values of voltages and the permitted tolerances as specified by NEC ?
3. How are building services classified ?
4. Mention some energy conservation techniques commonly adopted.
5. Why is it necessary to provide earthing in an electrical installation ? State the IE Rules regarding the points to be earthed in an electrical installation.
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9. What are the characteristic features of a high rise building ?
10. Explain Kerala Cinema Regulation Act relating to electrical systems in a cinema theatre. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) Briefly explain the significance of following IS codes.
IS 3043, IS 732, IS 2675, IS 2309 **8**

b) Explain the precommissioning test of domestic installations. **8**

c) Explain the working of an ELCB. **4**

OR

12. A two Bedroom domestic building has following loads.

Sl. No.	Room Type	Light Load	5 A Socket	Fan Load	15 A Socket
1	Bed rooms	20 W CFL 2 no.s/each room	2 no.s/each room	1 no./each room	1 no./each room
2	Drawing room cum Dining room	20 W CFL 4 no.s	4 no.s	2 no.s	
3	Kitchen	20 W CFL 2 no.s	1 no.	Exhaust fan 1 no.	2 no.s
4	Work Area + Toilet	20 W CFL = 4 no.s	2 no.s	1 no.	1 no.

Determine the total connected load, suggest the type of supply and determine number of subcircuits required for the installation. Give specifications of main switch, distribution board and draw the schematic diagram. **20**

Module – II

13. A small industry 20 m × 10 m size has the following connected load.
7.5 KW, 415 V, three-phase I/Motor – 1 No.
3.7 KW, 415 V, three phase I/Motor – 4 No.s
2.2 KW, 415 V, three phase I/Motor – 2 No.s
0.735 KW, 240 V, single phase I/Motor – 3 No.s
6 No.s of ceiling fans, 6 No. of 5 A

Socket points, 3 No. 15 A socket points, 3 No.s, 300 mm sweep exhaust fan. Provide illumination level of 200 lux using 2 × 40 W fluorescent lamps with a lumen output of 5200 lumens.

1) Design the size of cables to be used
2) Decide the ratings of switch fuse units of the switch board
3) Prepare a schematic wiring diagram for the industry. **20**

OR

14. Design the earthing system using plate electrodes for an industry having 11 kV/400 V, 1 MVA transformer with 5% reactance. The industry is fed by a substation 3 Km away by overhead lines of conductors 100 sq.mm. with spacing 1 m Fault level at substation is 250 MVA. Assume soil resistivity as 55 Ωm. **20**

Module – III

15. a) Explain the requirements of a Good lighting scheme. **8**

    b) Write short notes on the design of electrical system related to 1) fire fighting 2) lifts. **(6+6)**

OR

16. An ac cinema theatre has a seating capacity of 800 people. Design the electrical installation, show the details of all electrical fittings, size of cables, switch gears and draw the detailed schematic diagram. **20**

.arks)

(Pages : 3) **6032**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.803 ELECTRICAL SYSTEM DESIGN (E)

Time: 3 Hours Max. Marks: 100

Instructions : *Answer **all** questions in Part – **A** and **one** question from **each** module in Part – **B**.*

PART – A

1. What are the areas of electrical installations covered in National Electric Code ?
2. Write the safety aspects applicable to low and medium voltage installations.
3. Give the number of rules listed in the Indian Electricity Rules 1956 and write three important rules.
4. Mention the standard values of voltages and their permitted variations.
5. Explain the calculation of TR for air-conditioning systems.
6. Mention the differences between ELCB and MCB.
7. Explain the different factors to be considered for the selection of cables.
8. Write short notes on pipe earthing and mat earthing.
9. Explain the necessity of Kerala Cinema Regulation Act 1958.
10. Explain the different factors to be considered for good lighting schemes.

(10×4=40 Marks)

PART – B

Answer **any one** question from **each** module :

Module – I

11. a) Briefly explain the electrical services in buildings. **5**
    b) Draw the connection diagram for a multiple call bell system. **5**
    c) Write short notes on energy conservation. **5**
    d) Explain any two precommissioning tests of domestic installations. **5**

P.T.O.

12. Figure 1 shows the plan of a domestic building which is to be provided with electrical connection. Provide sufficient number of light and fan points, 5 A socket outlets. 16 A socket outlets and bed room air conditioner based on the provisions of national electric code. Suggest the type of supply, number of sub circuits and specifications of MS, DB, ELCB, MCBs and also draw the installation plan and schematic diagram.

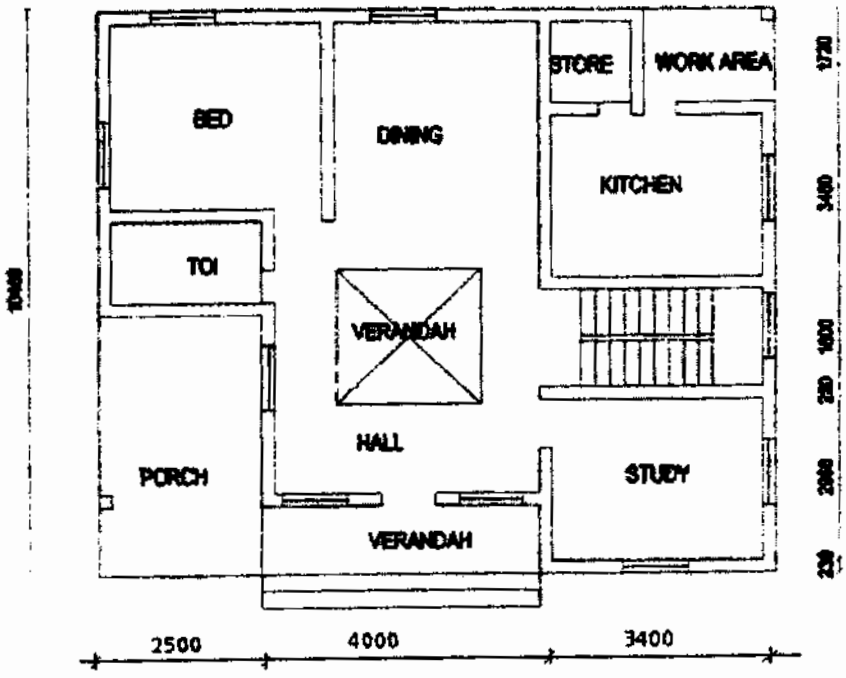

Figure 1

20

Module – II

13. A small workshop has to be equipped with the following loads.

    1) 5 kW, 415 V, 3-Phase, motor – 2 Nos.
    2) 3 kW, 415 V, 3-Phase, motor – 2 Nos.
    3) 1 kW, 240 V, 1-Phase, motor – 2 Nos.
    4) Light load and fan load of 4 kW.

    Design the electrical installation for this workshop and draw the installation plan and schematic diagram. For illuminating the work shop area, 24 nos. of 50 W twin fluorescent lamp fittings are proposed to be used. Any missing data can be assumed. 20

14. An indoor substation 11 kV/415 V is to be erected at the terminal point of existing 11 kV overhead line. The 11 kV/415 V transformer is to feed the following loads. Production shop having a load of 400 kW of 3 phase and single phase motors. Foundry shop has a load of 150 kW and administration block having light and fan loads of 100 kW. Design and estimate the quantity of materials required for the installation of the indoor substation (Assume the pf to be 0.8 and load factor to be 0.6) and prepare the schematic diagram. **20**

Module – III

15. a) Explain the factors to be considered for the selection of flood lighting source. **6**

    b) Write short notes on the installations of lifts and escalators. **7**

    c) Discuss the design of electrical system related to fire fighting. **7**

16. Design an electrical system for a cinema theatre of total area 900 sq.m. Provide sufficient number of stage light, globe lights, ceiling light, exhaust fans., exit lights, air conditioning for the hall etc. Draw the entire schematic diagram for the installation including the backup provision. **20**

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8. Explain saturation and dead zone non linearities associated with non-linear system.

9. With neat sketch explain how stability analysis is done using describing function method.

10. State Liapunov's stability theorems. **(10×4=40 Marks)**

PART – B

Each question carries **20** marks.

Module – I

11. a) Obtain state space representation of the given system in
    i) Observable canonical form and
    ii) Controllable canonical form

$$\frac{Y(s)}{U(s)} = \frac{7s^2 + 4s + 2}{s^3 + 8s^2 + 2s + 5}$$

b) Obtain the transfer function representation of the given system.

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ -1 & -1 & 0 \\ 1 & 0 & 0 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} u$$

$$Y = [0\ 0\ 1]\ X$$

12. a) Explain the concept of controllability and observability with the help of the given state space model

$$\dot{X} = \begin{bmatrix} -2 & 1 \\ 0 & 1 \end{bmatrix} X + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u\ ;\ Y = [1\ 1]\ X$$

b) Consider an LTI system described by state equation

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} X + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$$

Design a feedback controller such that closed loop poles are placed at $-2, -1 \pm j$.

Module – II

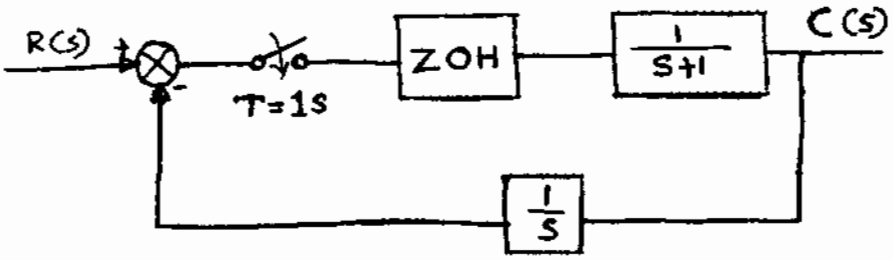
13. a) Explain different methods for signal reconstruction.

b) Solve the difference equation

$y(k) + 5y(k-1) + 6y(k-2) = 2$

$y(-2) = y(-1) = y(0) = 0$

c) For the sampled data control system shown in figure, obtain the step response



14. a) Characteristic equation of a discrete system is

$z^4 - 1.368\,z^3 + 0.4\,z^2 + 0.8\,z + 0.002 = 0$

Check the stability of the system using Jury's test.

b) Find inverse z-transform of the given system

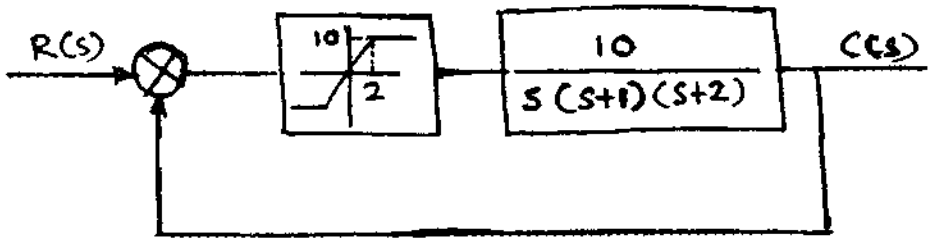
$$F(z) = \frac{1 + z^{-1} + 2z^{-2} - z^{-3} + 3z^{-4}}{1 + 2z^{-1} + 3z^{-2}}$$

c) What is pulse transfer function ? How it is obtained from G(s) ?

Module – III

15. a) How non-linearities are classified ? Derive the describing function of saturation non linearity.

    b) For a non linear system shown in figure, investigate the possibility of limit cycle. If limit cycle exist find its amplitude and frequency.



16. a) What is phase plane analysis ? How is it used for analysing non-linear system ?

    b) $A = \begin{bmatrix} -1 & 1 \\ 2 & -3 \end{bmatrix}$, find Liapunov's function and test the stability of the system.

(Pages : 2)

6036

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Examination, November 2012
(2008 Scheme)
08.805 (Elective IV) (c) SOFT COMPUTING TECHNIQUES (E)

Time: 3 Hours

Max. Marks: 100

PART – A

(Answer **all** questions.)

1 Differentiate between constrained and unconstrained optimisation.

2. Explain the steepest descent method.

3. Discuss derivative based optimisation.

4. Explain the McCulloch-Pitts model.

5. List the characteristics of neural networks.

3. What are competitive learning networks ?

7. Describe the operations and properties of fuzzy sets.

8. What is defuzzification ?

9. Discuss the fuzzy rule base system.

10. Distinguish between fuzzy and crisp sets. **(10×4=40 Marks)**

PART – B

(Answer **one** question from **each** Module.)

Module – I

11. a) Explain the classical Newton's method for optimisation. 8

b) Describe the significance of genetic algorithm in optimisation. 12

OR

P.T.O.

12. a) Explain simulated annealing. **14**

    b) What is derivative free optimisation ? **6**

Module – II

13. a) What are Kohonen networks ? **12**

    b) What are the limitations of perceptron model ? **8**

OR

14. a) Explain the perceptron model for a back propagation network. **12**

    b) Discuss radial basis function networks. **8**

Module – III

15. a) Explain fuzzy relations. **6**

    b) Discuss any four methods for assigning membership values to fuzzy variables. **14**

OR

16. a) Describe the different methods for defuzzification. **12**

    b) Explain fuzzy logic control. **8**

(Pages : 3) **6033**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.804 : POWER SEMI CONDUCTOR DRIVES (E)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer **all** questions from Part **A** and **one** question from **each** Module of Part **B**.*

*2) **Each** question carries **4** marks in Part **A**.*

PART – A

1. What are the different components of load torque ? Explain.
2. Draw and explain the torque speed characteristics of a fan and a coiler drive.
3. Discuss steady state stability criteria for a motor load system.
4. What is a cyclo converter ? Enumerate some of its industrial applications.
5. A 220V, 1500 rpm, 10 A separately excited dc motor is fed from a single phase fully controlled rectifies with an ac source voltage of 220V, 50 Hz. Ra = 2Ω. Under continuous conduction mode, calculate firing angle for half the rated motor torque and 500 rpm.
6. Derive the expression for output voltage of a step up chopper.
7. Explain the operation of a two quadrant chopper drive under forward regenerative braking mode.
8. Variable frequency control of induction motor is more efficient than stator voltage control, why ?
9. Discuss the operation of voltage source inverter drive.
10. Draw and explain about the speed torque characteristics of a 3 phase induction motor with v/f control. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) Explain the four quadrant operation of motor during a hoist load and draw torque speed characteristics. **10**

b) Describe the basic principle of working of single phase to single phase step down bridge type cyclo converter with the help of voltage and current wave forms for discontinuous mode of conduction. **10**

OR

12. a) Derive the expressions for equivalent values of drive parameters for loads with rotational and translational motion. **8**

b) A 3 phase to single phase cyclo converter employs 3 pulse positive and negative group converters. Each converter is supplied from 400V, 50 Hz supply through a delta/star transformer whose per phase turns ratio is 3:1. For an output frequency of 2 Hz, the load reactance is $W_0L = 3\Omega$. The load resistance is 4Ω. The commutation overlap and thyristor turn-off time limit the firing angle in the inversion mode to 165°. Compute

a) peak value of rms output voltage

b) rms output current and

c) output power. **12**

Module – II

13. a) Discuss the speed control of a separately excited d.c. shunt motor using single phase half controlled rectifier with relevant waveforms for continuous conduction. Also derive an expression for the average value of armature voltage. **10**

b) Draw the circuit diagram and explain the operation of a 4 quadrant chopper fed d.c. motor. **10**

OR

14. a) Explain how the speed of a separately excited d.c. motor can be controlled in all the 4 quadrants using a dual converter, when the dual converter is operating in circulating current mode. **10**

b) A d.c. series motor fed from 400 V d.c. source through a chopper, has the following parameters: $r_a = 0.05\Omega$, $r_s = 0.007\Omega$, $k = 5\times10^{-3}$ Nm/amp^2. The average armature current of 200 A is ripple free. For a chopper duty cycle of 50%, determine

1) input power from the source
2) motor speed and
3) motor torque. **10**

Module – III

15. a) Explain the slip power recovery scheme for the speed control of 3 phase slip ring induction motor. **10**

b) A 3 phase, 400 V, 50 Hz, 10 kW, 960 rpm, 6 pole star connected slip-ring induction motor has the following constants referred to the stator

$R_s = 0.4\Omega$, $R_r' = 0.6\Omega$, $X_S = X_r' = 1.4\Omega$

The motor drives a fan load at 960 rpm. The stator to rotor turns ration is 2.

i) What resistance must be connected in each phase of the rotor circuit to reduce the speed to 800 rpm ?

ii) When the motor is controlled by static rotor resistance control, calculate the value of external resistance so that motor runs at 800 rpm for duty ratio of 0.5 ? **10**

OR

16. a) Explain the different methods of speed control available for squirrel cage induction motor drives. **10**

b) What are the various methods of speed control of synchronous motor ? Explain any one method in detail. **10**

14. a) Explain how the speed of a separately excited d.c. motor can be controlled in all the 4 quadrants using a dual converter, when the dual converter is operating in circulating current mode. **10**

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2) motor speed and
3) motor torque. **10**

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1) input power from the source
2) motor speed and
3) motor torque. **10**

Module – III

15. a) Explain the slip power recovery scheme for the speed control of 3 phase slip ring induction motor. **10**

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i) What resistance must be connected in each phase of the rotor circuit to reduce the speed to 800 rpm ?

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16. a) Explain the different methods of speed control available for squirrel cage induction motor drives. **10**

b) What are the various methods of speed control of synchronous motor ? Explain any one method in detail. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B. Tech. Degree Examination, November 2012
(2008 Scheme)
08.801 : ADVANCED CONTROL THEORY (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Prove that state space model of a system is not unique.
2. What are the advantages in choosing phase variables for state space modelling ?
3. Define state, state variable, state space and state trajectory.
4. What are the advantages of state space analysis compared to classical approach ?
5. State initial and final value theorems as referred to z-transforms.
6. Explain Shannon's sampling theorem.
7. What is pulse transfer function ?
8. What are the limitations of describing function method for analysis of non-linear systems ?
9. Check whether the following function is positive definite or not.

   $Q = 5x_1^2 + 5x_2^2 + 5x_3^2 + 10x_1x_2 + 20x_2x_3 + 30x_3x_1$.

10. State Liapunov's stability theorems.

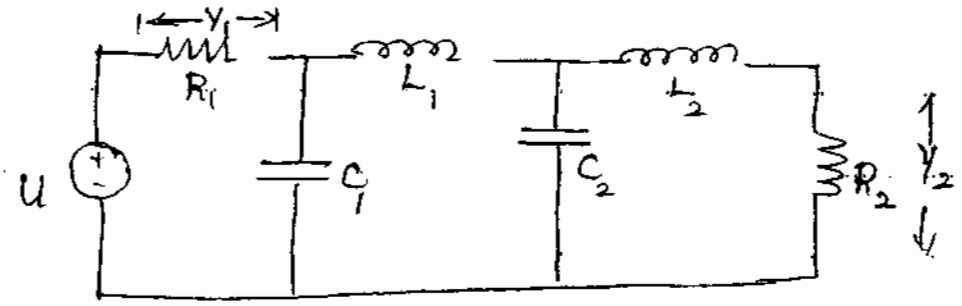
P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – 1

11. a) Obtain the state space model of the following electrical system.



b) Obtain the state space representation in observable canonical form for the following transfer function.

$$\frac{y(s)}{u(s)} = \frac{s^2 + 3s + 3}{s^3 + 2s^2 + 3s + 1}$$

12. a) Solve the state equation : $\dot{X} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X ; x(0) = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$. Find the state transition matrix.

b) Check the controllability and observability of the following system :

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \\ \dot{x}_3 \end{bmatrix} = \begin{bmatrix} 2 & -2 & 3 \\ 1 & 1 & 1 \\ 1 & 3 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 11 \\ 1 \\ -14 \end{bmatrix} 4$$

$$y = \begin{bmatrix} -3 & 5 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

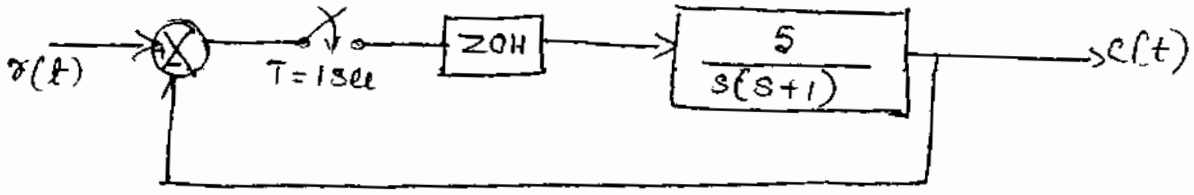
Module – 2

13. a) Solve the difference equation using z-transforms.

$x(k) - 3x(k-1) + 2x(k-2) = 4^k$

$x(k) = 0$ for $k < 0$.

b) Obtain the pulse transfer function of the following sampled data control system :



14. a) Draw the block diagram of a sampled data control system and explain the advantages of sampled data control systems.

b) Explain Jury's stability test and find the stability of the following system.

$F(z) = z^4 - 1.368z^3 + 0.4z^2 + 0.8z + 0.002$.

Module – 3

15. a) With the help of neat diagrams explain the characteristics of non-linear sytems.

b) A system is described by

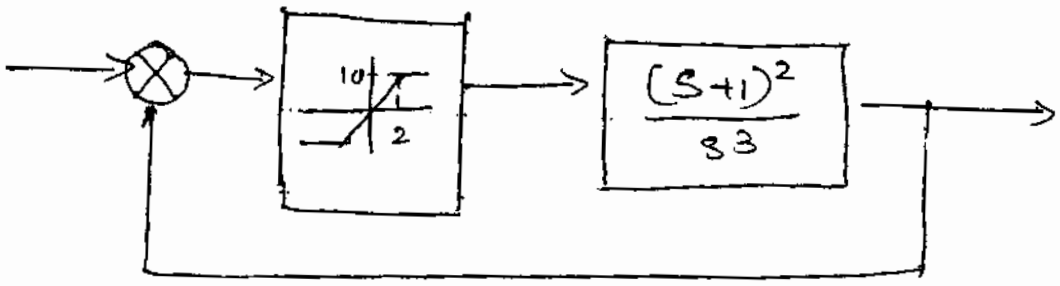
$\dot{x}_1 = -x_1 + x_2 + x_1(x_1^2 + x_2^2)$

$\dot{x}_2 = -x_1 - x_2 + x_2(x_1^2 + x_2^2)$

Determine the asymptotic stability using Liapunov's II method.

16. a) Derive the describing function of relay non-linearly.

b)



Investigate the stability of the above systems. If limit cycle exist, find out the magnitude, frequency and nature of limit cycle.

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : ELECTRICAL MACHINE DESIGN (E)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part – **A** and **one** question from **each** module of Part – **B**.*

PART – A

1. Explain the properties and applications of magnetic materials used in electrical machines.
2. Explain the different types of ventilation systems used in electrical machines.
3. Describe the various methods of cooling transformers of large capacity.
4. What are the different types of transformer cross sections ?
5. Derive the relation between real and apparent flux density in highly saturated armatures teeth'.
6. What are the factors to be considered for the selection of no. of poles in a DC machine ?
7. Mention the factors that governing the choice of no. of armature slots in a DC machine.
8. Derive the output equation of an alternator.
9. Estimate various aspects to be considered when selecting the airgap length of an induction motor.
10. Compare the analysis and synthesis method of computer aided design of electrical machines ? **(10×4=40 Marks)**

PART – B

Module – I

11. a) What is Carter's coefficient ? What is its usefulness in the design of electrical machines ? **4**

    b) A transformer has a final steady temperature rise of 75°C at full load and a heating time constant of 3 hr. The copper loss at full load is twice the iron loss. Calculate the temperature rise of the transformer at the end of the following load cycle after starting from cold conditions, full load - 2hr, no load $1^1/_2$ hr., 25% overload 1 hr. **16**

OR

P.T.O.

12. a) Derive the output equation of a 3 phase transformer ? **5**

    b) Determine the main dimensions of the core, no. of turns and the cross section of the conductors for a 5 kVA, 11000/400 V, 50 Hz, single phase core type distribution transformer. The net conductor area in the window is 0.6 times the net cross section of iron in the core. Assume a square cross section for the core, a flux, density 1Wb/m^2, a current density 1.4 A/mm^2 and window space factor 0.2. The height of window is 3 times its width. **15**

Module – II

13. a) Deduce an expression for the MMF required for the airgap of an armature with slots and ducts. **8**

    b) Determine the apparent flux density in the teeth of a DC machine when the real flux density is 2.15 wb/m^2. slot pitch 28 mm, slot width 10 mm and the gross. Core length 0.35 m. The no. of ventilating ducts is 4, each 10 mm wide. The magnetising force for a flux density of 2.15 wb/m^2 is 55000 At/m. The iron stacking factor is 0.9. **12**

OR

14. Determine the main dimensions, no. of poles and length of airgap of a 600 kw, 500 V, 900 rpm DC generator. Assume average gap density = 0.6 wb/m^2, ampere conductors/m = 35,000, the ratio of pole arc to pole pitch = 0.75, full load efficiency = 91%. The mmf required for air gap is 50% of armature mmf and gap contraction factor is 1.15. **20**

Module – III

15. a) Explain step by step design procedure for field winding of synchronous machine. **8**

    b) Determine the main dimensions for a 1000 kVA, 50 Hz, 3 phase, 375 rpm alternator. The average air gap flux density is 0.55 wb/m^2 and the ampere conductors/metre are 28,000. Use rectangular poles and assume ratio of core length to pole pitch as 2. **12**

OR

16. a) Explain the factors to be considered for the choice of specific loadings of an induction motor. **6**

    b) Determine the approximate diameter and length of stator core, the no. of stator slots, and the no. of stator conductors for a11KW, 400 V, 3 phase, 4 pole, 1425 rpm, delta connected induction motor. Bav = 0.45 wb/m^2, ac = 23000 ampere conductors/metre; full load efficiency = 0.85, power factor = 0.88, ratio of core length to pole pitch - 1. The stator employs a double layer winding. **14**

(Pages : 2) **6042**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.806 (Elective – V) (b) : ADVANCED ELECTRONIC COMMUNICATION (E)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions :

1. Differentiate between land line communication and satellite communication.
2. What happens, when a signal is sampled at less than the Nyquist rate ?
3. Briefly explain, what is meant by companding ?
4. Explain briefly the difference between single-mode and multi-mode fibre. Which give better performance ? Why ?
5. Name and compare two types of photo detectors that are used in optical communication.
6. Explain frequency hopping.
7. Explain the basic principle of computer communication.
8. What is the name of protocol used by internet ?
9. What steps are necessary to setup communication between modems ?
10. Write short notes on Intranet. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one full** question from **each** Module.

MODULE – I

11. a) Explain the basic principle of ISDN. **10**

    b) List and describe the three multiple-access systems in common use. **10**

12. a) With the help of block diagram, explain the working of PCM receiver. **10**

    b) Explain three types of analog pulse modulation techniques. **10**

MODULE – II

13. a) Why are laser diodes preferred for use with single mode fibre ? **10**

    b) Draw the cross-section of LED and describe its operation. **10**

14. a) Explain direct sequence system of spread spectrum communication. **10**

    b) How do spread spectrum signals reduce the effect of multipath fading ? **10**

MODULE – III

15. a) Write short notes on FDMA and CDMA. **10**

    b) Explain X.25 packet network protocol. **10**

16. a) Why is IP described as a connectionless protocol ? **10**

    b) Explain ATM network. **10**

(Pages : 2) **1786**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.806 (Elective – V) (b) : ADVANCED ELECTRONIC COMMUNICATION (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What are repeaters ? Why are they needed in long-haul terrestrial microwave systems ?
2. With the help of figure list three types of analog pulse modulation techniques.
3. Find maximum dynamic range for linear PCM system using 16-bit quantizing.
4. Explain the differences between transmissive and reflective optic couplers.
5. Draw a cross section of LED and describe its operation.
6. Compare frequency hopping and direct sequence spread spectrum system.
7. Explain the basic principle of computer communication.
8. Why IP described as a connection less protocol ?
9. Explain the difference between the multiple access and multiplexing.
10. Write short note on Intranet. **(10×4=40 Marks)**

PART – B

Answer **any one** full question from **each** Module.

Module – I

11. a) Explain the advantages and disadvantages of satellite communication system. **10**
    b) With the help of block diagram explain the working of PCM transmitter. **10**

P.T.O.

12. a) For a PCM signal, describe the effect of
    i) Increasing the sampling rate.
    ii) Increasing the number of bits per sample **10**

    b) Explain pulse-code modulation. **10**

Module – II

13. a) Draw a cross section of laser diode and describe its operation. **10**

    b) Explain the advantages of coherent optical communication system. **10**

14. a) How can the receives decode a spread spectrum signal that is below the noise level ? **10**

    b) Explain time hopping. **10**

Module – III

15. a) Explain in detail the different services provided by Internet. **10**

    b) How does CSMA/CD protocol allow a node to decide whether to transmit. **10**

16. a) Explain OSI protocol with a neat architecture. **10**

    b) What is the function of a domain named server ? **10**

(Pages : 2) **1787**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.806 (Elective – V) (c) : HIGH VOLTAGE ENGINEERING (E)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part – **A** and **one full** question from **each** Module in Part – **B**.*

PART – A

1. Draw and explain a circuit for generating dc voltage of $2V_{max}$ with respect to ground.
2. What is the principle of operation of electrostatic machines ?
3. Explain the working of a Tesla coil.
4. Define the terms : (i) Impulse flashover voltage and (ii) Impulse puncture voltage.
5. How rod gap provide protection against lightning ?
6. What is the significance of BIL high voltage equipments ?
7. How over voltages are classified in power system ? Explain in details.
8. Draw the equivalent circuit of insulating material during partial discharges.
9. What is the principle of live line maintenance ?
10. What are the biological effects on design of HV and UHV line design ?

(10×4=40 Marks)

PART – B

Module – I

11. a) Explain the working of a resonant transformer with the help of a neat sketch. What the merits and demerits compared to cascade transformer ? **10**

    b) With the help of a neat sketch explain the working of a 4 stage impulse generator. Obtain its single stage equivalent circuit. **10**

P.T.O.

12. a) Explain the working of Vande -Graff generator with its merits and demerits. **10**

    b) An 8 stage impulse generator has 0.12 μ f capacitors rated at 167 kV. What is the maximum discharge energy ? If it has to produce a 1/50 μ s wave form across a load capacitor of 1500 pF. Find the values of wave front and wave tail resistance . **10**

Module – II

13. a) Explain the significance of over voltages in power system. **5**

    b) Draw and explain the typical volt-time characteristics in connection with insulation break down. **10**

    c) Discuss how switching over voltages are produced in power system. **5**

14. a) Explain how rod gap and lightning arresters protect power system equipments under external over voltage condition. **10**

    b) Explain how insulation co-ordination in a typical substation is done with the help of neat volt-time characteristics. **10**

Module – III

15. a) What are the different test done on HV bushings ? Mention the procedure for testing. **10**

    b) Explain how impulse testing is done on transformer with the help of suitable circuit diagram. **10**

16. a) Explain with neat sketch how will you defect partial discharges using straight defectors. **10**

    b) Explain the different tests to be conducted on HV cables. **10**

(Pages : 2) **1782**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.805 (Elective – IV) (e) : HVDC AND FACTS (E)

Time : 3 Hours Max. Marks : 100

***Instruction**: Answer **all** questions from Part – **A**. **Each** carries **4** marks.*

PART – A

1. What is load compensation ? What are its objectives ?
2. Draw the simple equivalent circuit of any FACTS devices. Give the control variables for SVC, SSSC and STATCOM.
3. What do you mean by a Symmetrical Line and what is the significance of Surge Impedance Loading ?
4. What are the different configurations of SVC ?
5. What is the major issue of series compensation in transmission lines ? How is it addressed by TCSC ?
6. Draw and explain the V-I characteristics of a typical STATCOM.
7. What are the advantages of UPFC ? Where can they be connected in the system ?
8. What are the advantages of HVDC transmission ?
9. Give the issues associated with DC circuit breakers.
10. What are the advantages of operating a DC link parallel with an AC line ?

(10×4=40 Marks)

PART – B

Answer **two** questions **each** from **each** Module. **Each** question carries **10** marks **each**.

Module – I

11. Derive the equivalent circuit of an uncompensated line.
12. Derive the equivalent circuit of a line compensated by a series compensator at the midpoint.

P.T.O.

13. Compare and contrast the performance of lines with distributed and passive compensations.

14. List the advantages of using FACTS devices in transmission and distribution systems.

Module – II

15. Draw the control characteristic of an SVC and derive the expression for voltage and power.

16. What are the various operating configurations of a TCSC ?

17. What is the principle of operation of a typical STATCOM ? Draw one example circuit and illustrate.

18. Explain the different configurations of TCPAR.

Module – III

19. Explain the different types of DC Links.

20. What are the methods of control adopted for HVDC links ?

21. What are the various equipments required at converter stations ?

22. What is the significance of reactive power requirements at converter stations ?

13. Compare and contrast the performance of lines with distributed and passive compensations.

14. List the advantages of using FACTS devices in transmission and distribution systems.

Module – II

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(Pages : 2) **1777**

Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.804 : POWER SEMI CONDUCTOR DRIVES (E)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part **A** and **one** question from **each** Module of Part **B**.*

PART – A

1. Differentiate between active torque and passive torque.
2. Derive the fundamental equations of motor load system.
3. Explain the torque speed characteristics of hoist and fan.
4. What is a cyclo-converter ? Enumerate some of its industrial applications.
5. Describe the regenerative braking of dc motor using chopper.
6. Write down the basic performance equations for a dc series motor and sketch its characteristics indicating the two modes of operation.
7. What are the advantages of voltage source inverter fed drive.
8. Explain Kramer drive.
9. What are the advantages of v/f control of induction motors ?
10. Describe, with appropriate voltage and current wave forms, the working of a single phase fullconverter fed dc drive. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Draw the block diagram of an electric drive system. Explain the functions of each block. **12**

    b) Derive the output voltage equation of 'm' phase cycloconverter. **8**

OR

12. a) Describe the principle of working of a 3ϕ to 1ϕ cycloconverter for continuous conduction. Draw the circuit diagram and relavant waveforms. **13**

    b) Explain load commutated cycloconverters.

Module – II

13. a) What are the different methods of braking applicable to electric motors ? Explain briefly. **10**

    b) A 200V, 1000 rpm, 10A separately-excited dc motor has an armature resistance of 1 ohm. It is fed from a single phase full converter with an ac source voltage of 230 V, 50 Hz. Armature current is continuous calculate
    a) Motor speed at the firing angle of 30° and torque of 8 Nm.
    b) Developed torque at firing angle of 45° and speed of 700 rpm. **10**

OR

14. a) Describe the four quadrant operation of a dc motor using single phase dc converter drive. **8**

    b) Derive the expression for I_{max} and I_{min} for first quadrant chopper fed dc motor. **12**

Module – III

15. a) Explain the different methods of speed control available for induction motor drives. **10**

    b) A three phase squirrel cage induction motor drives a blower type load. No load rotational losses are negligible. Show that the rotor current is maximum when motor runs at a slip $S = \frac{1}{3}$. Find also an expression for maximum rates current. **10**

OR

16. a) Explain the slip power recovery schemes at sub-synchronous and super synchronous speed control of 3 phase slip ring induction motors. **10**

    b) Explain the operation of a voltage source inverter fed synchronous motor drive. **10**

(Pages : 2) **6031**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : ELECTRICAL MACHINE DESIGN (E)

Time : 3 Hours Max. Marks : 100

***Instructions** : Answer **all** questions from Part – **A** and **one** question from **each** module of Part – **B**.*

PART – A

1. Explain the properties and applications of magnetic materials used in electrical machines.
2. Explain the different types of ventilation systems used in electrical machines.
3. Describe the various methods of cooling transformers of large capacity.
4. What are the different types of transformer cross sections ?
5. Derive the relation between real and apparent flux density in highly saturated armatures teeth'.
6. What are the factors to be considered for the selection of no. of poles in a DC machine ?
7. Mention the factors that governing the choice of no. of armature slots in a DC machine.
8. Derive the output equation of an alternator.
9. Estimate various aspects to be considered when selecting the airgap length of an induction motor.
10. Compare the analysis and synthesis method of computer aided design of electrical machines ? **(10×4=40 Marks)**

PART – B

Module – I

11. a) What is Carter's coefficient ? What is its usefulness in the design of electrical machines ? **4**

    b) A transformer has a final steady temperature rise of 75°C at full load and a heating time constant of 3 hr. The copper loss at full load is twice the iron loss. Calculate the temperature rise of the transformer at the end of the following load cycle after starting from cold conditions, full load - 2hr, no load $1^1/_2$ hr., 25% overload 1 hr. **16**

OR

12. a) Derive the output equation of a 3 phase transformer ? **5**

b) Determine the main dimensions of the core, no. of turns and the cross section of the conductors for a 5 kVA, 11000/400 V, 50 Hz, single phase core type distribution transformer. The net conductor area in the window is 0.6 times the net cross section of iron in the core. Assume a square cross section for the core, a flux, density 1Wb/m^2, a current density 1.4 A/mm^2 and window space factor 0.2. The height of window is 3 times its width. **15**

Module – II

13. a) Deduce an expression for the MMF required for the airgap of an armature with slots and ducts. **8**

b) Determine the apparent flux density in the teeth of a DC machine when the real flux density is 2.15 wb/m^2. slot pitch 28 mm, slot width 10 mm and the gross. Core length 0.35 m. The no. of ventilating ducts is 4, each 10 mm wide. The magnetising force for a flux density of 2.15 wb/m^2 is 55000 At/m. The iron stacking factor is 0.9. **12**

OR

14. Determine the main dimensions, no. of poles and length of airgap of a 600 kw, 500 V, 900 rpm DC generator. Assume average gap density = 0.6 wb/m^2, ampere conductors/m = 35,000, the ratio of pole arc to pole pitch = 0.75, full load efficiency = 91%. The mmf required for air gap is 50% of armature mmf and gap contraction factor is 1.15. **20**

Module – III

15. a) Explain step by step design procedure for field winding of synchronous machine. **8**

b) Determine the main dimensions for a 1000 kVA, 50 Hz, 3 phase, 375 rpm alternator. The average air gap flux density is 0.55 wb/m^2 and the ampere conductors/metre are 28,000. Use rectangular poles and assume ratio of core length to pole pitch as 2. **12**

OR

16. a) Explain the factors to be considered for the choice of specific loadings of an induction motor. **6**

b) Determine the approximate diameter and length of stator core, the no. of stator slots, and the no. of stator conductors for a11KW, 400 V, 3 phase, 4 pole, 1425 rpm, delta connected induction motor. Bav = 0.45 wb/m^2, ac = 23000 ampere conductors/metre; full load efficiency = 0.85, power factor = 0.88, ratio of core length to pole pitch - 1. The stator employs a double layer winding. **14**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.802 : ELECTRICAL MACHINE DESIGN (E)

Time : 3 Hours Max. Marks: 100

***Instructions** : Answer **all** questions from Part **A** and **one full** question from **every** Module of Part **B**.*

PART – A

1. Explain the factors to be considered in the design of electrical machines.
2. Distinguish between Power and Distribution Transformers with particular emphasis on the design aspect.
3. Explain the different types of ratings of electrical machines.
4. Why the core of a core type transformer stepped ? Explain.
5. What are the factors to be considered in selecting the number of poles of a dc machine ?
6. Explain the significance of Carter's coefficient.
7. Mention the factors to be considered in the design of shunt field winding of a dc machine.
8. How the peripheral velocity is significant in the design of alternators ?
9. Explain the method of obtaining the end ring current of a squirrel cage induction motor.
10. What are the advantages of CAD ? **(10x4=40 Marks)**

P.T.O.

PART – B

Module – 1

11. a) Explain how the insulating materials used in electrical machines are classified. **8**

    b) A transformer has a final steady temperature rise of 75°C at full load and a heating time constant of 3 hours. The copper loss at full load is twice the iron loss. Calculate the temperature rise of the transformer at the end of the following load cycle after starting from cold conditions.

    Full load – 2 hrs; no load – 1 hr, 20% over load – 1 hour. **12**

OR

12. a) Why CRGO Silicon Steel laminations are used in the fabrication of transformer core ? **6**

    b) Estimate the number of cooling tubes required for the tank of a 400 kVA, Single phase oil immersed natural cooled transformer. Tank is 150 cm in height, 100 cm long, 60 cm width. Length of the tube is 127.5 cm. Full load losses to be dissipated is 6.34 kW. Mean temperature rise of tank wall is 35°C. Sketch the plan showing the arrangement of cooling tubes. Assume missing data suitably. **14**

Module – 2

13. a) Derive the output equation of a DC machine. **8**

    b) A design is required for a 50 kW, 4-pole, 600 rpm, dc shunt generator, the full load terminal voltage being 220 V. If the maximum gap density is 0.83 Wb/m^2 and the armature ampere conductors/m are 30,000, Calculate suitable dimensions of armature core to give a square pole face. Assume that the full load armature voltage drop is 3% of rated terminal voltage and the field current is 1% of rated full load current. Ratio of pole arc to pole pitch is 0.67. **12**

OR

14. The following particulars refer to the shunt field coil of a 440V, 6-pole, dc generator. MMF/pole = 7000, depth of winding = 50 mm, Length of inner turn = 1.1 m, Length of outer turn = 1.4 m, Loss radiated from outer surface excluding ends = 1400 W/m^2, space factor = 0.62, Resistivity = 0.02Ω /m and mm^2, calculate i) diameter of wire, ii) number of turns iii) Length of coil iv) Exciting current.
Assume a voltage drop of 20% of terminal voltage across the field regulator. **20**

Module – 3

15. A 1000 kVA, 3300 V, 50 Hz, 300 rpm, 3-ph alternator has 180 slots with conductors/slot = 5 and single layer winding with full pitched coils. Determine the specific electric and magnetic loadings, if the stator bore is 2 m and core length is 0.4 m. Using the same loadings, determine the corresponding data for a 1250 kVA, 3300V, 50 Hz, 250 rpm, 3-ph, star connected alternator having two circuits per phase. The machine has 60° phase spread. **20**

OR

16. a) Explain the rules for selecting the number of rotor slots in a 3-ph, squirrel cage induction motor. **8**

b) Determine the turns/ph, number of stator slots, stator conductor size and stator slot area of a 100 kW, 3-ϕ, 50 Hz, 400 V, 1450 rpm, Δ connected slip ring induction motor.

B_{av} = 0.5 T, D = 35 cm, L = 30 cm δ = 3.5 A/mm2. Space factor = 0.4
Efficiency = 0.88, power factor = 0.85. **12**

14. The following particulars refer to the shunt field coil of a 440V, 6-pole, dc generator. MMF/pole = 7000, depth of winding = 50 mm, Length of inner turn = 1.1 m, Length of outer turn = 1.4 m, Loss radiated from outer surface excluding ends = 1400 W/m^2, space factor = 0.62, Resistivity = 0.02Ω /m and mm^2, calculate i) diameter of wire, ii) number of turns iii) Length of coil iv) Exciting current.
Assume a voltage drop of 20% of terminal voltage across the field regulator. **20**

Module – 3

15. A 1000 kVA, 3300 V, 50 Hz, 300 rpm, 3-ph alternator has 180 slots with conductors/slot = 5 and single layer winding with full pitched coils. Determine the specific electric and magnetic loadings, if the stator bore is 2 m and core length is 0.4 m. Using the same loadings, determine the corresponding data for a 1250 kVA, 3300V, 50 Hz, 250 rpm, 3-ph, star connected alternator having two circuits per phase. The machine has 60° phase spread. **20**

OR

16. a) Explain the rules for selecting the number of rotor slots in a 3-ph, squirrel cage induction motor. **8**

b) Determine the turns/ph, number of stator slots, stator conductor size and stator slot area of a 100 kW, 3-ϕ, 50 Hz, 400 V, 1450 rpm, Δ connected slip ring induction motor.

B_{av} = 0.5 T, D = 35 cm, L = 30 cm δ = 3.5 A/mm2. Space factor = 0.4
Efficiency = 0.88, power factor = 0.85. **12**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08-805(C) : SOFT COMPUTING TECHNIQUES (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **4** marks **each**.

1. Distinguish between constrained and unconstrained optimisation.
2. Discuss the steps involved in genetic algorithm.
3. Show that Newton's method finds the minimum of a quadratic function in one iteration.
4. Discuss Rosenblatt's perceptron model. What are the disadvantages ?
5. Explain the effect of learning rate and momentum term in neural network training.
6. Discuss various activation functions used with neural networks.
7. What are the applications of neural networks ?
8. Explain centroid method for defuzzification.
9. What is meant by membership functions ? Explain with two examples.
10. Given A = {(1, 2), (2, 3)} and B = {(1, 2), (1, 3), (2, 3)}. Using min-max composition, find A.B.

PART – B

Answer **any one** question from **each** Module.

MODULE – 1

11. a) Discuss Steepest Descent method. **8**

    b) Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ starting from the point $X_1 = \begin{Bmatrix} 0 \\ 0 \end{Bmatrix}$ using Steepest Descent method. **12**

OR

12. a) Discuss in detail simulated annealing. **12**

    b) Explain the iterative procedure involved in Fletcher-Reeves method. **8**

P.T.O.

MODULE – 2

13. a) Explain backpropagation algorithm. **10**

    b) Briefly explain RBF networks. **10**

OR

14. a) Discuss in brief adaptive resonant theory (ART) architecture. **10**

    b) Explain self organising maps. **10**

MODULE – 3

15. Explain in detail how fuzzy logic can be applied for speed control of a DC motor. Discuss the membership functions selected, rule base and defuzzification involved. **20**

OR

16. a) Explain the difference between Mamdani and Sugeno fuzzy models. **10**

    b) Define fuzzy complements, fuzzy intersection and fuzzy unions. Discuss different axioms of each of them. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.805 (Elective – IV) (C) : SOFT COMPUTING TECHNIQUES (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is meant by derivative based optimisation ?
2. What is meant by Simulated Annealing ?
3. Distinguish between constrained and unconstrained optimization.
4. What are competitive networks ?
5. What are Kohenon Self-organising networks ? Explain.
6. What are the limitations of perceptron model ?
7. Explain the different types of activation functions used in ANN.
8. Explain how fuzzy sets find practical applications.
9. Explain the different types of membership functions used in fuzzy systems.
10. Explain how rule base is developed in a fuzzy system. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** Module.

Module – I

11. a) Explain the method of steepest descent of optimization. What are its limitations ? **8**

    b) Explain classical Newton's method of optimization. **12**

OR

12. a) Differentiate between derivative based and derivative free optimization methods. **8**

    b) Explain the following terminologies used in GA :

    i) Chromosome

    ii) Population

    iii) Fitness

    iv) Crossover

    v) Mutation. **12**

Module – II

13. a) Describe the main learning methods used in ANN. **10**

    b) What are the different classes (architectures) of ANN ? Explain briefly. **10**

OR

14. a) What are the important features of a biological neuron ? Explain how its function is brought about in an artificial neuron. **10**

    b) Describe Radial Basis Function Networks. **10**

Module – III

15. a) Discuss the choices of membership function of fuzzy system. **8**

    b) Describe the different stages in the design of a fuzzy logic controller. **12**

OR

16. a) Differentiate between crisp and fuzzy logic with the help of examples. **8**

    b) Explain the main defuzzification techniques used in Fuzzy Logic systems. **12**

(Pages : 3) **6816**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013

(2008 Scheme)

08.801 : ADVANCED CONTROL THEORY (E)

Time : 3 Hours Max. Marks : 100

***Instruction**: Answer **all** questions from Part **A**. **One full** question from **each** Module of Part **B**.*

PART – A

1. What is state and state variable ? Explain with example.
2. Mention the properties of state transition matrix.
3. Write the canonical form of state model of n^{th} order system.
4. State the condition for controllability by Gilbert's method.
5. Explain the relationship between S-plane and Z-plane poles.
6. What is zero order hold ?
7. Calculate the z transform of the system having the transfer function $\frac{1}{1+2S}$ subjected to a step input sampled at 3 Hz.
8. Explain limit cycles.
9. Explain basic concept of phase plane method.
10. What is frequency entrainment ?

PART – B

Module – 1

11. a) Determine the canonical state model of the system $\dddot{y} + 6\ddot{y} + 11\dot{y} + 6y = \dddot{u} + 8\ddot{u} + 17\dot{u} + 8u$. **10**

    b) A system characterised by the state model $\dot{x} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x + \begin{bmatrix} 0 \\ 2 \end{bmatrix} u; [x(0)] = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ u = unit step; compute state transition matrix and find the state response i.e. x(t), t > 0. **10**

OR

12. a) Consider the system $\dot{x} = \begin{bmatrix} -1 & 0 & 1 \\ 1 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} x + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u$ and output $y = [1 \quad 1 \quad 0]x$

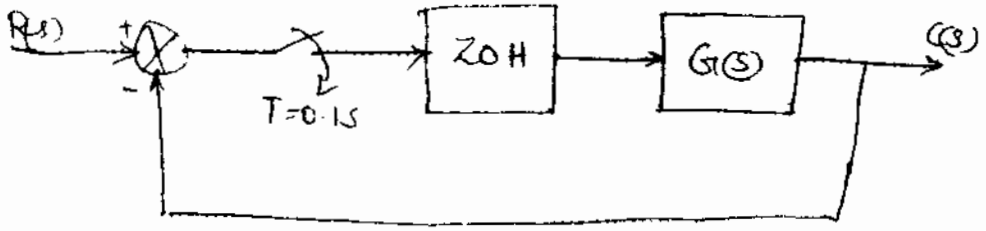
transform the system into controllable canonical form and observable canonical form. **10**

b) For the system $\dot{x} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix} u$. By using state feedback control $u = -kx$, it is desired to have closed loop poles at $s = -2 \pm j4$ and $s = -10$. Determine the state feedback gain matrix k. **10**

Module – II

13. a) Determine the z transfer function for the system $3c(k+2) + 4c(k+1) + c(k) = r(k+2) + 2r(k+1) - 3r(k)$ where $c(0) = 1$; $c(1) = -2$. Also obtain weighting sequence of the system. **10**

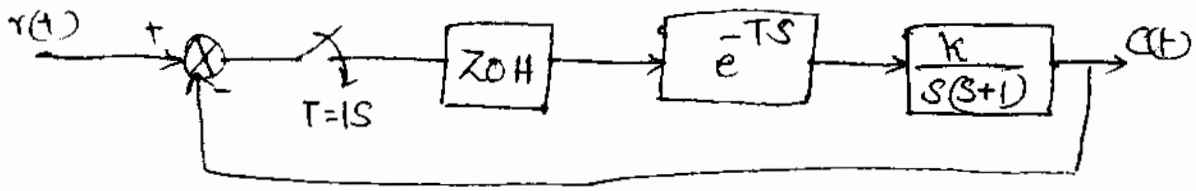
b) Find the unit step response for the temperature control system having the transfer function fo the plant as $G(s) = \frac{4}{s+2}$.



10

OR

14. a) Find the range of k for the system to be stable. **10**



b) What is samples and zero order hold ? Explain frequency response characteristics of zero order holding device. **10**

Module – III

15. a) Explain different types of non linearities. Derive the describing function for deadzone non linearity. **10**

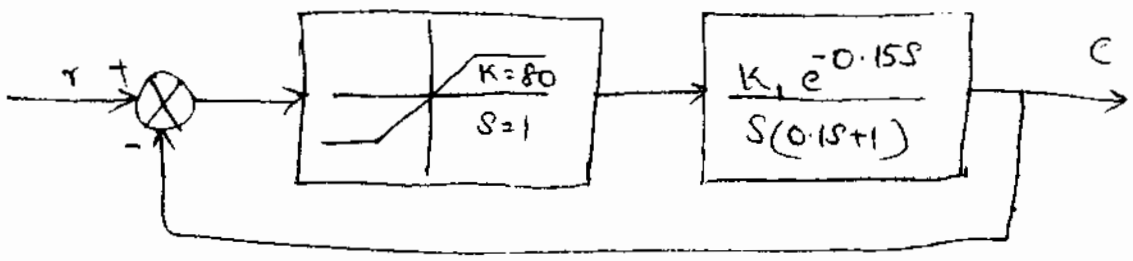
b) Determine asymptotic stability of the system by Liapunov's second method

$$\dot{X} = \begin{bmatrix} 0 & 1 \\ -1 & -1 \end{bmatrix} X$$ **10**

OR

16. a) Explain the stability analysis of non linear systems using phase trajectories. Describe the construction of phase trajectories. **10**

b) The system with saturation non linearity is given in fig. Investigate the stability of the system by describing function method. **10**



(Pages : 3) **6819**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.804 : POWER SEMI CONDUCTOR DRIVES (E)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part – **A** and **one full** question from **each** Module of Part – **B**.*

PART – A

(10×4=40 Marks)

1. What are the factors to be considered for the selection of an electric motor for a particular drive ?
2. Explain the speed torque characteristics of a motor drive with a fan and traction loads.
3. What are the different components of load torque ? Explain.
4. With the help of wave forms explain the operation of a single phase half controlled rectifier operation.
5. Describe the principle of cycloconverter operation.
6. Explain two quadrant control of a chopper fed dc drive.
7. Distinguish between circulating current and non circulating current type dual converters.
8. What are the advantages of v/f control of induction motors ?
9. What are the advantages of voltage source inverter ?
10. What is meant by slip power recovery scheme ? What are its advantages ?

P.T.O.

PART – B

Module – I

11. a) Discuss the torque-speed characteristics of the motor load system and hence derive the condition for steady state stability. **10**

    b) Draw and explain the principle of operation of a 3-phase to 1-phase cycloconverter. **10**

OR

12. a) Explain the four quadrants of operation with respect to a motor driving a hoist load. **10**

    b) A weight of 500 kg is being lifted up at a uniform speed of 1.5 m/s by a winch driven by a motor running at a speed of 1000 rpm. The moments of inertia of the motor and winch are 0.5 and 0.3 kg-m^2 respectively. Calculate the motor torque and equivalent moment of inertia referred to the motor shaft. In the absence of weight, motor develops a torque of 100 N-m when running at 1000 rpm. **10**

Module – II

13. a) Draw and explain four quadrant chopper fed dc motor. **10**

    b) The speed of a separately excited dc motor is controlled using a single phase fully controlled bridge converter. Obtain the relevant waveforms and obtain the expression for speed for continuous conduction mode of operation. **10**

OR

14. a) Explain the speed control of a d.c. motor operating in circulating current mode. **10**

    b) A 200 V, 1500 rpm, 10A separately excited dc motor has an armature resistance of 1 ohm. It is fed from a single phase full converter with an ac source voltage of 230V, 50 Hz. Armature current is continuous. Calculate.

    a) Motor speed at the firing angle of 45° and torque of 12 Nm.

    b) Developed torque at firing angle of 30° and speed of 800 rpm. **10**

Module – III

15. a) Explain the different methods of speed control available for induction motor drives. **10**

    b) Explain with diagram, speed controlling methods of synchronous motor. **10**

OR

16. a) Draw and explain family of speed torque characteristics of slip ring induction motor with respect to variations in rotor resistance. **10**

    b) Explain the slip power recovery schemes at sub synchronous and super synchronous speed control of 3 phase slip ring induction motors. **10**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013

(2008 Scheme)

08.802 : ELECTRICAL MACHINE DESIGN (E)

Time : 3 Hours Max. Marks : 100

***Instruction**: Answer **all** questions from Part **A** and **one full** question **each** from every Module of Part **B**.*

PART – A

1. What are the important specifications with regard to a transformer ?
2. Discuss the factors which affect the choice of flux density in the design of transformers.
3. How can the cooling time constant different from the heating time constant in the case of rotating electrical machines ?
4. What are the different types of transformer core sections ?
5. Explain how the size of the field winding conductor is calculated for a dc machine.
6. Discuss the factors to be considered in selecting the specific electric loading of a dc machine.
7. Explain the procedure for the design of interpole winding in a dc machine.
8. How the airgap length of a turbo alternator is designed ?
9. Explain the methods adopted to eliminate harmonic induction torques.
10. Which part of induction motor has maximum flux density ? What can be the maximum value in that part ? **(10×4=40 Marks)**

P.T.O.

PART – B

MODULE – 1

11. a) Explain the different ratings of a machine depending on load and its duration. **8**

    b) A 450 KVA transformer has a total loss of 7.5 kW at full load. The rate of heat dissipation from tank walls is 298 W/°C. The heat energy required to raise its temperature by 1°C is 0.5 kWh. Calculate i) the final steady temperature rise and the thermal time constant of the transformer ii) half hour rating of the transformer to give the same temperature rise as in i) if the copper loss at full load (450 KVA) is twice the iron loss. **12**

OR

12. a) Show that in an electrical machine, the temperature rise with respect to time follows an exponential law. **10**

    b) A 250 KVA, 6600/440 V, 50 Hz, 3-ph star/delta, core type oil immersed natural cooled transformer has the following details :

    Height of core + 2 times height of yoke = 85 cm, centre to centre distance between core limbs = 32 cm, outside diameter of HV winding = 31 cm, iron loss = 1500 W copper loss in LV winding = 1200 W, copper loss in HV winding = 2050 W.

    Calculate :

    i) Tank dimensions
    ii) Final steady temperature rise of transformer plain walled tank
    iii) No. of cooling tubes if the temperature rise is not to exceed 35°C. **10**

MODULE – 2

13. Determine the main dimensions, no. of poles and the length of air gap of a 600 kW, 500 V, 900 rpm dc generator. Assume average flux density as 0.6 Wb/m^2 and ampere conductors per meter are 35,000. The ratio of pole arc to pole pitch is 0.75 and the efficiency is 91 percent.

    The following are the design constraints :

    The peripheral speed should not exceed 40 m/s, frequency of flux reversals should not be more than 50 Hz. Current per brush not to exceed 400 A and armature mmf per pole should be less than 7500. The mmf required for the airgap is 50% of armature mmf and gap contraction factor is 1.15. **20**

OR

PART – B

MODULE – 1

11. a) Explain the different ratings of a machine depending on load and its duration. **8**

    b) A 450 KVA transformer has a total loss of 7.5 kW at full load. The rate of heat dissipation from tank walls is 298 W/°C. The heat energy required to raise its temperature by 1°C is 0.5 kWh. Calculate i) the final steady temperature rise and the thermal time constant of the transformer ii) half hour rating of the transformer to give the same temperature rise as in i) if the copper loss at full load (450 KVA) is twice the iron loss. **12**

OR

12. a) Show that in an electrical machine, the temperature rise with respect to time follows an exponential law. **10**

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    Height of core + 2 times height of yoke = 85 cm, centre to centre distance between core limbs = 32 cm, outside diameter of HV winding = 31 cm, iron loss = 1500 W copper loss in LV winding = 1200 W, copper loss in HV winding = 2050 W.

    Calculate :

    i) Tank dimensions
    ii) Final steady temperature rise of transformer plain walled tank
    iii) No. of cooling tubes if the temperature rise is not to exceed 35°C. **10**

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    The following are the design constraints :

    The peripheral speed should not exceed 40 m/s, frequency of flux reversals should not be more than 50 Hz. Current per brush not to exceed 400 A and armature mmf per pole should be less than 7500. The mmf required for the airgap is 50% of armature mmf and gap contraction factor is 1.15. **20**

OR

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(Pages : 3) **6818**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Explain how will you calculate the connected load of a residential building ?
2. Mention the classification of voltage as per NEC.
3. State reasons why fuses are provided on the line wire and never on the neutral wire.
4. Explain the pre-commissioning tests of domestic installation.
5. Distinguish between the 3-core, 3.5 core and 4-core cables.
6. Briefly explain the design aspects of airconditioning and heating services.
7. Explain how the ratings of cables and fuses are decided for motor installations.
8. Enlist and describe in brief the equipments required for an indoor substation.
9. Mention the types of protections in a stand-by generators.
10. Describe Kerala Cinema Regulation Act-1958. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** full question from **each** Module.

Module – I

11. Design the electrical installation and estimate the material required for a house with the following details (use concealed conduit system) :
    i) Drawing room (3×3^m)
    ii) Dining room (3×3^m)
    iii) Bed room 1 (3×4^m)
    iv) Bed room 2 (4×4^m)
    v) Kitchen (3×3^m)
    vi) Toilet (1.5×1.2^m)
    vii) Sitout (1.5×3^m) **20**

OR

12. A residential building having 3 bedrooms, a common bathroom, a kitchen, a drawing-cum-dining room and a sit out is to be provided with electrical wiring of concealed type. Assume suitable number electrical points.
    i) Determine the size of wires required.
    ii) Estimate the quantity of material and its cost.
    iii) Draw a single line diagram showing typical power supply system for the building. **20**

Module – II

13. An industry has the following loads
    a) 100 KW, 415 V, 3-phase induction motors, 4 nos.
    b) 50 KW, 415 V, 3-phase induction motor-4 nos.

    -2 nos.
    c) Electric oven-5 KW
    d) Lighting loads – 10 KW.

    Select a suitable substation with appropriate transformer. Prepare the layout and control equipment together with the rating of cables switch fuse units etc. **20**

OR

14. Design the earthing system using plate electrodes for an industry having 11KV/ 400V 2MVA transformer with 7% reactance. The industry is being fed by a substation 3 km away by overhead lines 95 mm^2 with spacing 1 m. The fault level at the substation is 250 MVA. Assume earth resistivity to be 100 Ω m. **20**

Module – III

15. a) A eight-storyed building has 32 flats. The load to each flat is 8 KW. Design the supply system from EB supply to the distribution of power to each flat through rising mains. Show a schematic arrangement at various floors. Missing data may be suitably assumed. **12**

    b) Give the steps for the design of flood lighting. **8**

OR

16. Draw the schematic wiring diagram and design the ratings of all outlets for a cinema theatre of capacity 600 people. **20**

(Pages : 2) **6824**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.805 Elective – IV (e) : HVDC AND FACTS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. How a low power factor load affects the performance of a supply system ?
2. "A compensator can be designed to provide the reactive power requirement of the load rather than an ideal voltage regulator". Justify the statement.
3. In which of the aspects, a series capacitor improves the performance of a line ?
4. What are the benefits from FACTS technology ?
5. What are the objectives of SVC in transmission lines ?
6. Draw the configuration and associated waveforms of a TSC.
7. Explain the basic principle of a STATCOM.
8. Describe different types of DC link.
9. Which are the reactive power sources at a converter bus ?
10. Explain the basic concepts of DC circuit interruption. **(10×4=40 Marks)**

PART – B

Answer **one** question from **each** Module. **Each** question carries **20** marks.

MODULE – I

11. a) A star connected inductive load of 25 Mw and 50 MVAR is supplied from a 10 KV (L-N) system with R_s = 0.078 ohm and X_s = 0.392 ohm. All quantities are expressed in per phase. Determine the improvement in voltage regulation when the load is compensated for unity power factor.

P.T.O.

b) Derive the expressions for the midpoint voltage and power flow in a transmission line compensated by a shunt capacitor at the midpoint.

OR

12. a) Write a comparison between series and shunt capacitor reactive power compensation.

b) Draw the equivalent circuit of a line with SSSC at the midpoint and derive the expressions for the current and power flow in the line.

MODULE – II

13. a) Explain the operation and control of a TCR with neat sketches.

b) Describe the various operating configurations of a TCSC.

OR

14. a) What is the basic concept of power flow control by phase angle regulator ? How is it achieved through a TCPAR ?

b) How a UPFC control all the parameters affecting the power flow in a line ? Explain with diagrams.

MODULE – III

15. a) Draw the schematic diagram of a typical HVDC converter station and explain the major components.

b) Derive the expression for the average dc voltage at the output of a Graetz circuit without overlap.

OR

16. a) Explain the principles of DC link control and draw the converter control characteristics.

b) Compare AC and DC transmission systems. What are the applications of DC transmission ?

(Pages : 2) **6828**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806 (Elective – V) (B) : ADVANCED ELECTRONIC COMMUNICATION (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. List any four disadvantages of microwave radio.
2. What is repeater ? Explain.
3. What is meant by synchronization in PAM systems ? Explain.
4. Discuss the basic principles of ISDN.
5. What is direct sequence spread spectrum ? Explain.
6. Differentiate between slow and fast frequency hopping.
7. What is an acceptance angle ? Why do we need to know what this angle is ?
8. What is attenuation in an optical fiber ? What is loss in an optical fiber ?
9. What is internet protocol ? Explain.
10. Explain different needs for computer communication. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module :

Module – I

11. a) Draw the block diagram of QPSK system and explain its working. 8

    b) Represent QPSK signals in the signal space and find distance between them. What is the significance of each ? 6

    c) Sketch the QPSK waveform for the sequence 1101010010, assuming the carrier frequency to be equal to the bit rate. 6

OR

12. a) Write down microwave frequency bands. 5

b) Explain the principle of microwave radio repeaters. 6

c) Draw the block diagram of a microwave transmitter station and explain. 9

Module – II

13. a) Explain any two spread spectrum modulation techniques. Compare their features. 12

b) Discuss any two techniques for spread spectrum. 8

OR

14. a) Briefly explain various types of optical fibres. 8

b) Draw the block diagram of optical communication system and explain. 8

c) Compare the features of LED and ILD. 4

Module – III

15. a) Explain the principles of TDMA, FDMA and CDMA. 10

b) Describe the principles of :

i) MODEMs

ii) Inter-networking techniques. 10

OR

16. a) Describe various layers of OSI protocol. 10

b) Discuss briefly about inter-networking techniques. 10

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806 Elective – V(c) : HIGH VOLTAGE ENGINEERING (E)

Time : 3 Hours Max Marks : 100

PART – A

Answer **all** questions :

1. Explain with diagrams, different types of rectifier circuits for producing high d.c. voltages.
2. Give the expression for ripple and regulation in voltage multiplier circuits.
3. What are the differences in design considerations of a power transformer and testing transformer ?
4. Explain the principle of operation of a series resonant circuit for generating high a.c. test voltages.
5. Explain insulation co-ordination of EHV system.
6. Describe the principle and function of an expulsion type surge arrestor.
7. What are the methods of reducing switching over voltages ?
8. Mention the different high voltage tests on line insulators.
9. What are the environmental aspects in EHV line design ?
10. Write short notes on live line maintenance. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain the working of Cockcroft-Walton voltage multiplier circuits. **10**
    b) Determine the ripple voltage and regulation of a 10 stage Cockcroft-Walton type dc voltage multiplier circuit having a stage capacitance = 0.01 μF, supply voltage = 100 kV at a frequency of 400 Hz and a load current = 10 mA. **10**

OR

12. a) Explain the principle of generating high impulse currents. **6**
    b) Why is controlled triggering required in an impulse generator ? Describe a typical trigger arrangement. **10**
    c) How are damped high frequency oscillations are obtained from a tesla coil ? **4**

P.T.O.

(Pages : 2)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806 (Elective – V) (b) : ADVANCED ELECTRONIC COMMUNICATION (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define the following terms :

   Free-space path loss and feeder loss.

2. Explain what is meant by natural sampling.

3. What do you mean by synchronization in PAM systems ?

4. What is meant by the term critical propagation angle ? What fiber parameters do this angle depend on ?

5. Light travels within a cladding faster than it does within a core. Why ?

6. How does spontaneous emission occur ? How does stimulated emission occur ?

7. Discuss about slow frequency hopping.

8. List the advantages of digital communication over analog communication.

9. What are the primary principles of ISDN ?

10. Define :

    a) Protocol

    b) Handshaking. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Determine the Nyquist sampling rate and the Nyquist sampling interval for the following signals :

    i) $\text{sinc}(100\pi t)$

    ii) $\text{sinc}^2(100\pi t)$. **7**

    b) What is aliasing and how it is reduced ? **5**

    c) Explain terrestrial radio link systems. **8**

OR

12. a) Briefly describe the four major sections of a microwave terminal station. **10**

    b) Draw the block diagram of QPSK systems and explain its working. **10**

Module – II

13. a) List three major causes of attenuation in an optical fiber and explain their mechanisms. **10**

    b) Draw the block diagram of an optical communication transmitter and explain. **10**

OR

14. a) Name and explain three basic techniques used to couple light from an LED into an optical fiber. **8**

    b) What is PN sequence ? Describe the properties of a PN sequence. **6**

    c) Describe the characteristics of a photodiode. **6**

Module – III

15. a) Explain a five layer network showing layers, protocols and interfaces. **10**

    b) Compare OSI and TCP/IP reference models. **10**

OR

16. a) Explain the interface between the DCE and the transmission channel. **10**

    b) Define data communications and list the characteristics a modern system must have. **10**

(Pages : 3) **5793**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

08.806 Elective – V (c) : HIGH VOLTAGE ENGINEERING (E)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions from Part* ***A*** *and* ***one full*** *question from* ***each*** *Module in Part* ***B****.*

PART – A

1. Why it is preferable to use isolating transformers for excitation with cascade transformer units, if the power requirement is large ?
2. How are the wavefront and wavetail times controlled in impuse generator circuits ?
3. Differentiate between power frequency and impulse testing of insulator.
4. What is the procedure adopted for locating the insulation failure of a high voltage transformer ?
5. How is a lossy dielectric represented ?
6. What are the different methods of producing switching impulses in laboratory ?
7. What is the operating duty cycle test on a surge arrester ? Why is it more significant ?
8. What is the significance of non-destruction testing of insulating materials ?
9. Describe the different types of overvoltages and mention their cause of initiation.
10. What is a ground wire ? **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) Describe the circuit arrangement for producing lightning current waveforms in laboratories. **10**

b) Calculate the peak current and waveshape of the output current of the following generator. Total capacitance of generator is 53 μF. The charging voltage is 200 kV. The circuit inductance is 1.47 mH and the dynamic resistance of the test object is 0.051 ohms. **10**

OR

12. a) Why is a Cockcroft-Watton circuit preferred for voltage multiplier circuits ? Explain its working with a schematic diagram. **10**

b) Explain how high frequency a.c. high voltages are generated. Derive the expression for the high frequency a.c. high voltage. **10**

Module – II

13. a) Explain the mechanisms of lightning strokes development and how they induce overvoltages on overhead power lines. Give the mathematical models for lightning discharges. **10**

b) Explain how the transmission lines are protected against overvoltages. **10**

OR

14. a) What is the basic principle behind the design of EHV and UHV stations ? Explain. **10**

b) Explain the functions of surge arrester as a shunt protective device. **10**

Module – III

15. a) What are partial discharges and how are they detected under power frequency operating conditions ? Explain the method of calibrating the partial discharge detector. **10**

b) A sample of insulation is placed in one arm of the Schering bridge. Under balanced condition the other three arms are as follows : arm two of screened standard capacitor C_s = 109 pF, arm three with a resistance of 100 ohm and fourth arm with 309 ohm in parallel with 0.5 μF. Determine the capacitance and equivalent series resistance and power factor of the insulation in the first arm. Draw the phasor diagram. **10**

OR

16. a) Explain the method of impulse testing of high voltage transformer. What is the procedure for locating the failure ? **10**

b) What is the principle of live line maintenance ? **5**

c) Define :

a) Disruptive discharge voltage

b) Impulse voltages

c) Creepage distance. **5**

(Pages : 4) 1079

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. How are building services classified ? Explain briefly.
2. Explain the different types of safety aspects incorporated in system design.
3. Explain the relevance of following IS Codes. IS 2675, IS 2309, IS 732, IS 3043.
4. Mention few criterion for the selection of transformers for a substation.
5. Explain the statutory requirements of indoor transformer substations.
6. Explain the basic considerations for selecting a circuit breaker.
7. Distinguish between 3 core, 3.5 core and 4 core cables.
8. Explain the different types of light sources suitable for exterior lighting.
9. What are the basic considerations for road lighting ?
10. What are the characteristic features of a high rise building ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

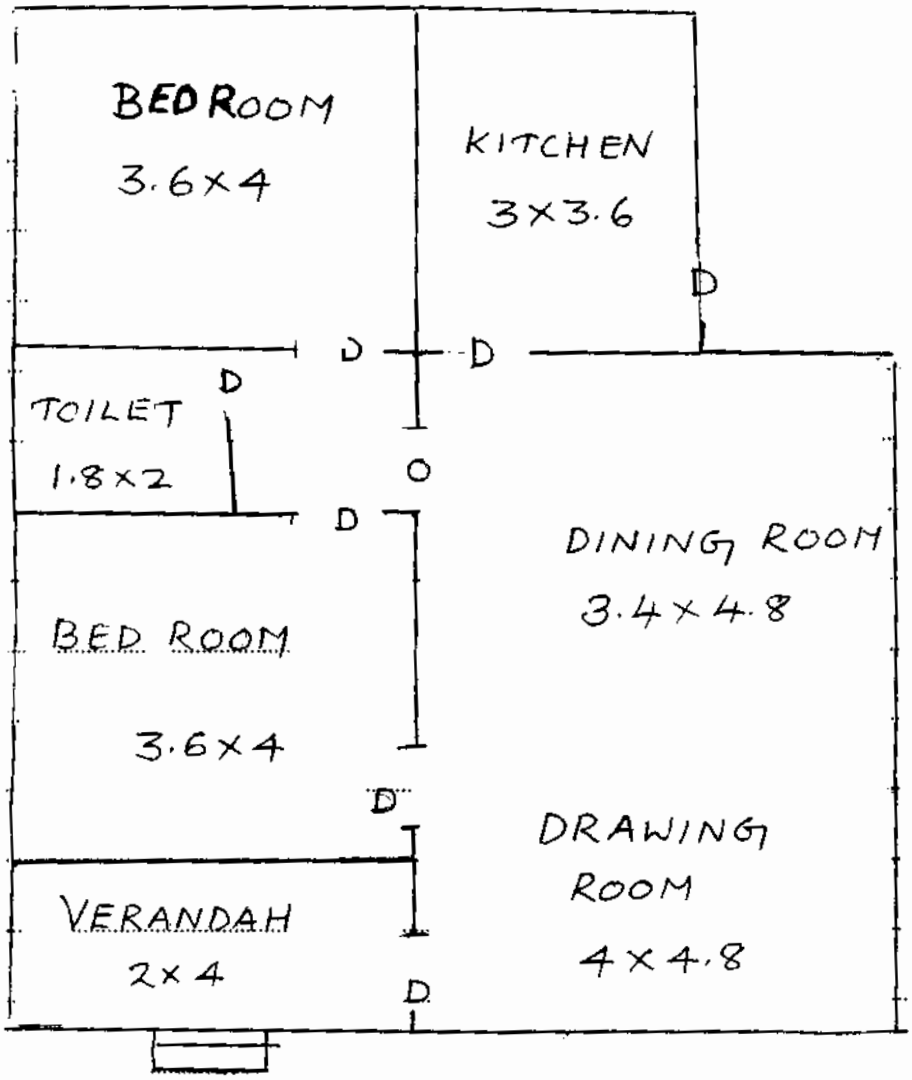
Module – I

11. A two Bedroom domestic building has following loads.

Sl.No	Room type	Light Load	5 A Socket	Fan load	15 A Socket
1	Bedrooms	20 W CFL, 2 no.s /each room	1 no. in each room	1 no. in each room	1 no./each room
2	Drawing cum dining	20 W CFL, 3 no.s	2 no.s	2 no.s	1 no.
3	Kitchen	20 W CFL, 2 no.s	2 no.	Exhaust fan 1 no.	2 no.s
4	Toilet	20 W CFL, 1 no.	-	Exhaust fan 1 no.	1 no.

Determine the total connected load, suggest the type of supply and determine the number of subcircuits required for installation. Give specifications of main switch, distribution board and draw the schematic diagram. **20**

12.



Prepare the electrical installation plan showing the position of light, fan, socket points and compute the following.

1) Connected load of the building.
2) Type of supply required.
3) Number of light and power circuits.
4) Details of Distribution board. **20**

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. A two Bedroom domestic building has following loads.

Sl.No	Room type	Light Load	5 A Socket	Fan load	15 A Socket
1	Bedrooms	20 W CFL, 2 no.s /each room	1 no. in each room	1 no. in each room	1 no./each room
2	Drawing cum dining	20 W CFL, 3 no.s	2 no.s	2 no.s	1 no.
3	Kitchen	20 W CFL, 2 no.s	2 no.	Exhaust fan 1 no.	2 no.s
4	Toilet	20 W CFL, 1 no.	-	Exhaust fan 1 no.	1 no.

Determine the total connected load, suggest the type of supply and determine the number of subcircuits required for installation. Give specifications of main switch, distribution board and draw the schematic diagram. **20**

(Pages : 3) **5782**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. What are the common light sources used in practice ? Give a brief comparison between any two commonly used.
2. Briefly explain the requirements of good lighting scheme.
3. Explain briefly the electrical services in building.
4. Write the important safety aspects of electrical system design.
5. What are the regulations for lightning protection in a high rise building ?
6. What is the purpose of a stand by generator ? How will you arrive at the capacity of a stand by generator ?
7. Briefly explain the pre-commissioning test of cables.
8. Draw a neat sketch of the arrangement of a rising main channel for a 4 storey building.
9. The illumination level of a waiting room measuring 18 m × 8 m is 70 lux. Design a lighting scheme for the room using fluorescent tube of 1200 mm length which will give 1600 lumen. Assume co-efficient of utilisation as 0.45.
10. Explain the necessity of earthing in electrical installations. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** module.

Module – I

11. a) Explain the relevance of IS codes.
IS 3043, IS 732, IS 2675 and IS 2309. **8**

b) Briefly explain the guidelines to be adopted in the design of electrical installation for domestic buildings. **12**

OR

12. a) A house is to be electrified using concealed conduct system of wiring. The requirements are as follows :

SL No.	Room Type	Light pts.	Fan Points	5 A Socket	15 A Socket
1.	Verandah	20 W CFL 1 No.	–	–	–
2.	Drawing cum dining	20 W CFL 4 No.s	2 No.s	2 No.s	1 No.
3.	Bedroom	20 W CFL 2 No.s	1 No.	1 No.	–
4.	Toilet	60 W Incand lamp 1 No.	–	–	–
5.	Kitchen	20 W CFL 2 No.s	1 No. Exhaust fan	–	1 No.

Find the connected load, suggest the type of supply and determine the no. of subcircuits. Write the specifications of mainswitch, distribution board and draw the schematic diagram. **20**

Module – II

13. A 11 Kv O/H line is to be run through a distance of 3 km from an existing 11 Kv O/H line. An indoor substation 11 Kv/415 V is to be erected at the terminal point of this O/H line. The 11 Kv/415 V transformer is to feed the following loads.
a) 100 kW, 415 V, 3ϕ I/motor – 2 No.s
b) 20 kW, 415 V, 3ϕ I/motor – 2 No.s
c) 1 kW, 240 V, 1ϕ I/motor – 3 No.s
d) Lighting loads – 8 kW.
Design the HT and LT panels. Prepare the details of cable sizes, connected switch gear and fuse ratings. **20**

OR

14. a) What are the factors to be considered in the selection of stand by generation for an installation ? **8**

b) Explain the pre-commissioning test of cables and generators. **12**

Module – III

15. a) A road 400 m long is to be illuminated by providing 40 W fluorescent lamps. Width of the road is 4 m. Design a street lighting scheme and estimate the material required if scheme is to achieve a minimum level of illumination of 0.6 lux. **12**

    b) A room 40 m × 15 m is to be illuminated by 80 W fluorescent lamps mounted 3 m above the workplane. An average illumination of 180 lux is needed. Design and sketch a layout showing the arrangement of lamps assuming co-efficient of utilisation as 0.5 and maintenance factor of 0.8. 80 W fluorescent lamps have an output of 4500 lumens. Space/Mounting height = 1.25. **8**

OR

16. a) A 415 V, 3ϕ, 4 wire supply is brought at the basement of a 5-storey building of 30 flats. Each flat has a load of 8 kW. Show by a diagram how power is distributed to each flat through rising mains showing the details of SFu. **10**

    b) What are the requirements to be satisfied for good road lighting ? How are light sources selected for road lighting ? **10**

(Pages : 2) **5799**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806 Elective – V (i) : SPECIAL ELECTRICAL MACHINES (E)

Time : 3 Hours Max. Marks : 100

Instruction *: Answer* ***all*** *questions from Part* ***A*** *and* ***any one*** *question from* ***each*** *module of Part* ***B****.*

PART – A

1. Explain the different modes of excitation used in variable reluctance stepper motor.
2. Define step angle and holding torque for a stepper motor.
3. Explain the necessity of damping in AC servomotors.
4. Obtain the expression for hysteresis torque developed in a hysteresis motor.
5. Compare the different types of BLDC motors.
6. Compare rotary induction motor and linear induction motor.
7. Explain the principle of operation of reluctance motors.
8. What are the essential differences between a stepper motor and switched reluctance motor ?
9. Explain a typical application of an ac servomotor.
10. What are the methods of reducing the step angle in a stepper motor ?

(10×4=40 Marks)

P.T.O.

(Pages : 3) **5780**

Reg. No. : .....

Name : .....

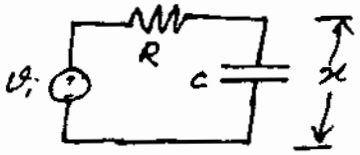
Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.801 : ADVANCED CONTROL THEORY (E)

Time : 3 Hours Max. Marks : 100

Answer **all** questions from Part **A** and **any one** question from **each** Module in Part **B.**

PART – A

1. Define state of a system. Derive the state space representation of the system shown in figure with x as the state variable.



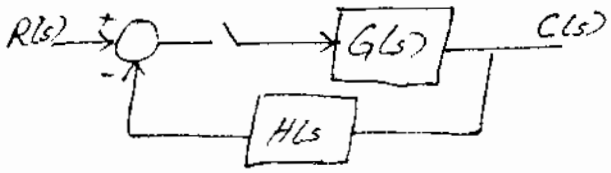
2. Define controllability and observability.

3. What are the properties of state transition matrix ?

4. Determine the solution to the state equation

   $\dot{x} = Ax + bu$ from $x(0) = x_0$ for $t \geq 0$

5. Derive the pulse transfer function for the system shown in figure.



6. State initial and final value theorems.

7. Find the z transform of the sequence x(1) = 2, x(4) = – 3, x(7) = 8 and all other samples are zeros.

P.T.O.

8. What are the different types of nonlinearities ?

9. When do we say a function is positive definite ? Give example.

10. How describing function analysis helps to identify the existence of limit cycle in a system ? **(10×4=40 Marks)**

PART – B

Module – I

11. a) Transform the system into controllable canonical form

$$\dot{x} = \begin{bmatrix} -1 & 1 & -2 \\ 0 & -2 & -1 \\ 1 & 0 & 1 \end{bmatrix} x + \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix} u,\ y = \begin{bmatrix} 1 & 1 & 0 \end{bmatrix} x$$ **12**

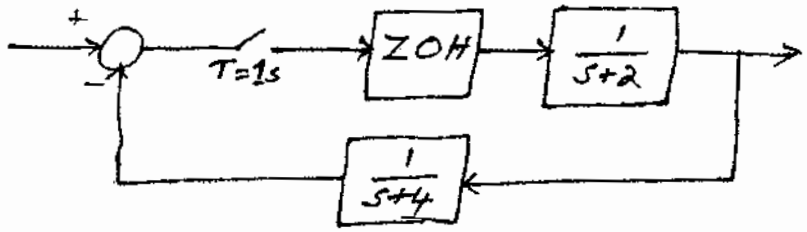
b) Show that similarity transformation does not alter the location of poles of a system. **8**

OR

12. Decompose the system $T(s) = \dfrac{2}{s(s+1)(s-2)}$ into controllable canonical form of statespace representation and hence design a state feedback controller to place the poles at $-2, -2 \pm j\sqrt{3}$. **20**

Module – II

13. Examine the stability of the following system.



20

OR

14. a) Obtain the unit step response of the system with pulse transfer function

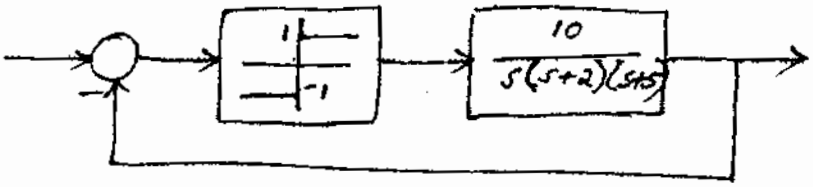
$$T(z) = \frac{(5z+4)(z-1)}{z^2 + \frac{3}{2}z + \frac{1}{2}}.$$ 10

b) Examine the stability of the system using Jury's test.

$$T(z) = \frac{24}{4z^4 + 1.2z^3 + 0.6z^2 + 0.3z + 0.2}$$ 10

Module – III

15. Examine the stability of the following system. Derive the expressions used for the analysis.



20

OR

16. a) Distinguish between focus and node. 8

b) State Liapunov stability and apply Liapunov stability to examine the stability of the following autonomous system 12

$$\dot{x} = \begin{bmatrix} -2 & 1 \\ 3 & -4 \end{bmatrix} x.$$

(Pages : 2) **5783**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.804 – POWER SEMI CONDUCTOR DRIVES (E)

Time : 3 Hours Max. Marks : 100

PART – A

(Answer **all** questions, **each** question carries **equal** marks)

1. Explain two types of load torque with example.
2. Draw and explain the torque speed characteristics of viscous friction load and fan type load.
3. What are advantages and disadvantages of cycloconverters ?
4. Draw and explain the operation of single phase semiconverter feeding a separately excited dc motor.
5. What is continuous current operation of chopper fed dc motor ? Explain.
6. Draw and explain the torque speed characteristics of a fan and centrifugal pump.
7. Explain with a neat circuit diagram the basic principle of operation of a class 'A' type chopper.
8. Starting from the fundamentals, prove that torque developed by the induction motor is proportional to the square of supply voltage.
9. Describe the stator voltage control technique for speed control of three phase induction motor.
10. Describe static Kramer drive. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Explain four quadrant operation of a motor driving a hoist load. **10**

    b) Explain the operation of three phase to single phase cycloconverter with the help of waveform. **10**

OR

12. a) Explain steady state stability criteria for a motor load combination. **10**

    b) Explain the working of load commutated cycloconverter. **10**

Module – II

13. a) Draw the block schematic of a dual converter controlled four quadrant dc separately excited motor drive. **10**

    b) Explain simultaneous and non-simultaneous control of dual converter control. **10**

OR

14. a) Explain the operation of a dc series motor fed by three phase half controlled converter. **10**

    b) Derive the speed and torque expression, for a single phase fully controlled converter connected to separately excited dc motor. **10**

Module – III

15. a) Draw a suitable circuit diagram and explain the working of slip power recovery scheme using static Kramer drive. **10**

    b) Explain the static rotor resistance control for speed control of conduction motor. Draw the speed and torque responses. **10**

OR

16. a) With a suitable circuit diagram explain the principle of operation of voltage source inverter fed synchronous motor. **10**

    b) Explain different methods of speed controls available for squirrel cage induction motor drive. **10**

(Pages : 2) **1085**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.805 : Elective – IV (e) HVDC AND FACTS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions and **all** questions carry **equal** marks :

1. What is the need for reactive power control in electrical transmission line.
2. What are the advantages of STATCOM ?
3. Draw and explain the equivalent circuit of a line with shunt capacitor at the mid point.
4. Define the term static var compensates.
5. What is the role of DC link in UPFC ?
6. How to model a TCSC ?
7. What are the advantages of HVDC transmission ?
8. Explain different configuration of TCPAR.
9. What are the disadvantages of AC transmission system ?
10. Explain any two applications of DC transmission system.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any two** questions from **each** Module :

Module – I

11. With neat circuit diagram explain the various basic types FACTS controllers. 10

12. Explain a transmission line with shunt capacitor at the midpoint of the line. 10

13. Explain the power flow and dynamic stability consideration of uncompensated transmission line. 10

14. What is the load compensation ? Discuss its objectives in power system. 10

Module – II

15. Explain the performance of a STATCOM compare it with the performance of SVC. 10

16. How series compensation is achieved in SSSC ? 10

17. With aid of block diagram, explain the characteristics of UPFC. 10

18. Discuss the power transmission control using SVC. 10

Module – III

19. Explain different types of DC link. 10

20. Explain the basic concept of DC circuit interruption. 10

21. What are the methods of control adopted for HVDC link ? 10

22. Compare monopolar converter station and bipolar converter station. 10

(3x20=60 Marks)

Reg. No. : .....

Name : .....

(Pages : 2)

1085

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.805 : Elective – IV (e) HVDC AND FACTS (E)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions and **all** questions carry **equal** marks :

1. What is the need for reactive power control in electrical transmission line.
2. What are the advantages of STATCOM ?
3. Draw and explain the equivalent circuit of a line with shunt capacitor at the mid point.
4. Define the term static var compensates.
5. What is the role of DC link in UPFC ?
6. How to model a TCSC ?
7. What are the advantages of HVDC transmission ?
8. Explain different configuration of TCPAR.
9. What are the disadvantages of AC transmission system ?
10. Explain any two applications of DC transmission system.

(10×4=40 Marks)

P.T.O.

PART – B

Answer **any two** questions from **each** Module :

Module – I

11. With neat circuit diagram explain the various basic types FACTS controllers. **10**

12. Explain a transmission line with shunt capacitor at the midpoint of the line. **10**

13. Explain the power flow and dynamic stability consideration of uncompensated transmission line. **10**

14. What is the load compensation ? Discuss its objectives in power system. **10**

Module – II

15. Explain the performance of a STATCOM compare it with the performance of SVC. **10**

16. How series compensation is achieved in SSSC ? **10**

17. With aid of block diagram, explain the characteristics of UPFC. **10**

18. Discuss the power transmission control using SVC. **10**

Module – III

19. Explain different types of DC link. **10**

20. Explain the basic concept of DC circuit interruption. **10**

21. What are the methods of control adopted for HVDC link ? **10**

22. Compare monopolar converter station and bipolar converter station. **10**

(3×20=60 Marks)

(Pages : 3) **1078**

Reg. No. : 08414026

Name : Vinu V. Pavick

Eighth Semester B.Tech. Degree Examination, April 2014
(2008 Scheme)
08.802 : ELECTRICAL MACHINE DESIGN (E)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part **A** and **one** full question from **each** Module of Part **B**.*

PART – A

1. Explain the factors to be considered while designing electrical machines.
2. Distinguish between distribution and power transformers.
3. What are the different types of ratings for an electrical machine ?
4. Describe the classification of insulating materials based on temperature.
5. Derive the output equation of a DC machine.
6. Describe any two methods for the calculation of mmf for tapered tooth.
7. Determine the length of air gap in a dc machine if the air gap mmf/pole = 3675 A, average flux density in the gap = 0.6 wb/m^2 and the ratio of pole arc to pole pitch = 0.7.
8. Derive an expression for end ring current in induction motor.
9. Explain the rules for selecting rotor slots for squirrel cage induction motor.
10. Compare analysis and synthesis method of CAD of electrical machines.

(10×4= 40 Marks)

P.T.O.

PART – B

Module – I

11. a) Derive an expression for the number of cooling tubes needed for a transformer tank. **10**

    b) An induction motor has a final temperature rise of 40°C when running at its rated output. Calculate its half hour rating for the same temperature rise, if copper losses at rated output is equal to 1.25 times constant losses. Heating time constant = 90 minutes. **10**

12. a) Derive the heating equation of a homogenous body and hence obtain the temperature rise time curve. **10**

    b) Determine the dimensions of core and yoke for a 200 kVA, 50 Hz single phase core type transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times the width of core laminations. Assume voltage per turn 14 V, $B_m = 1.1$ Wb/m^2, $K_w = 0.32$, $\delta = 3$A/mm^2 and stacking factor = 0.9. **10**

Module – II

13. a) Distinguish between real and apparent flux density in the teeth of a slotted armature and derive an expression connecting them. **10**

    b) Calculate the mmf required for the air gap of a machine having core length = 0.32 m including 4 ducts of 10 mm each, pole arc = 0.19 m, slot pitch = 65.4 mm, slot opening = 5 mm, air gap length = 5 mm, flux per pole = 52 mWb. Given Carter's coefficient is 0.18 for opening/gap = 1 and is 0.28 for opening/gap = 2. **10**

14. a) Explain the factors to be considered for the selection of specific magnetic loading of a dc machine. **5**

    b) Determine the main dimensions, no. of poles and length of air gap of a 600 kW, 500 V, 900 rpm generator. Assume average gap density = 0.6 Wb/m^2 and ac = 35000. The ratio of pole arc to pole pitch is 0.75 and efficiency is 91%. The following are the design constraints :

    peripheral speed $\leq$ 40 m/s, frequency of flux reversal $\leq$ 50 Hz, current/ brush $\leq$ 400 A and armature mmf $\leq$ 7500 A. The mmf required for air gap is 50% of armature mmf and gap contraction factor is 1.15. **15**

Module – III

15. a) Derive the output equation of a 3ϕ induction motor. **8**

    b) Determine the main dimensions of 10 kW, 400 V, 50 Hz, 4 pole, 3 phase induction motor. $B_{avg} = 0.45$ Wb/m^2, ac/cm = 220, $\eta = 0.9$, pf = 0.85. Determine no. of conductors per phase when the stator is star connected. **12**

16. a) Find the main dimensions of a 2500 kVA, 187.5 rpm, 50 Hz, 3 phase, 3 kV, salient pole synchronous generator. The generator is to be a vertical, water wheel type. The specific magnetic loading is 0.6 wb/m^2 and specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. **10**

    b) Explain the general procedure for optimisation in the design of an electrical machine. **6**

    c) Mention the advantages of CAD. **4**

(Pages : 2)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806 (Elective – V) (c) : HIGH VOLTAGE ENGINEERING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Why is a Cockcroft Walton circuit preferred for voltage multiplier circuits ?
2. How are damped high frequency oscillations obtained from a Tesla Coil ?
3. Define the front and tail times of an impulse wave. What are the tolerances allowed as per specification ?
4. What are the main components of a multistage impulse generator ?
5. What are the causes of overvoltages in power systems ?
6. Compare the performance of thyrite and ZnO arresters.
7. Define BIL of a power system.
8. Define complex permittivity. What are the factors that govern the quantities relative permittivity and loss factor.
9. Explain the need for high voltage testing of cables.
10. Explain the principles of live line maintenance.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) Give the expression for ripple and regulation in voltage multiplier circuits. **10**

    b) An impulse generator has 8 stages with each condenser rated for 0.16 μF and 125 kV. The load capacitance is 1000 pF. Find the series resistance and damping resistance needed to produce 1.2/50 μs impulse wave. What is the maximum output voltage of the generates if the charging voltage is 120 kV. **10**

OR

12. a) Give the Marx circuit arrangement of multistage impulse generator. How is it modified to accomodate the wave time control resistance. **10**

b) A 10 stage Cockcroft-Walton cascade circuit has all capacitors of 0.06 μF. The secondary voltage of the supply transformer is 100 kV at a frequency of 150 Hz. If the load current is 1mA, determine :

i) Voltage regulation

ii) Ripple

iii) The optimum number of stages for maximum output voltage. **10**

Module – II

13. a) Explain the different methods to control overvoltages due to switching. **10**

b) Write short notes on :

a) Rod gaps used as protective devices

b) Ground wires for protection of overhead wires. **10**

OR

14. a) Explain how the insulation of a protective device is correlated with the insulation of the equipment with the help of V-t curves. **10**

b) Explain what do you mean by insulation co-ordination of a substation. **10**

Module – III

15. a) What is non destructive testing of insulating materials ? Give briefly the characteristics of these methods. **10**

b) Explain the impulse testing of high voltage transformers and what is the procedure for locating faults ? **10**

OR

16. a) What are partial discharges ? Differentiate between internal and external partial discharges. **10**

b) Explain in detail, the different tests carried out on insulators. **10**

Module – II

13. a) Discuss in detail about the nuclear programme in India.

    b) Discuss about different types of turbines used in the hydro electric power plants. **(10+10)**

OR

14. a) Discuss about the scope of wind energy in Kerala State.

    b) Compare between thermal and hydro electric power plants.

    c) With neat diagram explain about tidal energy generation. **(5+5+10)**

Module – III

15. a) Discuss in detail about the thermo-electric converters.

    b) Explain how to assess the fuel cell performance. **(10+10)**

OR

16. a) Discuss about co-generation in chemical process industries.

    b) Discuss about energy conservation techniques in NPK fertilizer plant. **(10+10)**

(Pages : 2)

7638

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. How is NEC different from Indian Electricity Rule 1956 ?
2. Give the standard symbols for
   a) Power Socket Outlet
   b) Auto transformer
   c) Current transformer
   d) Exhaust fan
3. List the standard voltages used in electrical systems in India and why voltage tolerances are permitted in the supply system.
4. Explain the working of ELCB with figure.
5. Draw the single line diagram of the circuit for wiring a 10 H.P. induction motor. Give the specification of the control and protective devices.
6. With a neat figure explain pipe earthing for domestic installations.
7. How is industrial installations classified ?
8. What are the design considerations for a good lighting system ?
9. Explain with figures the scheme for protection of high rise buildings from lighting.
10. Briefly explain air conditioning loads and its specifications. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module.

Module – I

11. Design the electrical layout and prepare the estimation for wiring a residential building with 4 bedrooms each of size 4 × 3 m. 2 bathrooms of size 1.8 × 2 m, a dining hall of 5 × 4 m and kitchen 3 × 3 m. Provide 2 numbers of 1.5 tonne air-conditioners and 4 numbers of power socket outlets. Assume missing data. **20**

12. A residential building having four bedrooms, three bathrooms, a kitchen, a drawing cum dining room, a work area and a sitout is to be provided with electrical wiring of concealed conduct type. Find out the number of circuits required. Draw the schematic diagram and list the materials required (with specification) for completing the wiring. **20**

Module – II

13. Two numbers 3 phase 400 V, 50 Hz squirrel cage induction motors of 15 H.D. and 10 H.P. ratings with star delta starters are to be installed in a workshop of size 9 m × 6 m. Draw a wiring scheme, indicating the number and size of cables used. Prepare a list of materials required, including necessary earthing with GI plates of 600 mm × 600 mm × 6 mm size. Estimate the cost of the scheme. **20**

14. In a village a residential load of 10 kw, agricultural load of 25 hp and industrial load of 25 h.p. has to be electrified. Select the type of substation to be erected. Make a list of materials required for the installation of the proposed substation. Also draw a single line diagram of the arrangement. A 3ϕ 11 kv/415 V supply is given. **20**

Module – III

15. Design a roadway lighting scheme with the following data :
    Width of the road way = 12 m
    Illumination required = 15 lux
    Mounting height of poles = 9 m
    Arm length = 2 m
    The lamps are placed on one side of the road. Assume any missing data. **20**

16. Design the electrical wiring system of a Cinema theatre of seating capacity 800. Draw the schematic wiring diagram and list the various materials required. Assume all other necessary data. **20**

(Pages : 2) **2685**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805 Elective – IV (e) HVDC AND FACTS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What are the objectives of load compensation ?
2. A consumer assumes the responsibility for power factor correction. Justify.
3. What is the approximate SIL for a single circuit 400 KV line ?
4. Briefly explain the phenomenon of sub synchronous resonance.
5. Compare SVC and STATCOM.
6. What is the basic concept of phase angle regulator ?
7. What is the significance of the adjective 'unified' in UPFC ?
8. Compare AC and DC transmission systems.
9. What are the problems associated with monopolar operation ?
10. Explain the basic concepts of DC circuit interruption. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Derive the expressions for midpoint voltage and current of a symmetrical line.

12. A 400 KV, 50 Hz, 600 Km long symmetrical line having an inductance of 1 mH/Km and capacitance of 11.1×10^{-9} F/Km is operated at rated voltage. Find :
    i) The theoretical maximum power carried by the line.
    ii) Midpoint voltage corresponding to this condition.
    iii) The reactance of the series capacitor to be connected at the midpoint of the line to double the power transmitted.

13. Explain different types of FACTS controllers.

14. Draw the equivalent circuit of a line with STATCOM at the midpoint and derive the expressions for the midpoint voltage and power flow in the line.

Module – II

15. Explain the operation and control of FC + TCR with neat sketches.

16. Derive expressions for voltage and power in SVC.

17. Explain the principle of operation of SSSC.

18. Explain the working principle of a UPFC with diagrams.

Module – III

19. a) Explain different types of DC link. **6**
    b) Draw the circuit of a 12-pulse converter unit at the converter station. **4**

20. Derive the expression for the average DC voltage at the output of a Graetz circuit without overlap.

21. Draw and explain the converter control characteristics of an HVDC system.

22. Why reactive power is required in HVDC systems and how is it controlled ?

(Pages : 2) **2696**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806 Elective V (i) : SPECIAL ELECTRICAL MACHINES (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Explain the principle of operation of an AC Servomotor.
2. What are the methods for reducing the step angle in a stepper motor ?
3. Draw the torque-slip characteristics of a hysteresis motor.
4. Compare switched reluctance motor and a conventional reluctance motor.
5. Discuss the advantages and disadvantages of Brushless DC motors.
6. Mention two applications of hysteresis motor.
7. Compare the conventional induction motor with linear induction motor.
8. Calculate the stepping angle for a 3-ϕ, 24 pole, PM Stepper motor.
9. Why ac servomotors are preferred to dc servomotor ?
10. Discuss the major drawbacks of a switched reluctance motor. **(10×4=40 Marks)**

PART – B

Answer **one full** question from **each** Module :

MODULE – I

11. a) Discuss the family of torque speed curves of an ac servomotor for various Values of control Voltage.
    b) Compare armature and field controlled DC servomotor.

P.T.O.

12. a) Explain the constructional details and working principle of a permanent magnet stepper motor.

    b) Compare the performance of different types of stepper motor.

MODULE – II

13. a) Discuss how the rotor material is selected in Hysteresis motors.

    b) Develop the torque equation and hence show the variation of torque with slip in a hysteresis motor.

14. a) Derive the expression for torque developed in a switched reluctance motor.

    b) Develop the torque slip characteristics of a reluctance motor.

MODULE – III

15. a) Explain the working of a brushless dc motor. Discuss the applications of Brushless DC motor.

    b) Compare the different types of Brushless DC motors.

16. a) Describe the working of Linear Induction motor and mention the applications.

    b) Explain the end effects in a Linear induction motor. **(20×3=60 Marks)**

(Pages : 2) **2679**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.803 : ELECTRICAL SYSTEM DESIGN (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. What is the role of National Electric Code (NEC) in system design ?
2. Define utilisation factor and maintenance factor. What are the factors affecting utilization factor ?
3. Write down some safety aspects applicable to domestic installation.
4. How are building services classified ?
5. Calculate the size of the conductor to be used for wiring a 20 hp, 3ϕ 415 V, 50 Hz induction motor.
6. Why is it necessary to provide earthing in an electrical installation ? State IE rules regarding points to be earthed in an electrical installation.
7. Explain how the ratings of cables and fuses are decided for motor installation.
8. State and explain the laws of illumination.
9. Explain the different types of artificial light sources with reference to their colour rendering properties.
10. Draw a neat sketch of the arrangement of a rising main channel for a five storey building. **(10×4=40 Marks)**

PART – B

Answer **any full** question from **each** Module :

Module – 1

11. The electrical installation of a residential building has the following points.
    Light points : 40 nos.
    6A socket = 11
    Fans and exhaust fan points = 7

16A power sockets = 7
20A power sockets = 2
Design and draw the schematic diagram showing the rating of
a) Cable b) SFU and c) Distribution board.
Also prepare the list of materials required. **20**

OR

12. A residential building having 4 bed rooms, a common bathroom, a kitchen, a drawing cum dining room and a sit out is to be provided with electrical wiring of concealed type. Assume suitable number of electrical points.
    1) Determine the size of wires required.
    2) Estimate the quantity of material
    3) Draw the single line diagram. **20**

Module – 2

13. An industry has the following loads.
    1) 100 kW, 415 V, 3ϕ induction motor - 2 Nos.
    2) 10 kW, 415 V, 3ϕ induction motor - 2 Nos.
    3) 2 kW, 415 V, 3ϕ induction motor - 6 Nos.
    4) Lighting loads - 8 kW.
    Design the HT and LT panels and prepare the details of cable sizes and connected switch gears and fuse rating. **20**

OR

14. A cement company is supplied from a substation 5 km away through an O/H line. The company has two transformers in parallel of 1 MVA each and 6% reactance. If the fault level at the substation is 350 MVA design the plate earthing for this company. The overhead line consists of conductors 95 Sq. mm at a spacing of 1 m. **20**

Module – 3

15. A community hall has a size 25 m x 15 m. Design the electrical installation, show the details of all electrical fittings, size of cables, switch gears and draw the detailed schematic diagram. **20**

OR

16. a) Write short notes on the design of electrical systems related to
        1) Fire fighting **5**
        2) Lifts. **5**

    b) A main road 2 km long and 8 m wide is required to be illuminated by 85 W sodium vapour lamps. The lamps are mounted on poles 10 m high, so that the minimum level of illumination is 0.8 lux. Design a suitable sheet lighting scheme using underground cable feeder. Give an estimate of materials required. **10**

(Pages : 3) **7636**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.801 : ADVANCED CONTROL THEORY (E)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.*

PART – A

1. A single input system is described by the following state equation $\dot{x} = \begin{bmatrix} -1 & 1 & 0 \\ 1 & -5 & 0 \\ 0 & 1 & -2 \end{bmatrix} x + \begin{bmatrix} 5 \\ 1 \\ 0 \end{bmatrix} u$, $y = [1\ 0\ 1]x + u$. Determine the transfer function of the system.

2. Transform the following system $\dot{x} = \begin{bmatrix} 0 & 1 \\ -0.5 & 1.5 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$, $y = [0.6\ 1]x$ into diagonal form.

3. Determine whether the system $\dot{x} = Ax + bu$, $y = cx$ with $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}, b = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ and $c = [1\ 0\ 0]$ is observable.

4. Show that state space representation of a system is not unique.

5. State sampling theorem.

6. Determine the stability of the system with characteristic equation $z^4 + 0.25 = 0$ by Jury's test.

7. Determine the transfer function of zero order hold circuit.

P.T.O.

8. Determine the singular points for the system $\dot{x}_1 = \sin(x_2)$, $\dot{x}_2 = x_1^2$.

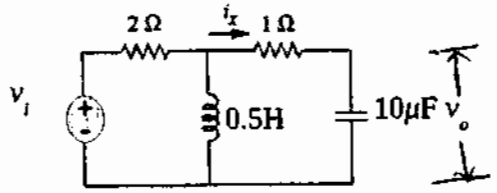
9. Distinguish between stability and asymptotic stability.

10. What is describing functions ? **(10×4=40 Marks)**

PART – B

Module – I

11. a) Derive the state space model of the system shown below. Also determine the poles of the system thus obtained. **10**



b) Convert the following system into statespace Jordan canonical form. Also sketch the realization of the system $\frac{Y(s)}{U(s)} = \frac{2s}{(s+1)^2(s+2)}$. **10**

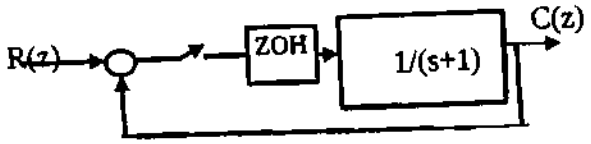
12. a) The system described by the equations $\dot{x} = \begin{bmatrix} 1 & 0 \\ 0 & 0.5 \end{bmatrix} x + \begin{bmatrix} 2 \\ 1 \end{bmatrix} u$, $y = [1\ 2]x$ is excited by u (t) = 1 for all $t \geq 0$ with initial condition $x(0) = [1\ 2]^T$. Find the output y (t). **8**

b) List the properties of state transition matrix. **4**

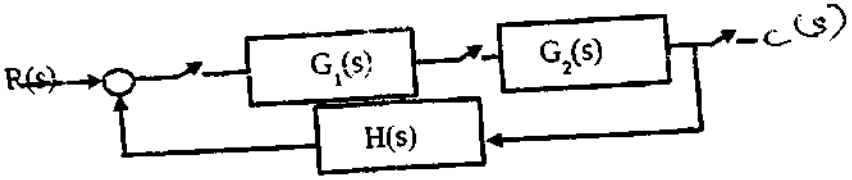
c) A single input system is described $\dot{x} = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -2 & 0 \\ 0 & 1 & -3 \end{bmatrix} x + \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix} u$. Design a state feedback controller which places the closed loop poles at $-1 \pm j2, -6$. **8**

Module II

13. Determine the unit step response of the system shown below with sampling time 0.1s. **20**



14. a) Determine the pulse transfer function for the negative feedback system shown below with sampling time Ts.



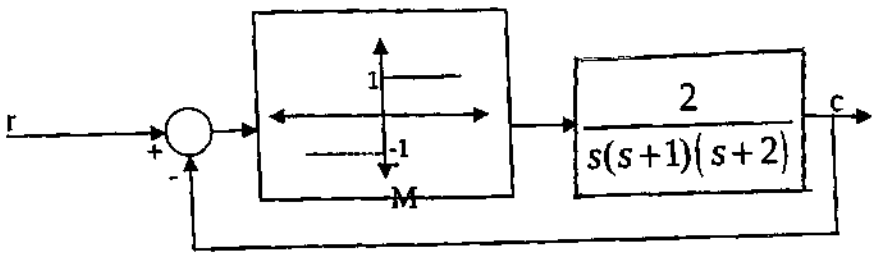
8

b) Apply Routh Hurwitz criterion to determine the stability of the system with characteristic equation $z^5 - 0.2z^4 - 1.23z^3 - 2.139z^2 - 1.1584z - 0.46848 = 0$. **12**

Module – III

15. What is Limit Cycle ? Determine whether the following system exhibits limit cycle. If the system exhibits limit cycle determine its frequency, amplitude and stability. Derive the expressions used.

functions



20

16. a) Explain the classification of equilibrium points. **8**

b) Define Lyapunov stability. Determine the stability of the system

$\dot{x}_1 = -x_1 + x_2$ $\dot{x}_2 = -x_2 - x_1$ by applying Lyapunov stability. **12**

(Pages : 3) **7641**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.805 Elective – IV(c) SOFT COMPUTING TECHNIQUES(E)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions from Part – **A, each** carries **4** marks.

1. What are the different steps involved in defining an optimization problem ?
2. Compare modern optimization techniques.
3. What is the base of Newton's method of optimization ? Discuss the step involved.
4. With the help of neat flow chart explain the optimization procedure in genetic algorithm.
5. Explain hard limiter and piecewise linear activation functions in ANN.
6. Explain error based and self adjusted learning methods in ANN.
7. What are the main characteristics of ANN ?
8. Prove the associative property of fuzzy set with suitable examples.
9. Differentiate between correlation minimum and correlation product.
10. What is the need of defuzzification ? What are the methods for defuzzification ?

(10x4=40 Marks)

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – I

11. a) Minimize $f(x) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ taking initial point at (0, 0) using steepest Descent method. **10**

    b) Optimize $z = 3x_1^2 + 14x_1x_2 - 8x_2^2$ subject to $3x_1 + 6x_2 \leq 72$. **10**

12. a) Distinguish between derivative based and derivative free optimizations. **4**

    b) Explain crossover, mutation and fitness evaluation processes in GA. **8**

    c) Explain simulated annealing with the help of neat flow chart. **8**

Module – II

13. a) Explain the working of biological neurons with neat sketch and hence explain the equivalent artificial model "McCulloch-Pits Neuron". **10**

    b) Explain different types of neural network architectures with the help of neat sketch. **10**

14. a) What you meant by linear separable problem ? Which types of network is suitable to handle these type of problem ? **5**

    b) Explain the different types of learning algorithms in ANN. **10**

    c) Explain applications of neural networks. **5**

Module – III

15. a) Given two Puzzy sets A and B where **8**

$$A = \left\{\frac{0.1}{2} + \frac{0.6}{3} + \frac{0.4}{4} + \frac{0.3}{5} + \frac{0.8}{6}\right\}$$

$$B = \left\{\frac{0.5}{2} + \frac{0.8}{3} + \frac{0.4}{4} + \frac{0.6}{5} + \frac{0.4}{6}\right\}$$

Calculate the following operations :

i) Complement

ii) Union

iii) Intersection

iv) Difference

v) Excluded middle laws.

b) With the help of neat sketch explain the difference between crisp logic and Fuzzy logic. **8**

c) How we can select the membership functions in Fuzzy system ? **4**

16. a) With the help of neat flow chart explain the steps involved in Fuzzy logic system. **6**

b) Clearly explain the parameters in fuzzy logic made upper hand over classical methods. **6**

c) Explain the working of Fuzzy logic controls. **8**

(Pages : 3) **2680**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.804 : POWER SEMI CONDUCTOR DRIVES (E)

Time: 3 Hours Max. Marks: 100

Instruction : *Answer **all** questions from Part – **A** and **one** question from **each** Module of Part – **B**.*

PART – A

1. Draw the block diagram of an electric drive system.
2. What are the components of load torque ? Explain.
3. Explain the current limit control scheme employed to limit motor current.
4. Explain the principle of cyclo converter operation.
5. Describe relative merits and demerits of four quadrant d.c. drives employing non circulating and circulating current dual converter.
6. Explain the motoring operation control of a separately excited d.c. motor by using a chopper.
7. Explain the forward motoring and reverse regenerative breaking operations of a single phase fully controlled rectifier fed d.c. motor.
8. Draw and explain the speed torque characteristics of a 3 phase induction motor with V/γ control.
9. Why the slip power recovery scheme is suitable mainly for drives with a low speed range ?
10. Why current source inverter fed induction motor drive is operated at constant rated flux. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module.

Module – 1

11. a) Discuss the torque characteristics of different types of loads. **6**

    b) A motor drives two loads. One has rotational motion. It is coupled to the motor through a reduction gear with a = 0.1 and efficiency of 90%. The load has a moment of inertia of 7 kg.m^2 and a torque of 10 Nm. Other load has translational motion and consists of 20 kg weight to be lifted up at the an uniform speed of 15 m/s. Coupling between this load and motor has an efficiency of 85%. Motor has an inertia of 1.2 kg m^2 and runs at a constant speed of 1000 rpm. Determine equivalent inertia referred to the motor shaft and power developed by the motor. **14**

OR

12. a) Derive the expressions for equivalent values of drive parameters for loads with rotational translational motion. **8**

    b) Describe the basic principle of working of a single phase to single phase step down cyclo converter for both continuous and discontinuous conductions for a bridge type cyclo converter. **12**

Module – 2

13. a) The speed of a separately excited dc motor is controlled using a single phase full controlled bridge converter. Explain the working with circuit diagram and waveforms and obtain an expression for average armature voltage for discontinuous conduction mode of operation. **10**

    b) A 220 V, 750 rpm, 200 A separately exerted motor has an armature resistance of 0.05 Ω. Armature is fed from a 3 phase non circulating current dual converter consisting of fully controlled rectifiers A and B. Rectifier A provides motoring operation in the forward direction and rectifier B in the reverse direction. Line voltage of ac source is 400 V. Calculate firing angles of rectifiers for the following assuming continuous conduction :

    i) Motoring operation at rated torque and 600 rpm.

    ii) Regenerative braking operation at rated torque and 600 rpm. **10**

OR

14. a) Explain the four quadrant operation of dc separately excited motor using a dual converter. **10**

    b) Draw the circuit diagram and explain the operation of a 4 quadrant chopper fed dc motor. **10**

Module – 3

15. a) Explain the slip power recovery schemes at sub-synchronous and super synchronous speeds of3 phase slip ring induction motors. **10**

    b) Discuss the operation of voltage source inverter fed three phase induction motor with circuit diagram. **10**

OR

16. a) With neat diagram explain speed controlling methods of synchronous motor. **10**

    b) A 3 phase, 400 V, 6 pole, 50 Hz delta connected, slip ring induction motor has rotor resistance 0.2 Ω and leakage reactance of 1 Ω per phase referred to stator. When driving a fan load it runs at full load at 4% slip. What resistance must be inserted in the rotor circuit to obtain a speed of 850 rpm. Neglect stator impedance and magnetizing branch. Stator to rotor turns ratio is 2.2. **10**

(Pages : 2) **7647**

Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806 Elective V (i) : SPECIAL ELECTRICAL MACHINES (E)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part – **A** and any **one** question from **each** Module of Part – **B**.*

PART – A

1. Explain the construction of synchronous reluctance motor.
2. Explain the advantages of armature controlled dc servomotors.
3. Why ac servo motors are preferred to dc servomotor ?
4. Compare permanent magnet stepper motors with variable reluctance stepper motor.
5. Explain the constructional differences of hysteresis motor and reluctance motor.
6. Draw the torque speed curve of a reluctance motor.
7. Compare switched reluctance motor with synchronous reluctance motor.
8. Explain the torque-slip characteristics of hysteresis motor.
9. Compare the two types of Brushless DC motor.
10. Why rotor position sensor is essential for the operation of switched reluctance motor ? **(10×4 = 40 Marks)**

P.T.O.

PART – B

Each full question carries **20** marks.

Module – I

11. a) Discuss the family of torque speed curves of an ac servomotor for various values of control voltage.

    b) Explain the torque speed curves of dc servomotor.

12. a) Explain the methods of reducing the step angle in a stepper motor.

    b) Explain how stepping action is achieved in a variable reluctance stepping motor.

Module – II

13. a) Derive the expression for the torque developed in a hysteresis motor. Draw the torque slip characteristics.

    b) Discuss the factors for the change in hysteresis torque with slip.

14. a) Explain the principle of operation of SRM and obtain the torque equation of SRM.

    b) Explain about the different types of power converters used for SRM.

Module – III

15. a) With a neat control circuit explain the working of a BLDC motor.

    b) Discuss about the different types of PMBLDC machines.

16. a) Obtain the equivalent circuit of a linear induction motor. State the significance of each parameter.

    b) Explain the working of linear reluctance motor. **(3x20 = 60 Marks)**

(Pages : 2) **7590**

Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.805.3 : FACILITIES PLANNING (MPU)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***all*** *questions in Part – **A**.*
*2) **Each** question in Part – **A** carries **4** marks.*
*3) Answer **any one** full question from **each** Module in Part – **B**.*
*4) **Each** question in Part – **B** carries **20** marks.*

PART – A

1. What are the objectives of plant layout ?
2. What is travel chart ?
3. What is meant by assembly line ? Explain ?
4. Explain one dust control system used in Industries.
5. Explain how safety education and training will help in industrial safety.
6. Give a classification of material handling systems.
7. What do you mean by AGV ?
8. Explain the present worth method in machine replacement analysis.
9. What is ALDEP ? Explain.
10. What are the principles of material handling ? Explain.

PART – B

Module – I

11. a) Explain the procedure of systematic layout planning. **14**
    b) What is Group Technology Layout ? Explain. **6**

P.T.O.

12. a) Distinguish between product layout and process layout. **8**

b) Sequence of operations of six items produced by a firm in five different shops A, B, C, D and E is given below along with number of units of each item produced.

Item no.	Sequence of operations	Number of units
1	ABCDE	250
2	ADBCE	100
3	DABCE	80
4	ACEBD	140
5	ABC	220

Prepare different layouts and suggest the best layout. **12**

Module – II

13. a) Enumerate common causes of industrial accidents. Describe various measures to prevent them. **12**

b) Describe various methods for the control of Air Pollution. **8**

14. a) Explain salient features of good lighting. What role it plays on productivity. **12**

b) Discuss the steps for effective control of plant services. **8**

Module – III

15. a) Explain the influence of material handling in increasing productivity of plant. **10**

b) Describe with neat sketches the working of two material handling equipments. **10**

16. a) What are the factors to be considered for replacing equipments. **5**

b) Machine A costs Rs. 8,000 while machine B costs Rs. 10,000. Operating cost of A is Rs. 2,000 for the first year and likely to increase by Rs. 1,000 after every year. Operating cost of B is Rs. 1,000 for the first year and likely to increase by Rs. 750 after every year. Resale value of the machines are zero and 8% intrest is assumed. Which machine should be purchased. **15**

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Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.805 (Elective – IV) (e) HVDC AND FACTS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **equal** marks.

1. What is passive reactive power compensation ?
2. Explain the need and importants of FACTS Technology.
3. What are the factor which limits the loading capability of the transmission line ?
4. What are the different configuration of SVC ?
5. Explain the performance of FC + TCR.
6. Explain the basic principle of series capacitive compensation.
7. Explain how the shunt compensation using a STATCOM is superior to that using variable impedance type compensators.
8. What are the problems in DC transmission system ?
9. Discuss any two applications of DC transmission system.
10. Write short notes on UPFC. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any two** questions from **each** Module.

MODULE – I

11. Explain different types FACTS controllers with neat sketches. **10**

12. Draw and explain the VI characteristics of STATCOM. **10**

13. Analyse lossless distributed parameter transmission line and hence obtain the power equation for symmetrical case. Also derive the mid point condition of a symmetrical line. **10**

14. Describe the procedure to locate the FACTS devices in an electrical network. **10**

MODULE – II

15. Explain different applications of SVC. **10**

16. Explain basic principle of operation of UPFC. **10**

17. Explain the performance of TCR. What is the basic difference between TCR and TSR. **10**

18. What are the various operating configuration of TCSC ? **10**

MODULE – III

19. Explain the basic concept of DC circuit interruption. **10**

20. Explain different types of DC links. **10**

21. Explain monopolar converter station and bipolar converter station with neat figure. **10**

22. What are the various equipments required at the converter station. **10**

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806 (Elective – V) (B) ADVANCED ELECTRONIC COMMUNICATION (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Differentiate between long haul and short haul microwave systems.
2. List down the advantages of microwave radio (any four).
3. Explain why flat-top sampling results in aperture effect.
4. Determine the nyquist sampling rate for the signals $\sin^2 100\pi t$ and $\text{sinc}\ 100\pi t$.
5. Discuss on synchronization procedure in spread spectrum technique.
6. Write a short note on fast frequency hopping.
7. Explain two conditions necessary to attain lasing action.
8. Compare photodiode and APD.
9. What is modem ? Why it is used ?
10. List important services provided by internet. **(10x4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module :

Module – I

11. a) With the help of neat diagrams, explain the transmitter and receiver of pulse code modulation. **8**

    b) Explain what is uniform quantization. **5**

    c) Derive the relations for signaling rate and transmission bandwidth in PCM system. **7**

OR

12. a) Give the merits and demerits of micrwave radio. **6**

    b) Draw the block diagram of a microwave receiver terminal and explain. **8**

    c) Discuss the principle of MASER. **6**

Module – II

13. a) Explain the operation of a quantum-well laser diode. **7**

    b) Compare the features of LED and ILD. **5**

    c) Describe the principle of operation of avalanche photodiode. **8**

OR

14. a) Draw the block diagram of a spread spectrum receiver and explain its operation. **12**

    b) Discuss a method to generate pseudorandom sequences. Illustrate with example. **8**

Module – III

15. a) Discuss the principle of computer communication networks. **6**

    b) Describe TCP/IP protocol layers. **8**

    c) Explain the principle of TDMA and FDMA. **6**

OR

16. a) Explain different OSI layers. **8**

    b) Discuss about CSMA/CD. **6**

    c) Explain various inter-networking techniques. **6**

(Pages : 2) **2690**

Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806 : Elective – V (c) : HIGH VOLTAGE ENGINEERING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. Explain the working of a voltage multiplier circuit.
2. Explain any one method of generation of high a.c. voltages.
3. What is a tesla coil ? Explain one application.
4. Explain the principle of generating high impulse currents.
5. Explain the origin and characteristics of switching over voltages.
6. Describe the principle of insulation co-ordination in EHV power systems.
7. Describe the working of Rod gaps as protective devices.
8. Define complex permittivity. What are the factors that affect loss factor ?
9. What are partial discharges and how they are detected under power frequency operating conditions ?
10. What are the biological aspects in EHV line design ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module :

Module – 1

11. a) Explain the working of a multistage impulse generator. **10**

    b) A four stage Cockroft-Walton type cascade circuit with capacitances all equal to 0.05 μ F, is fed from 150 kV. If 1.7 mA of current is to be supplied to the load by this circuit, determine (i) the ripple (ii) the voltage drop and regulation if the supply frequency is (i) 50 Hz (ii) 150 Hz. **10**

12. a) With a net diagram explain the principle of operation of a series resonant circuit for generating high a.c. test voltages. **10**

    b) A 12 stage impulse generator has 0.126 μ F capacitors. The wave front and wave tail resistances connected are 800 ohms and 5000 ohms respectively. If the load capacitor is 1000 pF, find the front and tail times of the impulse wave produced. **10**

Module – 2

13. a) What are the different methods employed for lightning protection of overhead wires ? **5**

    b) Explain with neat sketches the working of thyrite surge arrester. **10**

    c) Write short notes on rating of an arrester. **5**

14. a) Discuss the methods of reducing Q switching over voltages. **10**

    b) What is meant by insulation co-ordination ? How are the protective devices chosen for optimal insulation level in a power system ? **10**

Module – 3

15. a) Develop and draw equivalent circuit of an insulating material during partial discharges. Explain the parameters of the circuit. **10**

    b) A Schering-Bridge was used to determine the dielectric constant and loss factor of a 1 mm thick bakelite sheet at 50 Hz using a parallel-plate electrode configuration. The electrode effective area is 100 cm^2. At balance, the bridge arms are AB : test object, BC : standard capaitor = 100 pf, CD : variable capacitor in parallel with resistor 50 μ F and $1000/\pi$ ohms; DA : variable resistance 62.0 ohms. Determine the dielectric constant K, loss factor and tan δ. **10**

16. a) Explain how HV testing is done on bushing. **6**

    b) Explain the different tests to be carried out on high voltage cables. **8**

    c) Write short notes on 'Live line maintenance'. **6**

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Reg. No. : .....

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Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.802 : Electrical Machine Design (E)

Time : 3 Hours Max. Marks : 100

***Instructions** : Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.*

PART – A

1. Discuss the advantages of hydrogen as a cooling medium as compared to air.
2. The temperature rise of a loaded transformer is 15°C after one hour and 23°C after two hours of loading. Determine the steady temperature rise and heating time constant.
3. Show that the voltage per turn, $E_t = K\sqrt{Q}$ where K is a constant and Q is the kVA rating of the transformer.
4. List the Indian standard specifications for transformers and induction motors.
5. What are the factors to be considered for the choice of number of armature slots in a DC machine.
6. Explain field form factor. Find the average gap density in a dc machine if maximum gap density = 0.8 Wb/m^2 and field form factor = 0.75.
7. What are the advantages of having large number of poles in DC machines ?
8. What are the factors to be considered for estimating the length of air gap in induction motors ?
9. Explain the factors to be considered for the separation of D and L for salient pole machines.
10. What is Short Circuit Ratio (SCR) ? How SCR affects the design of alternators ?

(10×4=40 Marks)

P.T.O.

PART – B

Module – I

11. a) Derive the output equation of a 3ϕ transformer. **10**

    b) A 400 kVA transformer has its maximum efficiency at 80% full load. The temperature rise after 1hr. and 2 hrs. at full load are 24°C and 32°C respectively. Find T_h and θ_m. The cooling is improved so that the rate of heat dissipation is increased by 15%, find the new kVA rating for the same final temperature rise as before. **10**

12. a) Estimate the no. of cooling tubes required for the tank of a 400 kVA, 1ϕ oil immersed natural cooled transformer. Tank is 150 cm in height, 100 cm long, 60 cm width. Diameter of tube = 5 cm, length of tube = 127.5 cm, spacing should not be less than 7.5 cm between the centres. Full load loss to be dissipated is 6.34 kW. Mean temperature rise of tank wall is 35°C. Sketch the plan showing the arrangement. **14**

    b) Explain the different types of ventilation system used in electrical machines. **6**

Module – II

13. a) Explain the different methods employed for the calculation of mmf required for tapered tooth. **8**

    b) Estimate the ampere turns/pole required for the air gap of a 500V, 6 pole, 300 rpm, lap connected dc machine. The armature core length is 30 cm, having 90 slots. The pole pitch is 50 cm while pole arc is 33 cm. The air gap length = 0.5 cm, conductors/slot = 16, width of slot = 1.3 cm. Ventillating ducts = 5, width of slot = 1.3 cm. Ventillating ducts = 5, width of each duct = 1 cm. Carter's coefficient is 0.66 and 0.72 for width/gap of 2.6 and 2 respectively. **12**

14. a) Calculate the number of poles and main dimensions for a d.c. generator to develop 1800 kW, 600V running at 300 rpm. Assume specific loadings of 0.7 Wb/m^2 and 40,000 A/m. **10**

    b) Explain the factors which affect the choice of specific electric and magnetic loadings of a d.c. machine. **10**

Module – III

15. Determine the diameter and length of stator core for a 70HP, 415V, 3 phase, 50 Hz, star connected 6 pole induction motor for which Bav = 0.51Wb/m^2, a.c. = 32000 A/m, efficiency = 0.9 and power factor = 0.91. Assume pole pitch = core length. Estimate the number of stator conductors in which conductors are connected in two parallel paths. Choose a suitable number of conductors/slot so that slot loading does not exceed 750 Ampere conductors. Find the size of the conductors if the current density is 4A/mm^2. **20**

16. a) Determine a suitable number of slots and conductors per slot for the stator winding of a 3 phase, 3.3 kV, 50 Hz, 300 rpm alternator. The diameter is 230 cms and the axial length of core is 35 cms. The maximum flux density in air gap is nearly 0.9 Wb/m^2. Assume sinusoidal flux distribution. Use single layer winding star connection for stator. **14**

    b) Explain the procedure of optimization in the design of three phase induction motor. **6**

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Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08-704 Elective III (c) : Modern Operating Systems (E)

Instruction : *Answer **all** questions from Part – **A** and any **one full** question from **each** module of Part – **B**.*

Time : 3 Hours Max. Marks : 100

1. Explain the concept of multiprogramming.
2. Which scheduling algorithm is provably optimal in terms of turn around time ?
3. Differentiate between Process and Thread.
4. What are conditions that create Deadlocks ?
5. Differentiate between internal fragmentation and external fragmentation.
6. Explain clock page replacement algorithm.
7. How does working set model handles thrashing ?
8. What are the functions of I/O device controller ?
9. What is mean by RAID disks ?
10. Explain the principle of J/O software. **(10x4=40 Marks)**

PART – B

Module – I

11. a) What is a semaphore ? How does it is implemented ? How does it prevent busy waiting ? **10**

    b) Calculate the Turn around time, waiting time average waiting time for FCFS, SJF, shortest remaining time next and Round Robin (2 unit) scheduling algorithms for the processes given below. **10**

Process	Arrival Time	Burst Time (CPU)
P_1	2	4
P_2	4	6
P_3	5	3

OR

P.T.O.

12.a) Explain deadlock recovery methods. **6**

b) Explain any two deadlock avoidance method. **10**

c) Explain deadlock Prevention method. **4**

Module – II

13. a) What is virtual memory ? How it is implemented ? **10**

b) Explain the following page replacement algorithm with an example

1) FIFO 2) Optimal 3) LRV. **10**

OR

14. a) What is swapping ? Explain the memory management with Bit maps and linked list with examples. **14**

b) Explain occurance of Belady's anomoly. **6**

Module – III

15. a) What is a device driver ? Why are device drivers used in a O.S. ? **10**

b) Explain various disk arm scheduling algorithms. **10**

OR

16. a) Explain the following

1) File structure 2) File types

3) File access 4) File attributes. **10**

b) Explain single level directory system and two level directory system. **10**

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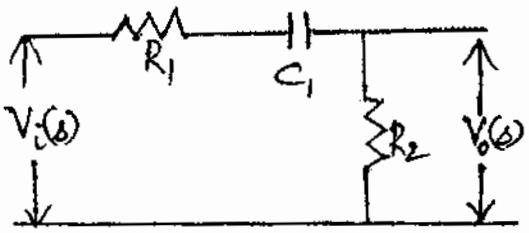
Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4=40 Marks)**

1. Define transfer function. What are the properties of transfer function ?
2. Explain force voltage analogy with example.
3. Explain the operation of DC servomotor.
4. Find the transfer function :



5. Explain rise time, peak time and peak overshoot of a second order under-damped system subjected to step input.
6. Differentiate between type and order of a system with example.
7. Find the value of k for which the unity feedback system $G(s) = \frac{k}{s(s+2)(s+4)}$ cross the imaginary axis.
8. Derive the transfer function of electrical lag network.
9. Explain minimum and non-minimum phase system.
10. Define resonant peak, resonant frequency and bandwidth of a system.

P.T.O.

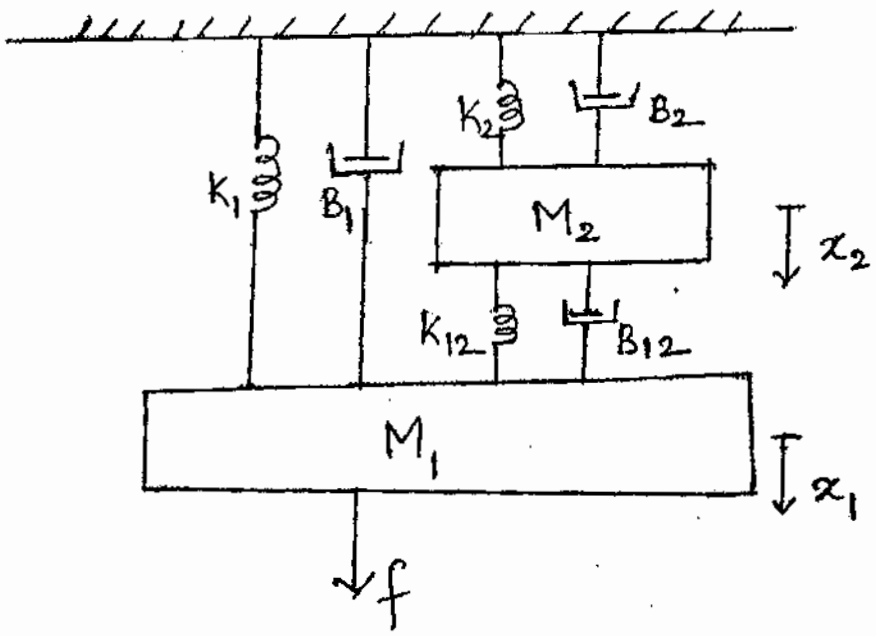
PART – B

Answer **any one full** question from **each** Module :

Module – 1

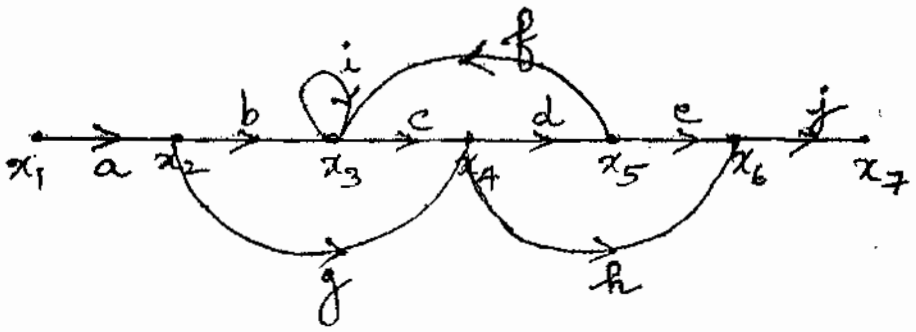
11. a) Derive the transfer function of a field controlled DC servomotor. **5**

    b) Derive the system equations for the mechanical system shown below. Also find the analogous electrical systems. **15**

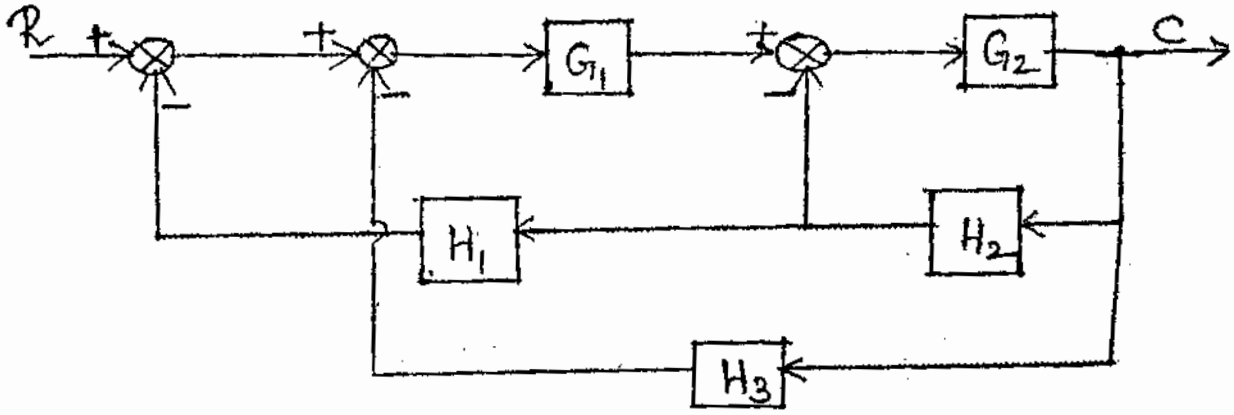


OR

12. a) Find $\frac{x_7}{x_1}$ using Mason's gain formula. **10**



b) Find $\frac{C}{R}$ using block diagram reduction technique. **10**



Module – 2

13. a) Derive the expression for step response of a second order system. **12**

b) Examine the stability of $s^5 + 2s^4 + 4s^3 + 8s^2 + 3s + 1 = 0$ using Routh's criteria. **8**

OR

14. a) A unity feedback control system has an open loop transfer function

$$G(s) = \frac{k}{s(s^2 + 8s + 17)}.$$

Sketch the root locus of the system. Find the value of k so that the system has a damping factor of 0.5 and for this value of k, find the roots of the characteristic equation. **15**

b) Define static error constants. Determine the value of error constants for a type 1 second order system. **5**

Module – 3

15. a) State and explain Nyquist stability criterion. **5**

b) Draw the Nyquist plot for the system whose open loop transfer function is $G(s)\,H(s) = \frac{K}{s(s+2)(s+10)}$. Determine the range of k for which the closed loop system is stable. **15**

OR

16. a) The open loop transfer function of a unity feedback system is given by $G(s) = \frac{10(s+3)}{s(s+2)(s^2+4s+100)}$. Draw the Bode plot and find the gain margin and phase margin. **15**

b) Sketch the polar plot of a type 1, second order system. **5**

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Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.705 : ELECTRICAL DRAWING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **any two** questions :

1. a) Sketch the yoke and pole assembly of a typical D.C. Machine. **15**
   b) Draw the half sectional view of a pin insulator. **10**
2. Draw the single line diagram of 220 KV substation with all equipments and specifications. **25**
3. Draw the full sectional elevation and plan of a 3 phase transformer for the dimensions given below :
   Core dia – 22 cm
   Height of core – 48 cm
   Height of yoke – 25 cm
   Centre to centre distance between the cores – 35 cm **25**

PART – B

Answer **any one** question :

4. Draw the longitudinal and end views (upper half in section) of a 60 HP, 4 pole DC shunt machine having the following dimensions. All dimensions are in cm.
   Armature :
   Outside diameter – 18.5, Length – 13.5, No. of slots – 24, Size of slot – 0.7 × 2
   Main pole :
   Length – 14, Width – 7, Pole arc – 10, Height – 11
   Inter pole :
   Size – 2 × 10.8, Length – 11, Air gap – 0.5
   Commutator :
   Diameter – 13, Length – 10
   Brushes :
   No. of spindles – 4
   Winding thickness :
   Main pole – 2, Inter pole – 1
   Armature is directly mounted on the shaft and is held between two end plates.
   Missing data, if any may be appropriately assumed. **50**

P.T.O.

5. Draw the following views of a 25 KVA, 400V, 1500 rpm, 50 Hz. Three phase salient pole alternator.

   a) Half sectional elevation (top half in section)

   b) End view.

   Stator : Outside diameter – 400 mm
   Inside diameter – 290 mm
   Thickness of frame – 36 mm
   Core length – 135 mm
   Slots open type 48 nos. – (32 × 12 mm) size
   Air gap length – 2 mm
   Rotor pole length – 135 mm
   Width – 70 mm
   Height with pole shoe – 75 mm
   Shaft diameter – 70 mm
   Assume reasonable values for other missing data. **50**

(Pages : 3)

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Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.702 : POWER SYSTEM ENGINEERING – III (E)

Time : 3 Hours Max. Marks : 100

Instructions : *Answer **all** questions from Part **A** and **any one** question from **each** Module of Part **B**.*

PART – A

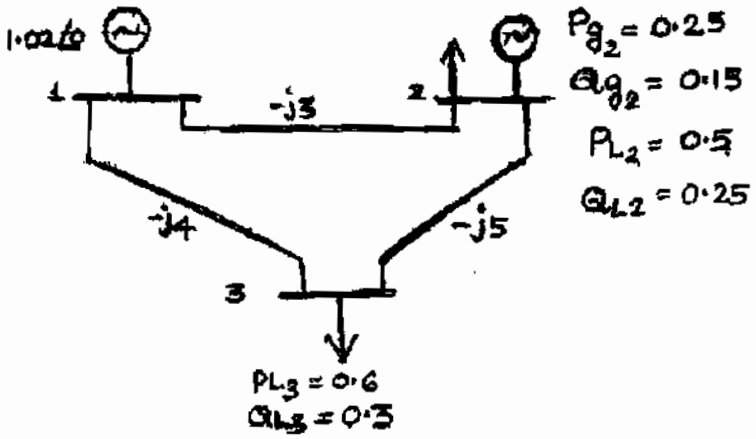
1. What are the different methods of solving SLFA ? Explain the difference between Gauss and Gauss-Seidel method.
2. Distinguish between Z_{BUS} and Y_{BUS} in power system analysis.
3. What are the assumptions in FDLFA ? What are the demerits of FDLFA ?
4. Differentiate between Economic dispatch problems and unit commitment problem.
5. What are the needs for reactive power compensation in power system ?
6. What are the benefits obtained from FACTS technology ?
7. Derive the expression for swing equation. What is the use of swing equation ?
8. Explain different terms associated with electric tractors.
9. What are the challenges and solutions associated with over voltages in power system ?
10. What are forked lines ? Obtain reflection and refraction coefficient of forked line from its equivalent circuit. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) Single line diagram of a 3 bus system is shown in figure. All parameters are in p.u. Compute the voltage magnitude and angle at the end of first iteration using Gauss-Seidel Method with an acceleration factor $\alpha = 1.5$. **10**



b) Derive Jacobian elements in polar form. **10**

OR

12. a) A 2 bus system consist of two power plants connected by a transmission line. The cost curve characteristics of the two plants are

$C_1 = 0.01\ P_1^2 + 18\ P_1 + 20$ Rs./hr

$C_2 = 0.03\ P_2^2 + 33\ P_2 + 40$ Rs./hr

When a power of 120 MW is transmitted from plant 1 to load (near to plant 2), a loss of 16.425 MW is ocurred. Determine the optimal scheduling of plants and load demand if cost of received power is Rs. 26/MWhr **15**

b) Explain various constraints in unit commitment problem. **5**

Module – II

13. a) What is meant by AGC ? What are the components in AGC ? Explain with the help of net sketch. **10**

b) Explain how reactive power is controlled in power system using synchronous compensators, reactors and static VAR compensators. **10**

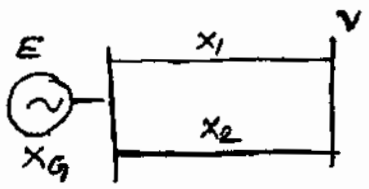
OR

14. a) Explain the principle and operation of STATCOM with neat sketch. **10**

b) A balanced 3ϕ fault occurs at the middle of line 2 when the power transfer is 1.5 p.u. Here E = 1.2; V = 1; $X_1 = X_2 = 0.4$ p.u., $X_G = 0.2$

i) Determine whether the system is stable for a sustained fault.

ii) The fault is cleared at $\delta = 60°$ is the system is stable ? If so find maximum rotor slip. **10**



Module – III

15. a) A train runs at an average speed of 50 Kmph between station situated at 2.5 Km apart. The train accelerates at 2 Kmphps and retards at 3 Kmphps. Find its maximum speed. Draw the speed time curve for the run and calculate the distance travelled by it before brakes are applied. **10**

b) Explain different configurations of HVDC systems. **6**

c) Write a short note on HVDC development in India. **4**

OR

16. a) Derive the expression for reflection and refraction coefficients when travelling wave is subjected to line termination with a cable of impedance Z Ω. **6**

b) A transmission line having surge impedance 400 Ω is terminated by two cable having Z = 50 Ω each. When this line is subjected to lightning stroke of 100 KV, find reflected and refracted values of voltage and current. **6**

c) Explain the operation of following surge arresters with the help of neat sketch.

i) Rod gap

ii) Non-linear surge arresters **8**

(Pages : 3) **2846**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
Branch : Electrical and Electronics Engg.
08.703 : DIGITAL SIGNAL PROCESSING

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. Explain various types of signals.
2. What are energy and Power Signals ?
3. Show that the discrete time system described by the input – output relationship y[n] = nx[n] is linear.
4. Find the even and odd part of the signals ; (a) x(n) = u(n), (b) $x(n) = \alpha^n u(n)$.
5. Show that if, $X(e^{j\omega})$ is real and even, x(n) is real and even using DTFT properties.
6. List four properties of Z-Transform.
7. Find the Z-transform of the function, $x(n) = ne^{-an}$ where a is real.
8. How circular convolution is performed using DFT ?
9. How the discrete time systems are implemented ?
10. Consider the causal shift invariant filter with system function

$$H(z) = \frac{1+0.875z^{-1}}{(1+0.2z^{-1}+0.9z^{-2})(1-0.7z^{-1})}$$. Draw the signal flow graph for this system using direct form I. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each Module** :

Module – I

11. a) With the help of a flow chart, explain DSP system concept.
    b) A linear system is one that is both homogeneous and additive.
       i) Give an example of a system that is homogeneous but not additive,
       ii) Give an example of a system that is additive but not homogeneous. **20**

OR

12. a) State the conditions for existence of FT.
    b) Explain the following
       i) Causal system
       ii) Linear system
       iii) LTI system.
    c) Test the given system is stable or not
       a) $h_1(n) = 2^n u(n-3)$,
       b) $h_2(n) = e^{n/2} u(n-4)$. **20**

Module – II

13. a) State and prove any five properties of Z-transform.
    b) Determine the Z-transform of given function $G(s) = \frac{s+1}{s(s^2+s+1)}$. **20**

OR

14. a) Determine the value of x(n) for the given $X(z) = \frac{z(1-e^{-Y})}{(z-1)(z-e^{-T})}$ using Residue method.
    b) Derive the expression for eight point Radix-2 DIT FFT algorithms and draw butterfly diagram. **20**

Module – III

15. a) The unit sample response of an FIR filter is

$$h(n) = \begin{cases} \alpha^n & 0 \le n \le 6 \\ 0 & \text{otherwise} \end{cases}$$

i) Draw the direct form implementation of this system.

ii) Show that the corresponding system function is $H(z) = \frac{1-\alpha^7 z^{-7}}{1-\alpha z^{-1}}$ $|z| > 0$.

b) Implement a discrete time system using IIR system in direct form. **20**

OR

16. Design a digital Butterworth filter satisfying the constraints :

$$0.707 \le \left|H(e^{j\omega})\right| \le 1 \text{ for } 0 \le \omega \le \frac{\pi}{2}$$

$$\left|H(e^{j\omega})\right| \le 0.2 \text{ for } \frac{3\pi}{4} \le \omega \le \pi$$

With T = 1 sec. using (a) The bilinear Transformation, (b) Impulse invariance. **20**

(Pages : 2) **7724**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
Elective – III 08.706.4 : PLANT ENGINEERING AND MAINTENANCE
(MPU)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part – **A**. **Each** carries **4** marks.*
*2) Answer **one full** question from **each** Module in Part – **B**, **each full** question carries **20** marks.*

PART – A

1. List down the useful applications of wear phenomenon.
2. Explain how wear is affected by environmental factors like temperature and moisture.
3. What are the causes of lubrication failure ?
4. Prepare a brief note on PVD.
5. Explain the significance of Weibull distribution in failure data analysis.
6. What are the factors affecting maintainability ?
7. Distinguish between chance failure and wear out failure.
8. Give an account on predictive maintenance.
9. Prepare the organization chart of a maintenance department.
10. What do you mean by 'Accident Proneness' ? **(10×4=40 Marks)**

PART – B
MODULE – I

11. a) Enumerate the various wear theories associated with wear process. **10**
    b) Give the relative merits and demerits of solid and liquid lubricants. **10**
12. a) Explain briefly a test for determining viscosity of a lubricating oil. **10**
    b) What is corrosive wear ? How does it differ from Abrasive wear ? **10**

P.T.O.

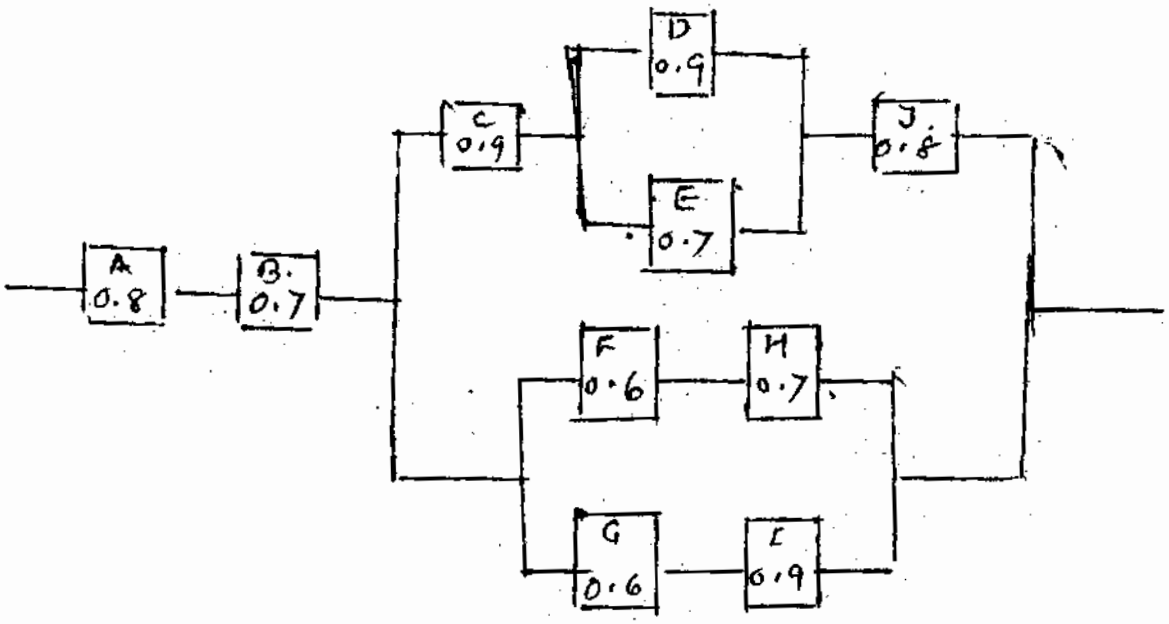
MODULE – II

13. a) Discuss different types of availability and differentiate between them. **10**

    b) Explain the concept of replacement analysis and various reasons for replacement. **10**

14. a) Derive an expression for reliability in the form $R(t) = e^{-\int z(t)dt}$. **10**

    b) Find the system reliability of the following configuration. Element reliabilities are given in the boxes. **10**



MODULE – III

15. a) Give the procedure you would like to introduce for the maintenance of lathe section of a factory. **10**

    b) How an investigation report concerned with industrial accident is to be prepared ? **10**

16. Prepare short notes on following :

    a) Proactive maintenance

    b) Industrial noise control

    c) CBM

    d) TPM. **(4×5=20 Marks)**

(Pages : 3) **2844**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015

(2008 Scheme)

08.701 – CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Define node, loop, mixed node and forward path associated with signal flow graph.
2. Compare open loop and closed loop control systems.
3. Explain the principle of operation of gyroscope.
4. Explain Mason's gain formula.
5. What is the effect of adding poles and zeros on root locus ?
6. Explain the standard test signals used for time domain analysis.
7. Define static error constants. Determine the value of error constants for a type I second order system.
8. State and explain Nyquist stability criterion.
9. Derive the transfer function of electrical lead network.
10. Explain the significance of gain margin and phase margin.

P.T.O.

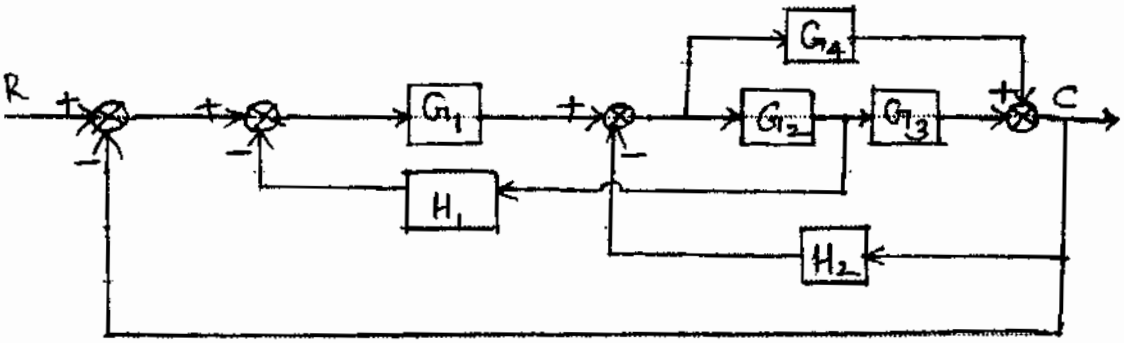
PART – B

Answer **any one full** question from **each** Module.

Module – I

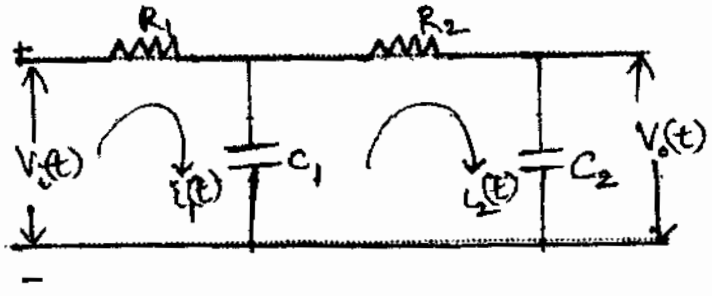
11. a) Derive the transfer function of an armature controlled d.c. motor. **8**

b) Determine the transfer function $\frac{C(s)}{R(s)}$ by applying block, diagram reduction technique. **12**

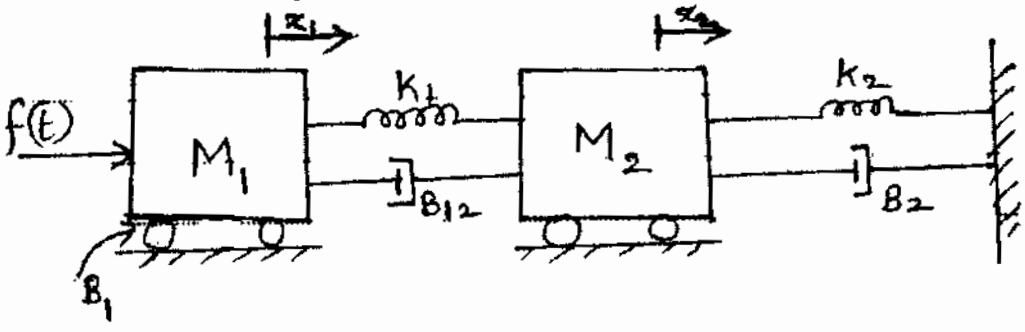


OR

12. a) Find $\frac{V_o(s)}{V_i(s)}$. **8**



b) Write the differential equations governing the mechanical system shown. Draw the force voltage analogous circuit and verify by writing mesh equations. **12**



Module – II

13. a) Determine the stability of the system whose characteristic equation is $s^5 + s^4 + 2s^3 + 2s^2 + 3s + 5 = 0$ using Routh's stability criteria. **8**

b) The closed loop transfer function of a unity feedback system is given by $G(s) = \frac{K}{s(s+10)}$. Determine the gain k so that the system would have a damping ratio of 0.5. For this value of K, determine settling time, peak time, delay time, peak overshoot and time for peak overshoot for unit step input. **12**

OR

14. For a unity feedback system, open loop transfer function is given by

$$G(s) = \frac{K}{s(s+2)(s^2+6s+25)}$$

a) Sketch the root locus for $0 < k < \infty$.

b) At what value of K, the system becomes unstable ?

c) At this point of instability determine the frequency of oscillation of the system.

d) Find k such that the system has a damping factor of 0.707. **20**

Module – III

15. a) Determine the stability of the closed loop unity feedback system using Nyquist stability criterion for the system whose open loop transfer function is

$$G(s) = \frac{1}{s^2(1+s)(1+2s)}.$$ **15**

b) Sketch polar plot of $G(s) = \frac{1}{(1+sT_1)(1+sT_2)}$. **5**

OR

16. a) The open loop transfer function of a unity feedback system is given by $G(s) = \frac{10(s+3)}{s(s+2)(s^2+4s+100)}$. Draw Bode plot and find the gain margin and phase margin. **15**

b) Explain minimum phase and nonminimum phase systems. **5**

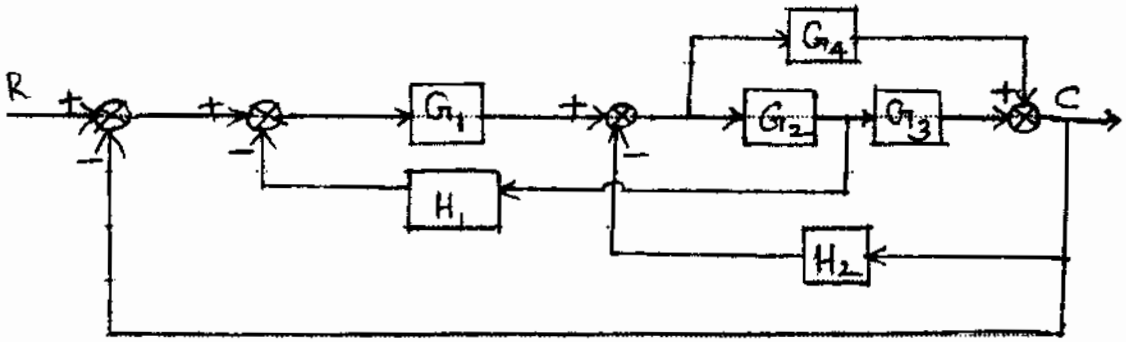
PART – B

Answer **any one full** question from **each** Module.

Module – I

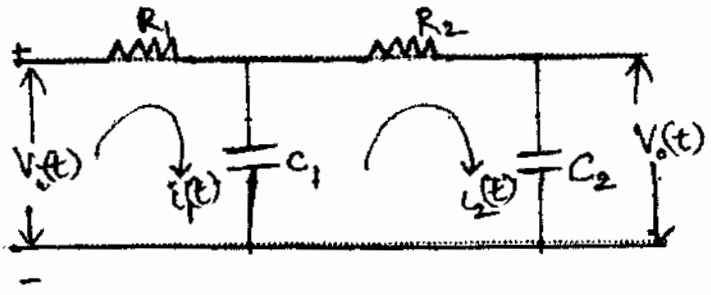
11. a) Derive the transfer function of an armature controlled d.c. motor. **8**

b) Determine the transfer function $\frac{C(s)}{R(s)}$ by applying block, diagram reduction technique. **12**

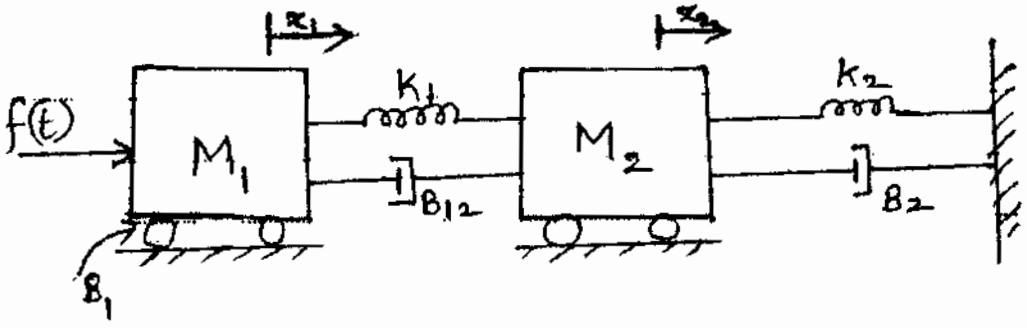


OR

12. a) Find $\frac{V_o(s)}{V_i(s)}$. **8**



b) Write the differential equations governing the mechanical system shown. Draw the force voltage analogous circuit and verify by writing mesh equations. **12**



(Pages : 2) **2847**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.705 : ELECTRICAL DRAWING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **any two** questions :

1. a) Draw a 220 kV double circuit transmission tower. **15**

   b) Sketch neatly the half sectional view of a Pin insulator. **10**

2. a) Draw a single line layout of a 220 kV substation and mark all the equipments with specifications. **15**

   b) Draw the half sectional elevation of the commutator assembly with the following dimensions :
   Diameter of the commutator = 13 cm
   Pole arc length of the commutator = 12 cm
   Diameter of the shaft = 4 cm
   Segment pitch with mica = 0.6 cm
   Mica thickness = 0.1 cm. **10**

3. Draw a suitable scale the detailed sectional end view of a 150 HP, 6-pole dc motor with the following dimensions (winding of armature and field need not be shown).
   Armature diameter = 55 cm, Number of slots = 61, Size of slot = 1 × 4.5,
   Slot open type
   Depth bellow slot = 9 cm, Commutator diameter = 42 cm
   No. of commutator bars = 244,
   Air gap length (radial) = 0.5 at main pole and 0.6 at inter pole.
   Main pole laminated, breadth = 14 cm, arc = 20 cm, height with shoe = 21 cm.
   Inter pole breadth = 4 cm, outside diameter of the yoke = 115 cm.
   Shaft diameter at bearing = 10 cm.
   The method of fixing the pole lamination and the pole to the yoke should be clearly shown. Assume any missing data. **25**

P.T.O.

PART – B

Answer **any one** question :

4. Draw a suitable scale a half sectional elevation of a salient pole alternator. The rotor pole shoe is made of steel laminations and fixed over the hub by means of stud bolts and the shaft is supported in the end shield bearings. The stator laminations are supported by means of two end plates, which are keyed to the yoke.
   Length of stator = 19 cm
   Inside diameter of the stator = 32 cm
   Outside diameter of the stator = 51 cm
   Stator coil overhang on each side = 10 cm
   Length of yoke = 24 cm
   Overall height of the machine = 61 cm
   Overall length of the machine = 50 cm
   Assume any missing data. **50**

OR

5. a) Draw half sectional end view and a half sectional elevation the squirrel cage rotor directly mounted over the shaft. Show clearly the method of fixing the rotor with the shaft.

   Diameter of rotor = 17.88 cm, Length of rotor = 13.5 cm,

   One radial cooling duct = 1 cm wide, Rotor conductor diameter = 0.9 cm,

   Distance between end ring and core = 0.5 cm,

   Diameter of shaft below rotor core = 3.5 cm, Six vanes are fixed to the rotor end plates to help the cooling. **25**

   b) Draw the full sectional elevation, sectional plan, sectional side elevation of a 3-phase transformer core for the given below dimensions. Show clearly the method of fixing the core and yoke.
   Core, 3-step construction
   Core dia. = 22 cm
   Height of core = 48 cm
   Height of yoke = 25 cm
   Centre to centre distance between the cores = 35 cm. **25**

(Pages : 2) **2848**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2015
(2008 Scheme)
08.704 : Elective – III (a) : ELECTRONIC COMMUNICATION (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Compare single side-band transmission with conventional AM.
2. An AM broadcast radio transmitter radiates 10 kw power. If percentage modulation is 75%, calculate how much of this is carrier power. What will be the carrier power if modulation percentage is increased to 90% ?
3. Draw the block diagram of low-level and high level AM transmitters.
4. Explain briefly the principle of power-line carrier communication.
5. Mention the advantages and disadvantages of digital transmission.
6. Describe interlaced scanning method. Why is it preferred in television ?
7. Explain the need for blanking and synchronising pulses in TV transmission.
8. Explain the principle of operation of a two-way communication system.
9. Describe the two most prevalent types of interference in cellular telephone systems.
10. List the advantages and disadvantages of PCSS. **(4×10=40 Marks)**

P.T.O.

PART – B

Answer **one full** question from **each** Module.

Module – I

11. a) With a neat block diagram explain the working of a superheterodyne receiver and describe how constant If is achieved in it. **12**

    b) Derive the output voltage expression for an FM wave. **8**

12. a) Describe with block diagrams the three methods of SSB generation. **10**

    b) Explain the operation of balanced-slope detector with circuit diagram and response characteristics. **10**

Module – II

13. a) What is pulse code modulation. Draw the block diagram of a PCM transmission system and explain. **10**

    b) With a neat sketch explain in detail a composite video signal. **6**

    c) Define :

    a) Luminance and chrominance

    b) Aspect-ratio. **4**

14. a) Draw the block-diagram of a monochrome TV receiver and mention the function of each block. **12**

    b) Write notes on :

    a) Quantization

    b) Companding. **8**

Module – III

15. a) Discuss in detail the GSM architecture with the help of a block-diagram. **10**

    b) Explain CDMA. What are its advantages over FDMA and TDMA ? **10**

16. a) Explain the basic concept of cell splitting and frequency sense used in cellular system. **12**

    b) Explain the hand-off control procedure when a mobile unit moves from cell to cell. **8**

(Pages : 3) **5568**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.705 : ELECTRICAL DRAWING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **any two** questions.

1. Draw the single line diagram of Generating station switch yard with all equipments and specifications. **25**

2. Sketch the following :

   a) 220 KV Double circuit Transmission Tower. **15**

   b) Disc Insulator. **10**

3. Draw a half sectional elevation of a salient pole alternator of 500 KVA.

   Stator lamination has 24 cm. length and has 5 radial ducts. The stator laminations are held by means of two end plates bolted together.

   Inside dia. of stator – 108.4 cm.

   Outside dia. of stator – 140.4 cm.

   Overhang of stator coil in each side – 16 cm.

   Dia. of rotor – 107.2 cm.

   The shaft is supported by means of two pedestal bearings 160 cm. apart. Other missing data may be assumed. **25**

P.T.O.

PART – B

Answer **any one** question.

4. Draw to a suitable scale the end and longitudinal elevation (top half in section) of a 100 kW, 500 volts, 1250 rpm, 6 pole dc shunt generator. The armature is supported over the spider and the shaft is supported by means of pedestal bearing for the dimensions given below.

   Dia. of armature – 75 cm.

   Length of armature – 27.8 cm.

   No. of slots – 86

   Size of slots – 1.11 $\times$ 5.24 cm.

   Depth of iron behind the slot – 9.26 cm.

   Ventilating ducts No. 3, each 1 cm wide.

   Air gap length below main pole – 0.5 cm.

   Main pole :

   Breadth – 17.75 cm.

   Height – 24 cm with shoe

   Length – 25.7 cm.

   Inter pole breadth – 4.63 cm; length – 20 cm.

   Air gap length below inter pole – 0.8 cm.

   Yoke : Thickness of yoke – 7.5 cm.

   Length of yoke – 40 cm.

   Commutator : No. of commutator segments – 344

   Dia. of commutator – 56 cm.

   Segment pitch – 0.51 cm.

   Length of commutator – 12.35 cm.

   No. of brushes per spindle – 3

   Shaft :

   Shaft dia. below armature – 9 cm.

   Shaft length between bearing centres – 120 cm. **50**

5. Draw the half sectional longitudinal and end view of squirrel cage induction motor with the following dimensions.

   External diameter of stator stamping – 69 cm.

   Inside dia. of stator stampings – 45 cm.

   Stator core length – 20 cm.

   The stator has 54 slots each of 6 cm. $\times$ 1.5 cm. section and the wiring overhang 5 cm. on each side.

   External dia. of rotor stamping – 44.75 cm.

   Inside dia. of rotor stamping – 25 cm.

   Rotor has 43 slots, each carrying a bar of 1.5 $\times$ 1.2 cm. section

   The end rings have a section of 0.75 $\times$ 3.5 cm.

   The rotor is mounted on a spider fixed to the shaft by a key.

   Shaft dia. = 5 cm.

   Total height of motor = 81 cm.

   The motor has ball-bearings carried by the end shield. Assume dim. of the motor frame and other missing data. **50**

(Pages : 2) **5569**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08-704 Elective – III (a)ELECTRONIC COMMUNICATION (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions : **(10×4 = 40 Marks)**

1. Draw the block diagram of low - level and high - level AM transmitters. (block diagram only)
2. Discuss the principle of AGC circuit. What is forward\AGC ?
3. Define : (1) Sensitivity (2) Selectivity and (3)Image frequency with reference to a receiver.
4. Explain the block diagram of an Amstrong FM transmitter.
5. Sketch and explain a composite video signal.
6. What is vestigial side-band transmission and why is it used for transmission of TV picture signals ?
7. Draw and explain the block diagram of a simple digital communication system.
8. Explain the frequency re-use concept of cellular communication. What is the significance of frequency reuse factor ?
9. What is CDMA ? What are its advantages over TDMA and FDMA ?
10. Discuss the two major kinds of interferences produced within a cellular telephone system. How can it be avoided ?

PART – B

Answer **one full** question from **each** Module.

Module – I

11. a) Discuss the principle of a balanced modulator. Prove that the output consists of side-bands only with carrier removed. **10**

    b) Explain the basic concept of an electronic telephone exchange. **10**

12. a) Briefly describe with block diagrams, the three methods of SSB generation. **15**

    b) An AM broadcast radio transmitter radiates 10KW power if percentage modulation is 75%. Calculate how much of this is carrier power. **5**

Module – II

13. a) Explain the concept of quantization and companding in digital communication systems. **10**

    b) Briefly describe the basic principle of the two types of pulse modulation-PAM and PCM. **10**

14. a) Draw the block diagram of a colour TV transmitter and briefly explain the function of each block. **10**

    b) With neat sketch describe the working of a TV picture tube. **10**

Module – III

15. a) Explain the cellular approach used in cellular communication. Also describe the necessity of cell splitting. **10**

    b) Briefly describe the procedures for wireline to mobile calls, mobile to wireline calls and mobile to mobile calls. **10**

16. a) Explain the following terms :

    1) Sectoring 2) Segmentation

    3) Dualisation 4) Hand off. **10**

    b) With a block diagram explain the operation of analog cellular transceiver. **10**

(Pages : 2) 5566

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.702 : POWER SYSTEM ENGINEERING – III (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Explain the significance of slack bus in load flow analysis.
2. Why is bus admittance matrix a sparse matrix ?
3. What are the assumptions that lead to development of FDLF from Newton-Raphson method ?
4. Explain the significance of spinning reserve.
5. Explain speed governor characteristics.
6. Differentiate between SVC and STATCOM.
7. Derive the power-angle equation.
8. Explain circuit breaking in HVDC.
9. What type of motor is ideally suited for traction purpose ? Give reasons.
10. Explain the use of Bewely Lattice diagram.

PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) With the help of a flowchart, explain how load flow analysis can be done using Gauss-Siedel method. **12**

    b) Explain the significance of penalty factor in economic load dispatch problem. **8**

OR

12. a) Explain singular transformation of Y-bus. **8**

    b) A power system is supplied by only two plants, both of which operate on economical dispatch. At the bus of Plant-I, the incremental cost is 55 Rs./MWh and at plant-2, is 50 Rs./MWh. Which plant has the highest penalty factor ? What is the penalty factor of Plant-1 if the cost of per hour of increasing the load on system by 1 MW is 75 Rs./hr ? **12**

Module – II

13. a) Explain with block diagram, the automatic load frequency control of an isolated power system. **12**

    b) Explain the principle of operation of Unified Power Flow Controller (UPFC). **8**

OR

14. a) Derive the swing equation of a synchronous machine. Explain its significance in stability analysis. **8**

    b) A 50 Hz generator is delivering 50% of the power that it is capable of delivering through a transmission line to an infinite bus. A fault occurs that increases the reactance between the generator and infinite bus to 500% of the value before the fault. When the fault is isolated, the maximum power that can be delivered is 75% of the original maximum value. Determine the critical clearing angle for the condition described. **12**

Module – III

15. a) Explain the reactive power requirements in HVDC system. **8**

    b) An electric train is to have a retardation of 3.2 kmphps. If the ratio of maximum speed to average speed is 1.3, the time of stop is 26 seconds and acceleration is 0.8 kmphps. Find its scheduled speed for a run of 1.5 km. Draw the simplified trapezoidal speed-time curve. **12**

OR

16. Write short notes on :

    a) Causes of over voltages in Power System. **6**

    b) Power flow control in HVDC system. **6**

    c) Insulation co-ordination. **4**

    d) Reflection coefficients and refraction coefficients. **4**

(Pages : 4) **5565**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

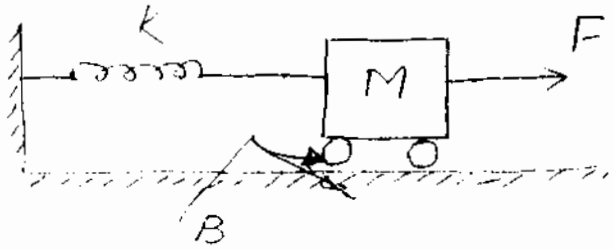
Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define a linear, time-invariant system. Explain superposition theorem which linear systems obey.

2. What are analogous systems ? Find the electric analog of the mechanical system below



3. Obtain the unit step response y(t) of

   1) $G_1(s) = \frac{10}{s+1}$

   2) $G_2(s) = \frac{10}{2s+1}$

   3) $G_3(s) = \frac{10}{5s+1}$

   Explain the significance of time constant.

4. Explain the principle of a DC tachogenerator.

5. Define the terms
   1) absolute stability
   2) relative stability.

P.T.O.

6. Distinguish between static and dynamic error constants.
7. A unity feed back control system has an open loop transfer function

$G(s) = \frac{k}{s(s+4)(s^2+8s+32)}$. Make a rough sketch of the root-locus plot of the system.

8. Mention few performance specifications characterizing desired frequency response that are used in the design of linear control systems using Bode plot.
9. What is Nichols chart ? How can we identify resonance peak and bandwidth from Nichol's chart.
10. Discuss the compensation characteristics of cascade lag and lead compensators using Bode plots. **(10×4=40 Marks)**

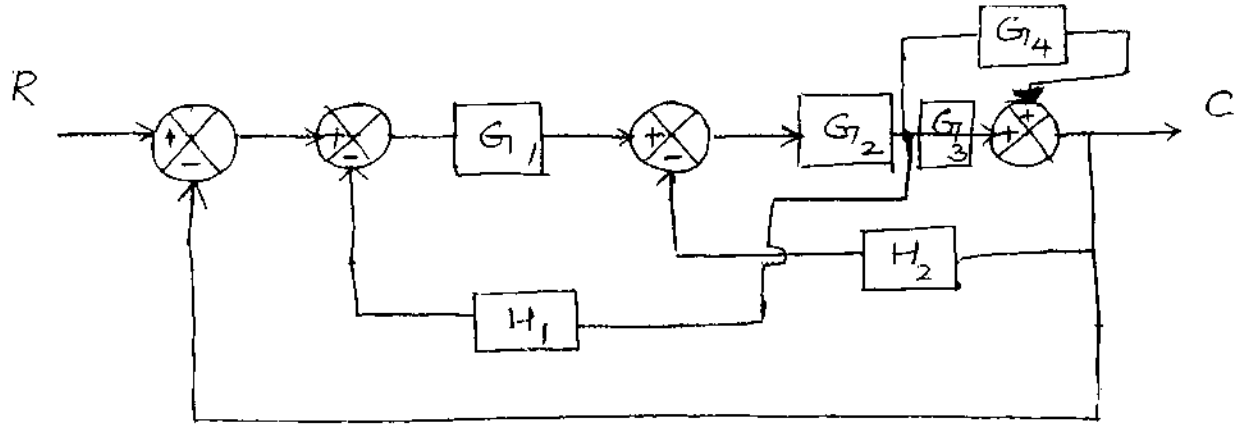
PART – B

Answer **any full** question from **each** Module.

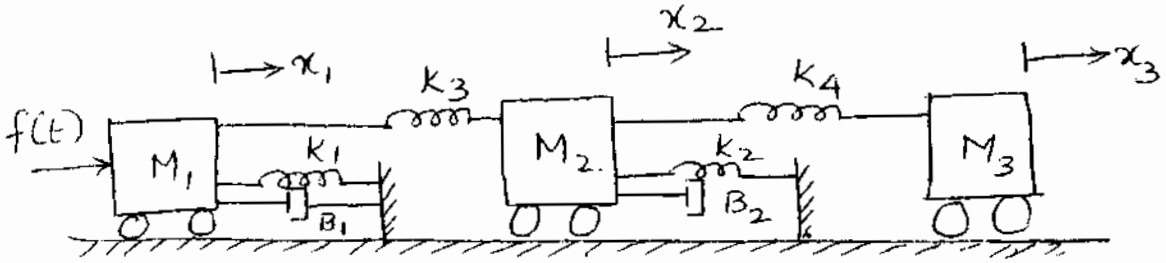
Module – I

11. a) A unity feed back system has forward path transfer function $G(s) = \frac{20}{s+1}$. Determine the response of open and closed loop systems for unit step input. Parameter variations cause G(s) to modify to $G^1(s) = \frac{20}{s+0.4}$. What will be the effect on unit step response of open and closed-loop systems ? Comment on sensitivity of system to parameter variations.

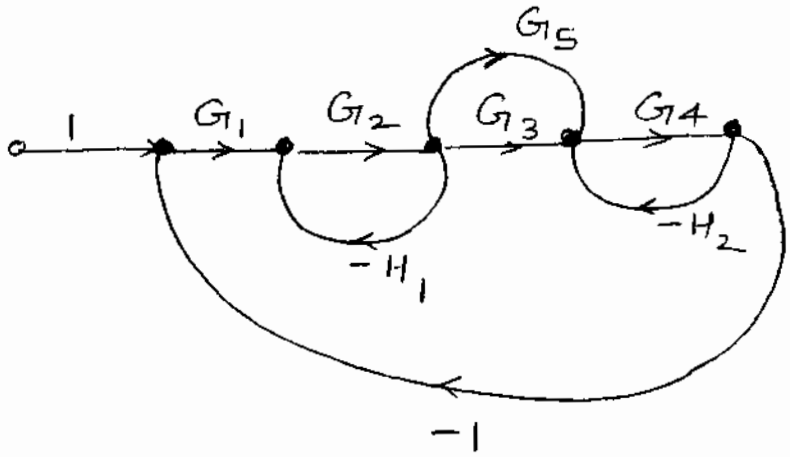
b) Find the overall transfer function of the system using block diagram reduction technique. **10**



12. a) Draw the electric analog of the mechanical system given below. **10**

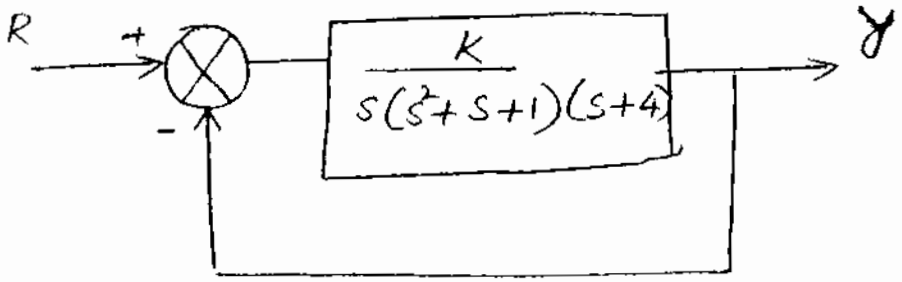


b) Draw the block diagram of the following signal flow graph and find the overall transfer function by block diagram reduction. Verify the result by Mason's gain formula. **10**



Module – II

13. a) Find the range of k for which the system is stable using Routh-Hurwitz criterion. **10**



b) A unity feed back system is characterized by open-loop transfer function

$$G(s) = \frac{1}{s(0.5s + 1)(0.2s + 1)}$$

Determine steady state errors to unit step, unit ramp and unit parabolic inputs. Also determine risetime, peaktime, peak overshoot and settling time of unit step response of the system. **10**

14. a) Sketch the complete root locus for a feedback system with characteristic equation $1 + \frac{k}{s(s + 1)(s + 2)} = 0$; $k \geq 0$. **10**

b) Explain the relation between time domain and frequency domain specifications. **10**

Module – III

15. a) A unity feedback control system has $G(s) = \frac{k}{s(1 + s)(1 + 0.1s)}$

Draw the Bode-plot of this system.

Determine from the plot, the value of 'k' so as to have

Gain Margin = 10 db

Phase Margin = 50°. **12**

b) Sketch the polar plot of $G(s) = \frac{1}{s^2(1 + sT_1)(1 + sT_2)(1 + sT_3)}$. **8**

16. a) What are the advantages of frequency response analysis ? **8**

b) Draw the Nyquist plot for the system whose open-loop transfer function

$G(s)H(s) = \frac{k}{s(s + 2)(s + 10)}$. Determine the range of k for which closed-loop system is stable. **12**

(Pages : 3) **5567**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.703 : DIGITAL SIGNAL PROCESSING (E)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part – **A** and **one full** question from **each** Modules of Part – **B**.*

PART – A

1. What is the relation between bounded sequence and energy of a sequence ? Explain power and energy of a sequence.

2. Check the causality and memory of the system

$$y(n) = x(n) + \frac{1}{x(n-1)}.$$

3. Sketch the discrete sequence described by difference equation
$x(n) = \delta(n+2) - \delta(n+1) + 2\,\delta(n) + \delta(n-2) - 0.5\,\delta(n-3)$.

4. State and explain Parseval's theorem ? Find energy of sequence $x(n) = \{2, 2, \underset{\uparrow}{2}, 2, 2\}$.

5. Find z-Transform of a general negative time sequences.

6. What is a stable system ? How we can analyse stability of discrete time system ?

7. Find poles and zeros of system described by difference equation
$y(n) = x(n) + 3x(n-1) + 4y(n-1) - 2y(n-2)$.

8. Explain the need of FFT in detail.

9. Compare Direct form I and Direct form II realization of IIR filters.

10. Explain linear phase realization of FIR filters in detail ? Where it is used ?

(10×4=40 Marks)

P.T.O.

PART – B

Module – I

11. a) With neat block diagram explain the need of Digital signal processing in biomedical application. **8**

b) Explain the need of quantization and coding of signals in DSP. **4**

c) Check for periodicity, Energy and Power of given signals **8**

i) $x(t) = e^{-5t}\, u(t)$

ii) $x(n) = (-0.3)^n\, u(n)$.

12. a) Check for linearity and time invariant for the following systems. **8**

i) $y(t) = \log(x(t))$ iii) $y(n) = x(-n)$

ii) $y(n) = A\, x(n) + B$ iv) $y(n) = x(n^2)$.

b) Define DTFT of x(n) and hence find out DTFT of following sequence. Also plot the spectrum.

i) $x(n) = \{2, \underset{\uparrow}{3}, 1, 4\}$

ii) $x(n) = \left\{ \frac{1}{2}, 1, 1 \right\}$

iii) $x(n) = 5(3)^n\, u(-n)$. **12**

Module – II

13. a) State and explain initial value and final value theorem with the help of an example. **6**

b) Find z-Transform of following sequences

i) $x(n) = 3^{n-1}\, u(n-1)$

ii) $x(n) = 2^n\, u(n) + 3\left[\left(\frac{1}{2}\right)^n u(n)\right]$. **8**

c) Obtain the inverse z-Transform of

$$X(z) = \frac{1}{1 - 1.5\, z^{-1} + 0.5 z^{-2}} \quad \text{for ROC } 0.5 < |z| < 1 \text{ and } |z| > 1.$$ **6**

14. a) Determine the system Transfer function and impulse response of the discrete LTI system described by difference equation

$y(n) = x(n) + 3x(n-1) + 2y(n-1) - y(n-2)$. **10**

b) Given $x(n) = \{2, 1, 4, 6, 5, 8, 3, 9\}$

Draw an 8-point radix – 2 DIT FFT flow graph. **10**

Module – III

15. a) Realize the system $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n) + \frac{1}{3}x(n-1)$ in cascade and parallel form. **12**

b) Obtain direct form I and Direct form II realization of the difference equation $y(n) = 0.5\,y(n-1) - 0.25\,y(n-2) + x(n) + 0.4\,x(n-1)$. **8**

16. a) Realize the system function with minimum number of multipliers

$$H(z) = \frac{1}{2} + \frac{1}{3}z^{-1} + z^{-2} + \frac{1}{4}z^{-3} + z^{-4} + \frac{1}{3}z^{-5} + \frac{1}{2}z^{-6}.$$ **8**

b) Design low pass Butterworth filter using impulse invariant method for satisfying the following constraints. **12**

Pass band W_p	=	0.162 rad
Stop band W_s	=	1.63 rad
Pass band ripple	=	3 dB
Stop band attenuation	=	30 dB
Sampling frequency	=	8 KHz

(Pages : 3) **1882**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Explain the properties of transfer function.
2. Derive the transfer function of a transactional second order mechanical system.
3. Define node, loop, mixed node and forward path associated with signal flow graph.
4. What is the nature of unit step response of a closed loop system with unity feed back having open loop transfer function $G(s) = \frac{20}{s(s+10)}$?
5. Explain the operation of DC servo motor.
6. Find the value of k for which the unity feed back system $G(s) = \frac{k}{s(s+2)(s+4)}$ cross the imaginary axis.
7. Explain the performance specification of steady state response.
8. State and explain Nyquist stability criterion.
9. Derive the transfer function of electrical lead network.
10. Define control action and different types of controllers.

P.T.O.

PART – B

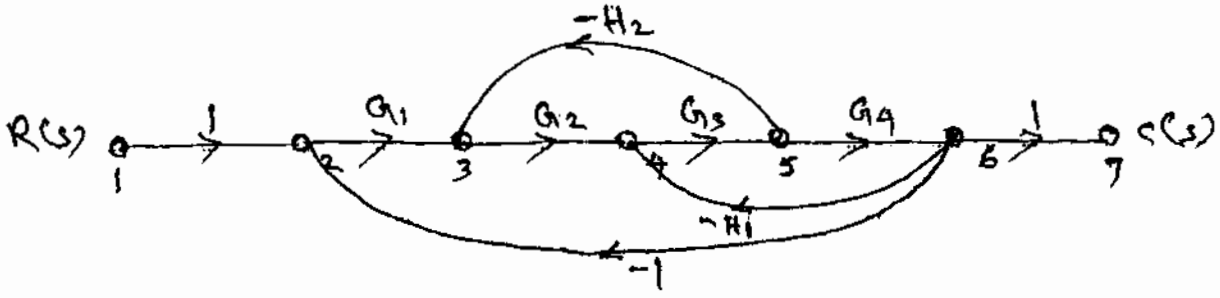
Answer **any one full** question from **each** Module.

Module – 1

11. a) State and explain Mason's gain formula. **5**

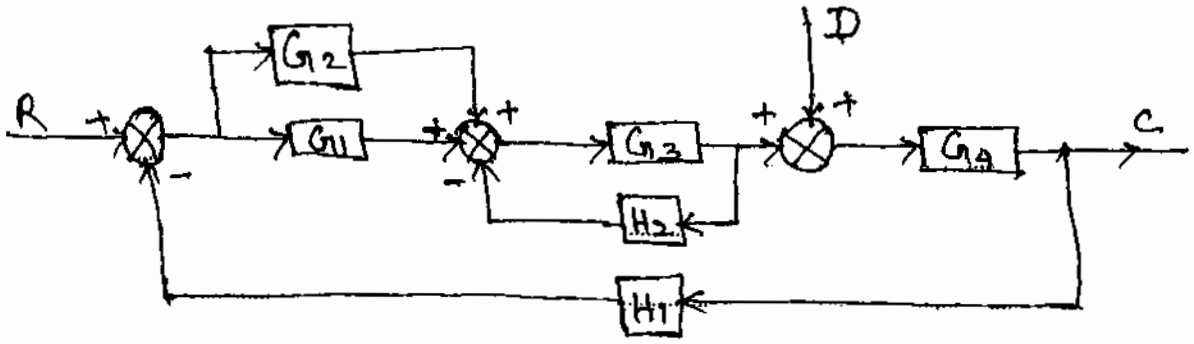
    b) Explain force-voltage analogy with example. **5**

    c) Find the overall transfer function for the signal flow graph shown in figure. **10**



12. a) What are the different components of an automatic control system and explain. **10**

    b) Determine the ratio C/R, C/D and the total output for the system block diagram shown below **10**



Module – 2

13. a) Explain the performance specification of time domain response of a second order system. **10**

    b) Using Routh criterion determine the value of k for which the system with characteristic equation $s(s + 1)(s^2 + s + 1) + k = 0$ is stable. **10**

14. a) Explain type of a system, different static and dynamic error co-efficients. 8

b) For a unity feed back system with open loop transfer function $G(s) = \frac{10(s+2)}{s^2(s+1)}$

find :

i) The position, velocity and acceleration error constants

ii) Steady state error for an input of

$$R(s) = \frac{3}{s} + \frac{1}{3s^3} - \frac{2}{s^2}.$$ 12

Module – 3

15. a) Plot the bode diagram for an open loop transfer of a system

$G(s)H(s) = \frac{50}{s(0.5s+1)(0.005s+1)}$. Obtain the gain margin and phase margin. 15

b) Define gain margin and phase margin. 5

16. a) Explain minimum and non-minimum phase system. 5

b) Sketch the Nyquist plot for a unity feed back system having the loop transfer function $G(s)H(s) = \frac{k}{s(s+1)(s+10)}$. Determine the range of k for the system to be stable. 15

(Pages : 3) **5571**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08-704 – Elective – III : MODERN OPERATING SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Explain the system calls for process management.
2. Differentiate the safe and unsafe state of process.
3. How can the Semaphore be used to solve the critical Section ?
4. Discuss about the different states of process.
5. How does the use of TLB reduces the effective memory access time ?
6. What is thrashing ? How can it be avoided ?
7. Consider the following page reference string 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page fault would occur for the following replacement algorithm with 3 frames where all frames are initially empty.
   1) LRU Replacement
   2) FIFO Replacement
   3) Optimal Replacement.
8. Explain about the different types of File access method.
9. What are the functions of I/O device controllers ?
10. Explain about RAID.

P.T.O.

PART – B

Answer only **one** question from **each** Module.

Module – I

11. a) Explain the layered operating system structure. **8**

b) Consider the following set of process, with length of CPU burst time given in milli seconds.

Process	**Burst time**	**Priority**
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

The process are assumed to have arrived in order P_1, P_2, P_3, P_4, P_5 all at time O.

i) Draw 4 Gantt chart illustrating the execution of these process using FCFs, SJF, a-nonpreemptive priority and RR scheduling.

ii) What is the turn around time of each process for each of the scheduling algorithm in Part (i) ?

iii) What is the waiting time of each process for each of the scheduling algorithm in part(i) ?

iv) Which of the schedule in part(i) results in minimal average waiting time ? **12**

OR

12. a) Explain the banker's algorithm for deadlock avoidance. **10**

b) Explain and compare the different process scheduling algorithm. **10**

Module – II

13. a) What are the different page replacement algorithms ? **10**

    b) What is virtual memory ? How is it implemented ? **10**

OR

14. a) Explain about the logical to physical memory address conversion used in paging. **10**

    b) What are the various free space management techniques used in memory ? Explain. **10**

Module – III

15. a) Explain the various directory structures. **10**

    b) Discuss the different file allocation methods. **10**

OR

16. a) Describe the fixed head and moving head structure of disk. **8**

    b) Explain the various disk scheduling algorithm. **12**

(Pages : 3) **5945 A**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, January 2013
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define Transfer function with example.
2. Explain D' Alembert's principle with example.
3. Explain the principle and use of Gyroscope.
4. Explain the use of magnetic amplifier.
5. Explain the standard test signals used in time domain study.
6. Derive static error coefficients.
7. What is the effect of adding poles and zeros with not locus approach in control systems ?
8. Distinguish between Gain cross over frequency and phase cross over frequency.
9. Distinguish between relative stability and absolute stability.
10. Explain phase lead network. **(10×4=40 Marks)**

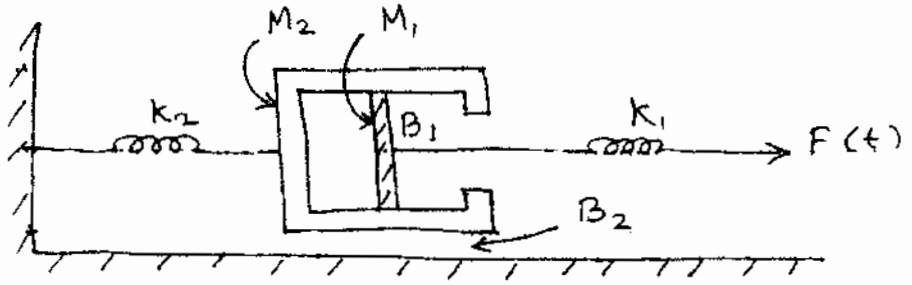
P.T.O.

PART – B

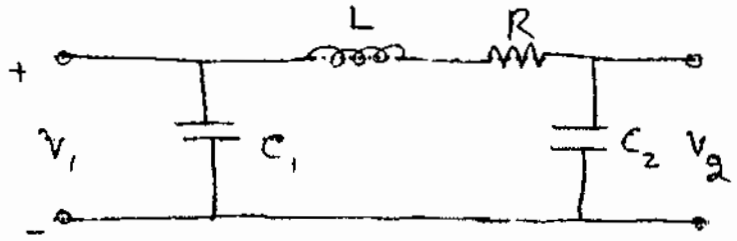
Answer **any one full** question from **each** Module. **(3×20=60 Marks)**

Module – 1

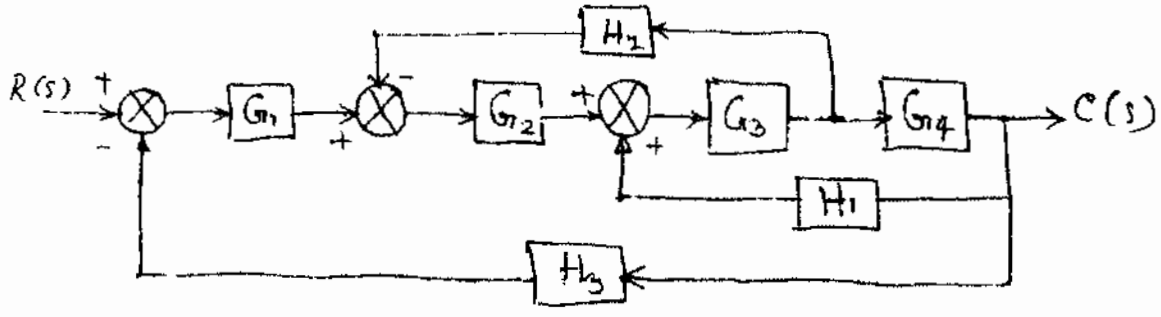
11. a) Draw the electrical analogous circuit-use force voltage analogy. **10**



b) Draw the block diagram and determine the transfer function of the given circuit. **10**



12. a) Determine the over all transfer function relating C and R for the system whose block diagram is given below by block reduction method. **12**



b) Derive the transfer function of armature controlled DC motor. **8**

Module – 2

13. a) Point out the limitations of Routh Hurwitz stability criterion. Determine the number of roots that lie in the right half-plane of s-plane. The characteristic equation of the system is $S^6 + 6S^5 + 10S^4 + 12S^3 + 13S^2 - 18S - 24 = 0$.

(3+7=10)

b) Find the dynamic error coefficients of the unity feedback system whose forward transfer function is $G(S) = \frac{200}{S(S+5)}$. Find the steady state error of the system for the input $4t^2$. **10**

14. The open loop transfer function of a control system is given by

$G(S)H(S) = \frac{K}{S(S+6)(S^2+4S+13)}$. Sketch the root locus and determine the break-away point, the angle of departure from complex poles and the stability condition. **20**

Module – 3

15. a) Sketch the polar plot for $G(S) = \frac{20}{S(S+1)(S+2)}$ and determine whether the system is stable. **10**

b) Draw the Bode plot for

$$G(S) = \frac{23.7(1+jw)(1+0.2jw)}{(jw)(1+3jw)(1+0.5jw)(1+0.1jw)}$$

From the plot find phase margin and gain margin. **10**

16. a) A unity feedback system has open loop transfer function $G(S) = \frac{1}{S(1+2S)(1+S)}$. Sketch Nyquist plot for the system and therefore obtain the gain margin and phase margin. **12**

b) Explain the Nyquist stability criterions. **8**

(Pages : 4) **5924**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

nswer **all** questions.

1. With sketches, compare input-output configuration of open-loop and closed-loop control systems.

2. Define transfer function. What are the properties of systems whose responses can be defined by transfer function ?

3. Explain the construction and operation of tachometer.

4. Describe various standard test signals commonly used in control system design. Give time-domain and s-domain representation of the signals.

5. The transfer function of a first order process is given by $G(s) = \frac{K}{\tau S + 1}$. Find

   a) impulse response to an impulse of strength 'A' b) step response to a step of strength 'A' c) Response to a sinusoidal input A $\sin \omega t$.

6. Show with examples that introduction of derivative mode of control in a feedback system with proportional control makes it less oscillatory. What is the effect on steady state accuracy ?

7. Explain the effect of adding poles and zeros to a root locus plot.

8. Define the terms resonance peak 'M_r' and band width 'W_b' of closed-loop control system.

9. Roughly sketch the polar plot a system described by the transfer function

   $$G(s) = \frac{1}{(1+S\tau_1)(1+S\tau_2)}.$$

10. State Nyquist stability criterion. **(10×4=40 Marks)**

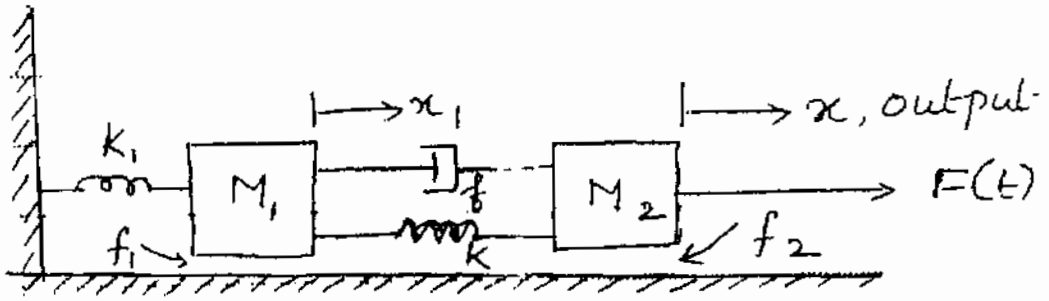
P.T.O.

PART – B

Answer **one** full question from **each** Module.

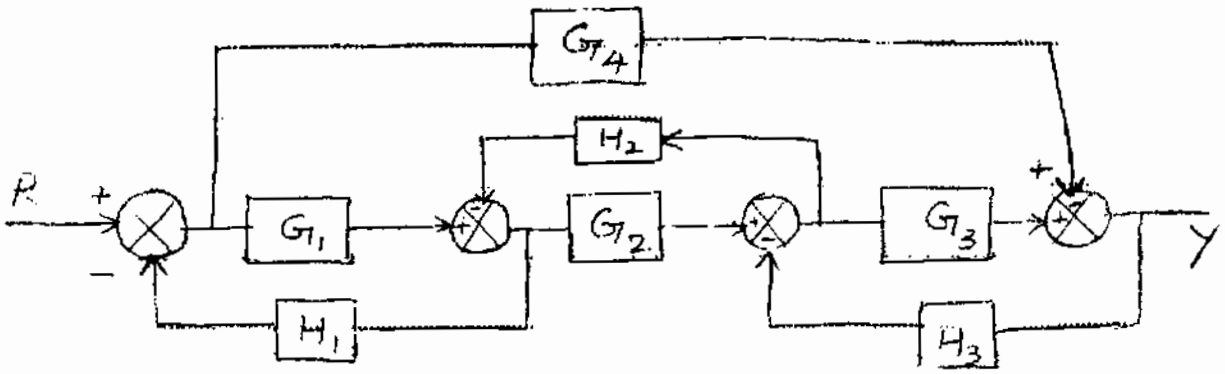
MODULE – I

11. a) Obtain the transfer function $\frac{X(s)}{F(s)}$ for the mechanical system and draw its electric analog. **10**



b) Derive the expression for transfer function of a field controlled dc servomotor. State clearly the assumptions made. **10**

12. a) Block diagram of a typical system is shown below. Draw its equivalent signal flow graph and find the transfer function $\frac{Y}{R}$. **10**



b) Describe the construction and working of a two-phase motor suitable for use in a.c. servo systems. Draw the torque-speed characteristics and derive the transfer function model based on linearised characteristics. **10**

MODULE – II

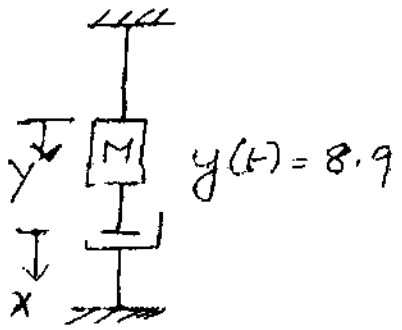
13. a) The characteristic equation of a system is given by

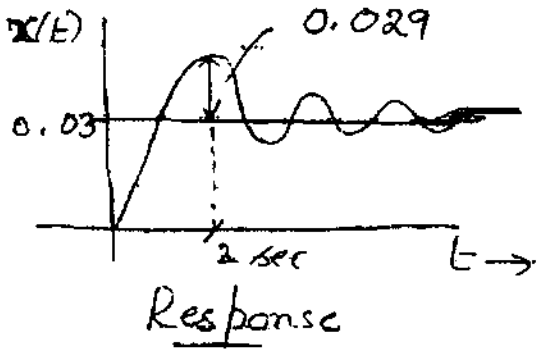
$S^4 + 3S^3 + 3S^2 + 2S + K = 0$

Determine the range of values of K for which the system is stable. **10**

b) Determine the values of M, B and K for the mechanical system shown from the response curve. **10**

n:





14. a) The open-loop transfer function of a control system with positive feedback is $G(s)\frac{K}{s(s^2 + 4s + 5)}$. Sketch the Root-locus of the system as a function of K ($0<K<\alpha$). **10**

b) A unity feedback control system has open-loop transfer function, $G(s) = \frac{10}{s(s + 2)}$.

Find the rise time, % overshoot, peak time, delay time and settling time for a step input of 12 units. **10**

MODULE – III

15. Sketch the Bode plot for the system having the transfer function

$$G(s) = \frac{3}{s(1+0.05s)(1+0.2s)}, \quad H(s) = 1.$$

Determine :

1) Gain cross over frequency and corresponding phase margin.

2) Phase cross over frequency and corresponding gain-margin.

Comment on system stability. **20**

16. Sketch the Nyquist plot and find the positive values of K for which the closed-loop operation is stable, for the system given by $G(s)\,H(s) = \frac{K}{s(1+s)(2+s)}$. **20**

(Pages : 2) **5927**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.705 : ELECTRICAL DRAWING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **any two** questions :

1. a) Draw a 400 KV double circuit transmission tower. **15**

   b) Draw the half sectional view of a disc type insulator. **10**

2. Draw the single line diagram of a 220 KV substation and mark all the equipments and specifications. **25**

3. Draw to a suitable scale the half sectional end view of a squirrelcage induction motor

   Inside dia of stator = 18 cm

   Length of stator = 13.5 cm

   Radial cooling duct = 1 cm wide

   Stator slot size = 0.95 × 2.9 cm

   Outside dia of stator = 32 cm

   Airgap length = 0.06 cm

   Other missing data can be assumed. **25**

P.T.O.

PART – B

Answer **any one** question.

4. Draw the full sectional elevation and sectional plan (with winding) of a single phase transformer (core type).

   Core : diameter = 33 cm

   Height of core = 43 cm

   Centre to centre distance between cores = 49 cm

   Yoke construction cruciform

   Yoke height = 25 cm

   Yoke length = 49 + 0.85 × 33 = 77 cm

   Total height of transformer = 99 cm

   L.V Winding

   Inside dia of L.V winding = 33.75 cm

   Outside dia of L.V winding = 38.35 cm

   LV winding total turns = 22

   LV wdg conductor cross section made from 20 square straps of size 5.5 × 5.5 mm = 500 sq:mm

   HT Winding (in 2 layers)

   Outside dia of HT 1st layer = 43.3 cm

   Inside dia of HT 1st layer = 41.5 cm

   Outside dia of HT 2nd layer = 46.8 cm

   Inside dia of HT 2nd layer = 45 cm

   Assume missing data. **50**

5. Draw the half sectional end view and elevation of 3 phase slipring induction motor.

   Inside diameter of stator = 55 cm

   Stator core length = 20 cm

   Stator winding overhang on each side = 10 cm

   Length of stator frame = 38 cm

   Dia of rotor = 54.6 cm

   Total length of motor = 73 cm

   Height of the motor = 93.04 cm

   Assume missing data. **50**

(Pages : 2) **5892**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.706.4 : PLANT ENGINEERING AND MAINTENANCE

Time : 3 Hours Max. Marks : 100

Instructions *: i) Answer **all** questions from Part – **A**.*

*ii) Answer **one full** question from **each** Module in Part – **B**.*

PART – A

1. List down the useful applications of wear phenomenon.
2. Distinguish between scuffing and pitting.
3. What are the effects of moisture and liquids on wear ?
4. Briefly explain a test to determine flash point of a Lubricant.
5. Explain the important factors associated with reliability.
6. From consideration of maintainability, what important points should be taken care of by designer ?
7. Prepare a short note on MAPI method.
8. What are the advantages and limitations of Condition Based Maintenance ?
9. Explain the various losses which may occur due to an accident in a factory.
10. Enumerate the role of inspection in reducing breakdown. **(4×10=40 Marks)**

PART – B

Module – I

11. a) Discuss the major factors affecting wear in machine elements. **10**

    b) Explain on various types of additives used in Lubricants. **10**

12. a) Give an account on various types of theories related with wear process. **10**

    b) Explain the significant properties of a Lubricant that decides its quality. **10**

P.T.O.

Module – II

13. a) What are the different categories of failure ? Draw a graph showing number of failures Vs time. How each is taken case of in design ? **10**

    b) Explain different types of 'availability' and differentiate between them. **10**

14. a) Enumerate the various factors which are responsible to replace the equipment, although it may be running. **10**

    b) How is economic life determined ? Compare and contrast individual and group replacement. **10**

Module – III

15. a) Distinguish between preventive maintenance and predictive maintenance techniques. **10**

    b) Give the procedure you would like to introduce for the maintenance on the Lathe section of a factory. **10**

16. Prepare short notes on following :

    a) Industrial noise control

    b) TPM

    c) DMS

    d) FAB. **(4×5=20 Marks)**

(3×20=60 Marks)

(Pages : 2) **6275**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2003 Scheme)
03.701 : INDUSTRIAL ENGINEERING AND MANAGEMENT (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Define Industrial Engineering. What are the different fields of application of industrial engineering ?
2. What is a journal ? Explain the steps in journalizing.
3. Define system. Explain the system approach applied to an organization.
4. Explain briefly different types of budgets.
5. Explain briefly systematic layout planning.
6. Differentiate between job evaluation and merit rating.
7. What is a two handed process chart ?
8. What are the causes of industrial fatigue ?
9. Distinguish between selling concept and marketing concept.
10. What is bench marking ? **(10×4=40 Marks)**

PART – B

(Answer **any two** questions from **each** Module).

Module – I

11. Explain in detail the functions of management. **10**
12. Explain various organisation structure. **10**
13. a) What are final accounts ? **5**
    b) Explain break even chart. **5**

P.T.O.

Module – II

14. What are the different factors to be considered for selecting site for an industry ? **10**

15. Explain different steps in method study. **10**

16. Explain any four types of wage incentive plans. **10**

Module – III

17. Explain the role of Trade Unions in industries. **10**

18. Explain various control charts for variables and attributes. **10**

19. What are the elements of marketing mix ? **10**

(3x20=60 Marks)

(Pages : 2) **5821**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.706.12 : NON CONVENTIONAL MACHINING TECHNIQUES

Time : 3 Hours Max. Marks : 100

Instructions : *i) Answer **all** questions from Part – **A**.*
*ii) Answer **one** question from **each** Module in Part – **B**.*

PART – A

1. What are the special requirements of Electrical Discharge Machines ?
2. Enumerate the main factors to be considered while selecting a particular Non Traditional Machining method and why ?
3. How does EDM machine employing relaxation circuit ? Compare with pulse generator.
4. Why is flushing important in EDM ?
5. What are the advantages and disadvantages of ECM ?
6. In what ways ECG differs from ordinary grinding process ?
7. What are the typical functions expected to be served by an electrolyte in ECM process ?
8. Explain the functions of abrasive slurry used in USM process.
9. Explain the principle behind Abrasive Jet Machining.
10. Write a note on special features of the equipment used for Water Jet Machining.

(10×4=40 Marks)

P.T.O.

PART – B

Module – I

11. Explain the mechanism of electric discharge machining. What is wire cut EDM ? Indicate its special applications. What are the basic requirements of a dielectric fluids ? **20**

12. a) In an EDM operation employing relaxation circuit, discuss the effects of
    i) charging resistance
    ii) gap setting and
    iii) capacitance on the rate of metal removal. **12**

    b) Give an account on Recent Developments in EDM Applications. **8**

Module – II

13. a) Describe the working of ECM machine with a neat sketch. **10**

    b) Write in brief the summary of EBM process with a neat sketch. **10**

14. a) What do you understand by LASER ? What are its applications in Production Technology ? **10**

    b) Enumerate the different process parameters considered for evaluation of effectiveness of ECG. **10**

Module – III

15. a) Describe the ultrasonic drilling process, giving areas of application. **10**

    b) Give an account on various process parameters associated with AJM. **10**

16. Prepare short notes on following : **20**
    a) Applications of AJM.
    b) Magnetostriction.
    c) Abrasive feeder.
    d) Coupling System in Ultrasonic Welding. **(3×20=60 Marks)**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions from Part **A**. **(10×4=40 Marks)**

1. Explain transfer function with an example.
2. Compare open loop and closed loop control systems.
3. For the simple mechanical system with mass, spring and friction, obtain the force voltage analogy.
4. Find the inverse laplace transform of

   $F(s) = \frac{1}{(s+2)(s+4)}$ by convolution method.

5. What is ac servomotor and where it is used ?
6. Using root locus, explain the effect of adding zeroes and poles to a system.
7. What is positional error constant ?
8. Explain setting time of a control system.
9. What are the frequency domain specifications of a control system ?
10. Explain the use of phase lead networks in control systems.

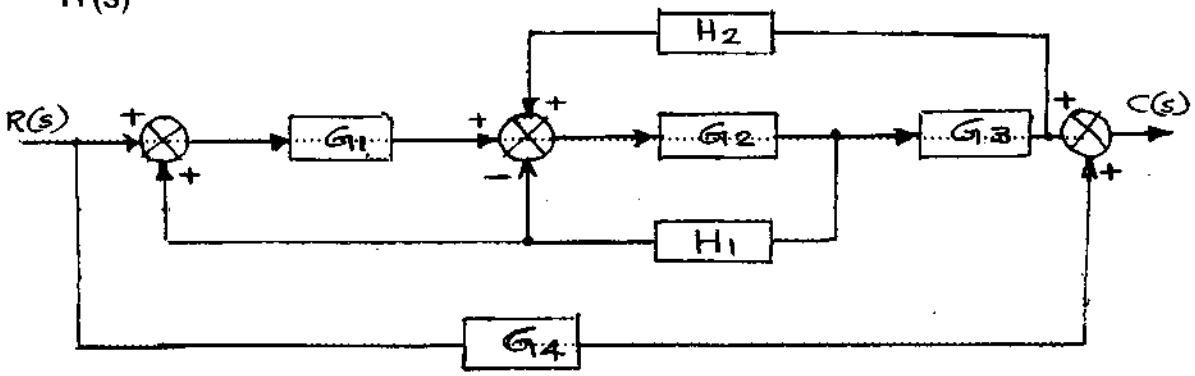
PART – B

Answer **any one full** question from **each** Module. **(3×20=60 Marks)**

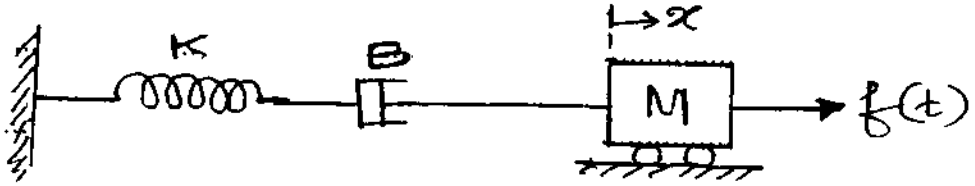
Module – 1

11. a) Derive the transfer function of a field controlled dc motor stating clearly the assumptions made.

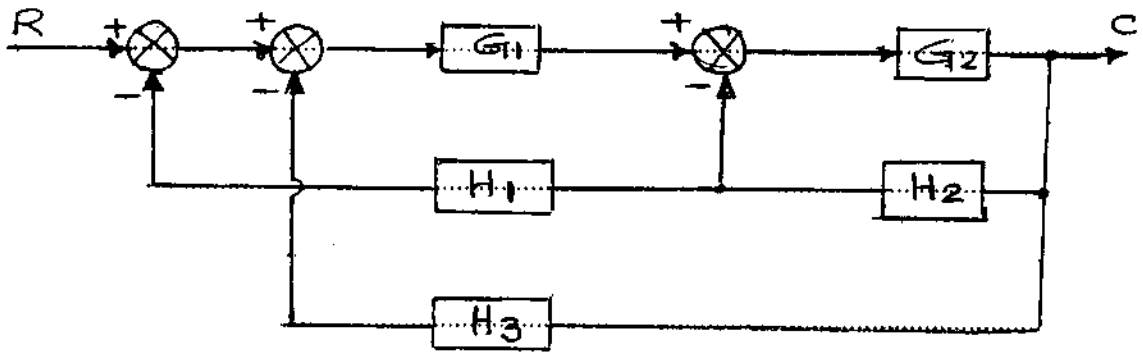
    b) By block diagram reduction technique, obtain the overall transfer function, $\frac{C(s)}{R(s)}$.



12. a) For the mechanical system shown below, obtain $\frac{X(s)}{F(s)}$.



    b) Using the signal flow graphs method, determine $\frac{C}{R}$ for the control system shown below.



Module – 2

13. a) A unity feedback system is characterised by an open loop TF, $G(s) = \frac{K}{S(S+10)}$.

Determine the gain 'K' so that the system would have a damping ratio of 0.5. For this value of 'K', determine the settling time, peak overshoot and time taken for the peak overshoot for unit step input.

b) Check the stability of the system whose characteristic equation is given by

$S^4 + 2S^3 + 3S^2 + 4S + 5 = 0$

14. Obtain the root locus plot of the system choose open loop transfer function,

$$GH(s) = \frac{K}{S(S+2)(S^2+2s+5)}.$$

What is the maximum value of 'K' beyond which the system is unstable ?

Module – 3

15. Sketch the Bode plots of the control system, whose open loop transfer function.

$$GH(s) = \frac{200(s+2)}{S(S^2+10s+100)}.$$

Also comment on the stability of the system.

16. a) How do you correlate the Transient analysis and the frequency response method of analysis of a control system ?

b) Determine the stability of the closed loop system whose open loop TF,

$GH(s) = \frac{1}{S^2(1+s)(1+2s)}$ by the Nyquist method.

(Pages : 3) **5845**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.701 CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

(Answer **all** questions)

1. Write the advantages and disadvantages of open loop and closed loop control systems.

2. A system is described by a differential equation $(d^2y/dt^2) + (3dy/dt) + 2y = (5dx/dt) + 2x$ where x is the input and y is the output. Obtain the poles and zeros of its transfer function.

3. Explain the properties of Transfer Function.

4. Describe the basic principle of operation of synchro.

5. Develop the transfer function for Rotational Mechanical System.

6. Write the standard test signals employed for time domain analysis.

7. Explain static and dynamic error constants.

8. Explain Nyquist stability criterion.

9. What are the different types of compensators ? Explain any one.

10. Explain the significance of Gain Margin and Phase Margin. **(10×4=40 Marks)**

P.T.O.

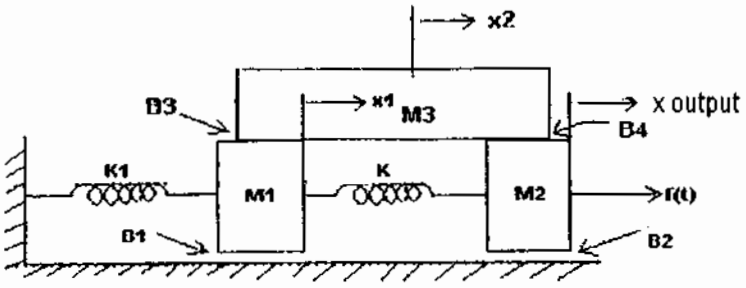
PART – B

(Answer **any one full** question from **each** Module)

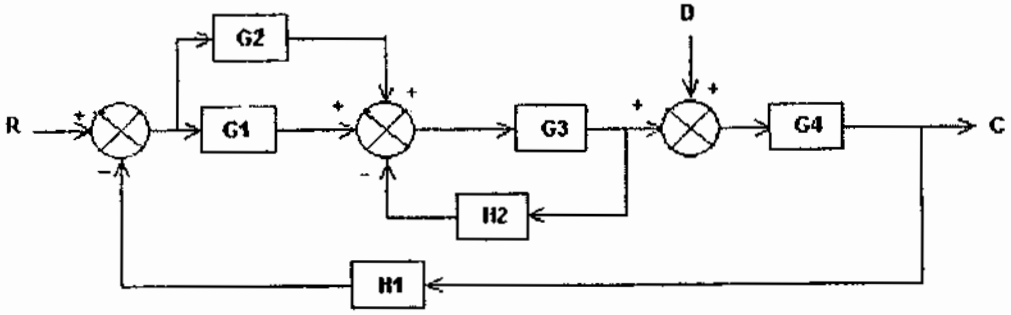
Module – I

11. a) Derive the transfer function for speed control of dc motor using armature speed control. **6**

    b) Obtain the transfer function of the mechanical system shown below and draw its force-voltage analogous circuit. **14**



12. a) Determine the ratio C/R, C/D and the total output for the system shown below. **10**



    b) Draw the signal flow graph for the system shown above. **5**

    c) Briefly explain the working of permanent magnet type stepper motor. **5**

Module – II

13. a) Consider a unity feedback control system with closed loop transfer function is $C(s)/R(s) = (ks + b)/(s^2 + as + b)$. Determine the steady state error for a unit ramp input. **10**

    b) Derive the expression for maximum peak overshoot of a second order system with unit step input. **10**

14. a) Explain the need and effect of adding poles and zeros to open loop transfer function of a physical system. **5**

    b) A unity-feedback control system has an open loop transfer function $G(s) = k/s\ (s+4)\ (s^2 + 8s + 32)$; $k \geq 0$. Sketch the root locus of the system. Hence find the value of k so that the system has a damping factor of 0.707. **15**

Module – III

15. a) Explain the steps for plotting polar plot. **5**

    b) The open loop transfer function of an unity feedback system is given by $G(s) = (10(s + 3))/(s(s + 2)(s^2 + 4s + 100))$. Draw the Bode plot and hence find the gain margin and phase margin. **15**

16. Consider the system whose open loop transfer function is $G(s) = 2.66/(s(s + 1)\ (s + 4))$. Design a suitable compensator, so that it meets the following specifications (a) Damping ratio $\zeta = 0.5$ (b) settling time $t_s = 10$ sec. and (c) Velocity error constant $k_v \geq 5\ sec^{-1}$. **20**

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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.705 : ELECTRICAL DRAWING (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **any two** questions.

1. Sketch the following :
   a) 220 KV double circuit transmission Tower. **15**
   b) Disc insulator. **10**

2. Draw the single line diagram of 220 KV substation with all equipments and specifications. **25**

3. Draw the full sectional elevation and plan of a 3 phase transformer for the dimensions given below.

   Core dia – 22 cm

   Height of core – 48 cm

   Height of yoke – 25 cm

   Centre to centre distance between the cores-35 cm. **25**

PART – B

Answer **any one** question.

4. Draw the half-sectional end view and half sectional elevation of a 10 HP, 3 phase, 50 – Hz, 4 pole, squirrel cage induction motor with the details given below

   Stator : Internal dia of stator – 18 cm

   Outside dia of stator – 32 cm

   Gross length of stator core – 13.5 cm

   (It has one vertilating duct of width 1.3 cm).

   slots – 36 numbers

P.T.O.

width – 0.77 cm

Depth – 3.4 cm

Length of air gap – 0.1 cm

Rotor : Rotor bars – 0.51 cm × 1.52 cm

No of slots – 31

End ring area – 1.69 cm^2

Shaft dia – 5.1 cm

Overall height of the motor – 47.5 cm

The squirrel cage rotor is mounted directly on the shaft. Assume suitable dimensions and shapes for the motor frame and other parts. **50**

5. Draw the following views of a 25 KVA, 400 V, 1500 rpm 50 Hz three phase salient pole alternator –

a) Half sectional elevation (top half in section)

b) End view

Stator : Outside diameter – 400 mm

Inside diameter – 290 mm

Thickness of frame – 36 mm

Core length – 135 mm

Slots open type 48 no: – (32×12 mm) size.

Air gap length – 2 mm

Rotor Pole Grial length – 135 mm

Width – 70 mm

Height with pole shoe – 75 mm

Shaft diameter – 70 mm

Assume reasonable values for other missing data. **50**

(Pages : 4) **6201**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011

(2008 Scheme)

08.701 : CONTROL SYSTEMS (E)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the operation of closed loop system with an example.
2. Explain the concept of stability as applied to a linear system.
3. A set of linear equations are given below.

   Draw the SFG

   $y_2 = ay_1 + by_2 + c\,y_3$; $y_3 = dy_2$; $y_4 = ey_1 + fy_3$; $y_5 = gy_3 + hy_4$.
4. Explain the principle of operation of Stepper Motor.
5. Differentiate between type and order of a system.
6. What is a PID controller ? Obtain its transfer function.
7. Define gain margin and phase margin.
8. Define static error constants. Determine the value of error constants when unit rump input is given.
9. Explain Mason's Gain formula.
10. Write down the important time domain specifications. **(10×4=40 Marks)**

P.T.O.

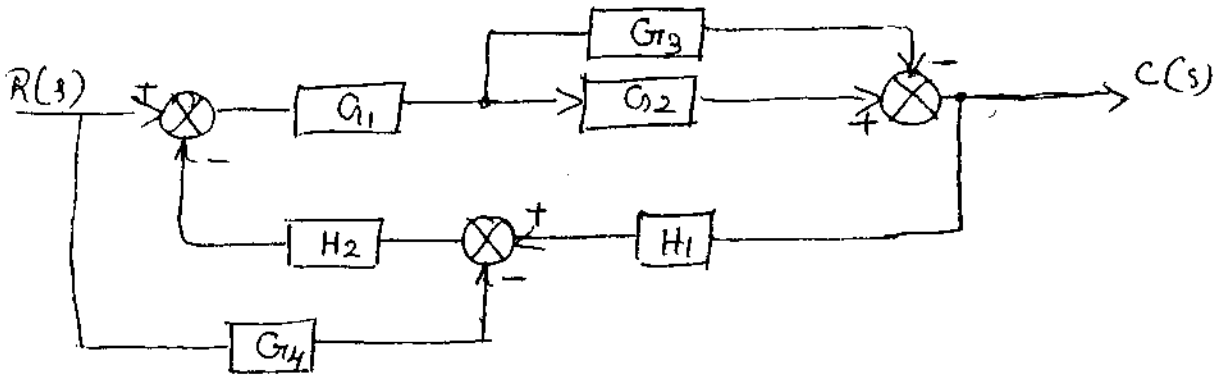
PART – B

Answer **any one full** question from **each** Module.

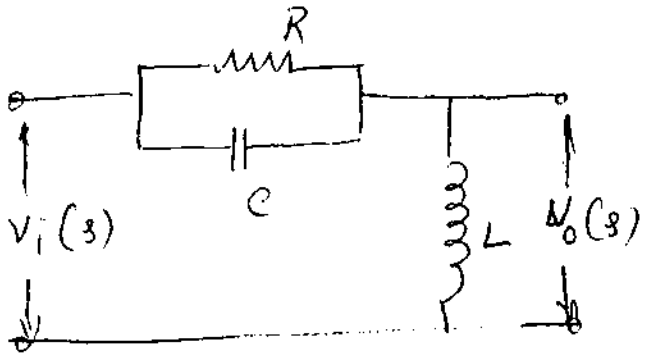
Module – I

11. a) Derive the transfer function of a field controlled DC motor and draw its block diagram. **10**

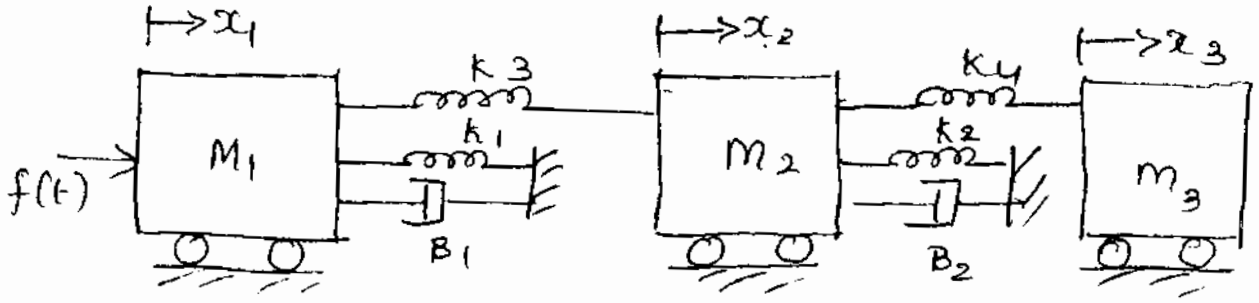
b) Find $\frac{C(s)}{R(s)}$ **10**



12. a) Find $\frac{V_0(s)}{V_i(s)}$ for the electrical circuit shown below **10**



b) Find $\frac{X_1(s)}{F(s)}$ for the mechanical system shown below **10**



Module – II

13. a) A unity feed back system has open loop transfer function of $G(s) = \frac{ke^{-s}}{s(s^2+5s+9)}$. Determine the maximum value of k for stability of closed loop system. **10**

b) For a unity feed back system the open loop transfer function is given by $G(s)H(s) = \frac{k(s+2)}{s^2+2s+3}$. Draw the roof locus. Also find the value of k for which damping ratio = 0.7. **10**

14. a) When a second order system is subjected to a unit step input, the values of damping ratio = 0.5 and natural frequency of oscillation = $6\,^{rad}/_{sec.}$ Determine the rise time, peak time, settling time and percentage peak overshoot. **10**

b) Determine the steady state error of type 0, type 1 and type 2 systems when subjected to unit step input signal. **10**

Module – III

15. a) A unit step response conducted on a second order system yielded peach overshoot $\mu_p = 0.12$ and peak time $t_p = 0.2$ sec. Obtain the corresponding response indices μ_r, ω_r and bandwidth of the system. **10**

b) Draw the Bode plot of the system given by $G(s) = \frac{20}{(1+0.2s)(1+s)(1+10s)}$. Hence determine the phase margin and gain margin. **10**

16. a) Explain Nyquist stability criterion. **5**

b) Draw the complete Nyquist plot of the system whose $G(s)H(s) = \frac{k}{s(s+1)(s+10)}$. Determine the range of k for the system to be stable. **15**

(Pages : 2) **2632**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.805.18 : RESEARCH METHODOLOGY (MPU)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.*

PART – A

1. Differentiate between conceptual and empirical research.
2. Discuss the importance of experimentation in research.
3. Outline the steps in research process.
4. Amplify the concept of research design.
5. Discuss two methods of data collection.
6. Discuss how research benefit society.
7. What does "Partial correlation" seek to bring forth ?
8. What is the main emphasis of a technical report ?
9. What considerations should go into a research report ?
10. Clarify "Interpretation" in the context of research findings. **40**

PART – B

Module – I

11. a) Discuss ways of arriving at a 'Research Problem'. **10**

    b) Discuss criteria of a good research. **10**

12. a) Explain the process of carrying out research. **10**

    b) Discuss the need for literature survey. **10**

P.T.O.

Module – II

13. a) Discuss the need for and features of Research Design. **10**

    b) What are the basic principles of experimental design ? **10**

14. a) Discuss various methods of data collection. **10**

    b) Elaborate on the different types of analysis of data. **10**

Module – III

15. a) Describe the layout of research report, covering all relevant points. **10**

    b) Describe the different forms in which a research work may be reported. **10**

16. a) Explain the technique and importance of oral presentation of research findings. **10**

    b) What is the importance of "Bibliography" in the context of research report ? **10**

(Pages : 3) **2641**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.806.1 : PROPULSION ENGINEERING (MPU)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part **A** and **one full** question from **each** Module in Part **B**.*
*2) Include figures **wherever** necessary.*
*3) Gas tables and atmospheric tables **allowed** in examination hall.*

PART – A

1. Give the general classification of propulsive devices.
2. Explain the working of turbofan engine.
3. List few advantages and disadvantages of Ramjet engine.
4. What are the different types of efficiencies related with turboengines ?
5. Explain surging phenomena in compressors.
6. Explain working of a solar rocket.
7. What do you mean by grain configuration ? List and sketch the commonly used solid grains.
8. List few of commonly used liquid propellants and explain their properties.
9. Explain pyrotechnic igniter.
10. Write short notes on :
    a) Escape velocity
    b) Characteristic velocity. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) Give the reason why propeller engines are not in common use in present day aircraft engines. **5**

    b) A turbojet engine develops a thrust of 7 kN when flying at a speed of 900 km/hr at an attitude where pressure and temperature are 19.4 kPa and 216.7 K respectively. The fuel used has a heating value of 48000 kJ/kg of fuel. The overall efficiency and propulsive efficiency of the engine are 0.16 and 0.5 respectively. Calculate the air fuel ratio, propulsive power and thermal efficiency. Given diameter of inlet section 0.65 m and neglect pressure thrust. **15**

OR

12. a) List advantages and disadvantages of Turbo fan engines. **12**

    b) What is a Scramjet engine ? In what way it is different from Ramjet engine ? **8**

Module – II

13. a) Explain the different types of combustion chambers used in Turbojet engines. Compare them. **12**

    b) What are the different inlet and exhaust ducts used in turboengines. **8**

OR

14. a) What are the advantages of axial compressors over centrifugal compressors in turbojet applications ? Explain a turnspool axial compressor. **12**

    b) Explain plasma propulsion. **8**

Module – III

15. a) Derive an expression for propulsive efficiency of a rocket engine. **6**

    b) Prove that $J_{sp} = \frac{C_F}{C_m}$ and $V^* = \frac{J_{sp}}{C_F}$. **6**

    c) A rocket flies at 10,080 km/hr with an effective exhaust jet velocity of 1400 m/s and propellant flow rate of 5 kg/s. If the heat of reaction of propellants is 6500 kJ/kg, determine $\eta_p, \eta_{th}, \eta_{overall}$ and propulsive power. **8**

OR

16. Write short notes on the following :

    i) Hybrid Rocket

    ii) Turbo pump fed rocket engine cycles

    iii) Cooling of thrust chambers

    iv) Combustion instabilities in LPR engines and their control. **(5×4 = 20 Marks)**

(Pages : 2) **2611**

Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.801 : ENERGY MANAGEMENT (MPU)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part **A** and **one full** question from **each** Module of Part **B**.*

PART – A

1. What are the difference between conventional power plant and non-conventional power plant ?
2. What are the various fuel options for a thermal power plant ?
3. What are the significances of biomass as an energy source ?
4. What are the basic procedures for conducting an energy audit ?
5. Discuss the viability of LED lights over CFL lights.
6. What are the applications of fuel cells ?
7. What do you mean by optimum performance of existing facilities ?
8. How are the waste heat recovery systems classified ?
9. Compare between renewable energy and non-renewable energy.
10. Mention four industries where cogeneration can be adopted. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

11. a) Explain the working of floating roof biomass digester. **10**

    b) What are the advantages of nuclear power plants over thermal power plants ? **10**

12. a) Explain the working of a fluidized bed biomass gasifier. **10**

    b) What are the challenges of storing hydrogen as an energy source ? **10**

Module – II

13. a) How you conduct a detailed energy audit ? **10**

    b) What are the recent energy conservation methods adopted by the Govt. of India ? **10**

14. a) How to formulate an energy management programme ? **10**

    b) What is meant by star labeling ? Give two examples. **10**

Module – III

15. a) Explain the working of a gas turbine based cogeneration system. **10**

    b) What are the various waste heat recovery systems in a steam turbine power plant ? **10**

16. a) Discuss the possibility of cogeneration in an IT sector. **10**

    b) What are the ECO's that can be adopted in residential building ? **10**

(Pages : 2) **7623**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.806.17 : ROBOTICS (MPU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is meant by work envelope of a robot ? Describe the work envelope of a SCARA robot.
2. Enumerate the different types of robot motions.
3. List the types of drives used in robots.
4. Explain the working of an touch sensor.
5. What are the different elements of a wrist sensor ?
6. What is meant by feature extraction with respect to robot vision ?
7. What are the salient features of VAL programming ?
8. Discuss the problems faced by robots used in material handling.
9. Differentiate between forward and inverse kinematics in robot arm transformations.
10. What is meant by lead through programming ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **one** question from **each** Module.

Module – 1

11. a) Discuss the pneumatic drive system. **10**

    b) Explain the construction and working of a variable reluctance stepper motor. **10**

12. a) Differentiate between point to point and continuous path system. **10**

    b) What are the factors to be considered in the selection of a gripper ? **10**

Module – 2

13. a) Explain the working of any two types of proximity sensors. **10**

    b) Write notes on acquisition of image data. **10**

14. Write notes on : **20**

    a) LVDT

    b) Slip sensors

    c) Image sampling

    d) Resolvers.

Module – 3

15. Compare teach pendant programming and lead through programming. Discuss their merits and demerits. **20**

16. List the different commands used in VAL II programming and describe its functions. **20**

PART – B

Module – I

11. a) Sketch and explain the p-T diagram for helium 4. Indicate lambda line, lambda point and critical point and explain their significance.

    b) Discuss the variation of different properties of materials during transition from normal to superconducting state.

OR

12. a) Give an account of the historical development of cryogenic technology.

    b) Briefly explain the application of cryogenics in electronics.

Module – II

13. a) In an ideal claude liquefaction system for nitrogen, the gas enters the compressor at 101.3 kPa and 20°C and is compressed to 4.05 MPa. Determine the expander flow rate ratio required for a liquid yield of 0.2, if the gas enters the reversible adiabatic expander at 4.05 MPa and 240 K.

    b) Explain the different losses which occurs in the different components of gas liquefaction systems.

OR

14. a) Determine the ideal work requirement for the liquefaction of neon beginning at 101.3 kPa and 300 K. Also determine the heat rejected per unit mass in the ideal isothermal compressor.

    b) Explain the simple Linde-Hampson system for the liquefaction of nitrogen gas.

Module – III

15. a) With a neat sketch and T-s diagram explain the working of a magnetic refrigeration system.

    b) Explain the importance of regenerators in cryogenic refrigeration system.

OR

16. a) With a suitable schematic and T-s diagram explain the working of a Phillips refrigerator.

    b) With the help of a neat sketch explain a cryogenic liquid storage vessel.

Reg. No. : .....

Name : .....

(Pages : 2)

5716

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.803 : AUTOMOBILE ENGINEERING (M)

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Differentiate multifuel and dual fuel engines.
2. Why diesel engines are not popular in two wheelers ?
3. Explain CRDI system.
4. Explain the working of any one type of direction indicator.
5. Explain the process of bleeding of Brakes.
6. Explain the function of Brake valve in air brake system.
7. Describe Hypoid drive and its advantages.
8. Describe air suspension system and its limitations.
9. Explain Castor angle and Camber angle along with its function.
10. Write note on hybrid vehicles.

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) What are the main parts that needs lubrication in a car ? Explain the different methods of engine lubrication.

    b) Explain the working of cooling water pump and cooling fan.

12. a) Why spark advance is essential ? Explain centrifugal spark advance system in detail.

    b) Draw the battery ignition system circuit for a four cylinder engine and explain its functioning.

Module – II

13. a) Describe the working and use of torque convertors.

    b) Explain the working of a Magnetic clutch. State its merits and demerits.

14. a) Sketch a constant mesh gear box in third gear engaged position and explain its working.

    b) Explain the mechanism of four wheel drive. State its advantages and disadvantages.

Module – III

15. a) Explain the working of drum type and disc type hydraulic brake system. What are the benefits of each over the other ?

    b) Explain the working, advantages, disadvantages and precautions of power brake system.

16. a) Explain various steering gear mechanisms used in automobiles.

    b) What are the benefits of independent suspension system ? Explain the working of suspension system using torsion bar.

(Pages : 2) **5685**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.802 : DESIGN AND DRAWING OF STEEL STRUCTURES (C)

Time : 4 Hours Max. Marks : 100

Instructions *:1) Answer* ***all*** *questions from Part* ***A*** *and* ***two*** *questions from Part* ***B****.*

2) Assume suitable data ***wherever*** *necessary.*

3) ***Use*** *of steel tables, IS 800, IS 875 (1, 2 and 3) IS 801, Is 804, IS 806, IS 1161, IS 6533(2) are* ***permitted****.*

PART – A **(2×10= 20 Marks)**

1. Design a base plate for a column IS HB 250 @ 51 kg / m which is carrying an axial load of 800 kN (factored). Foundation concrete is of M_{20} grade and clear angles to be used are ISA 80 × 80 × 6. **10**

2. Write a brief note on the lateral bracing system of railway bridges and its design procedure. **10**

PART – B **(2×40= 80 Marks)**

3. a) Design a circular water tank with hemispherical bottom for a capacity of 90 m^3 of water. Design of staging is not required. **20**

   b) Draw to a suitable scale the plan and elevation of the tank. **20**

OR

P.T.O.

4. a) Design a tubular truss for a span of 9 m with spacing 3 m, and having GI sheet roofing. Intensity of wind pressure may be taken as 1 kN/m^2. **20**

   b) Draw to a suitable scale the elevation and support joint details of the above truss. **20**

5. a) Design a self supporting steel chimney for a height of 80 m and with top diameter 4 m. It is subjected to a uniform wind pressure of 1.2 kN/m^2. **20**

   b) Draw to a suitable scale the elevation, plan and foundation details of above chimney. **20**

OR

6. a) Design a welded plate girder for a BG main railway track for a span of 20 m. **20**

   b) Draw to a suitable scale the elevation and plan of the above designed bridge. **20**

(Pages : 2) **5715**

Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.802 : INDUSTRIAL ENGINEERING (MPU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks :

1. Explain different functions of industrial engineering.
2. What are the characteristics of a good design ?
3. Explain principles of material handling.
4. What are the advantages of preventive maintenance ? What is total productive maintenance ?
5. Explain SIMO chart.
6. Explain different forms of communication in an industry.
7. Explain the procedure of time study.
8. Distinguish between job evaluation and merit rating.
9. What is statistical quality control ?
10. What is benchmarking ? **(10×4=40 Marks)**

PART – B

Answer **any one full** question from **each** Module. **Each** question carries **20** marks :

Module – I

11. a) What do you mean by C-V-P analysis ? **8**

 b) Explain different methods used for calculating depreciation with an example. **12**

P.T.O.

12. a) What is flexible manufacturing system ? **8**

    b) Explain any four types of material handling equipments used in industries. **12**

Module – II

13. a) Explain principles of motion economy. **12**

    b) What are the different types of allowances ? **8**

14. a) What are the essentials of a good wage incentive plan ? **8**

    b) Explain different methods used for settling industrial disputes. **12**

Module – III

15. a) Explain ABC analysis in inventory control. **8**

    b) What is economic order quantity ? Derive an expression for EOQ. **12**

16. a) Explain control charts for variables and control charts for attributes. **12**

    b) Distinguish between consumer's risk and producer's risk. **8**

(3×20=60 Marks)

(Pages : 3) **5753**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.806.10 : FLEXIBLE MANUFACTURING METHODS (MPU)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions from Part – **A**.*
*2) Answer **one** question from **each** Module in Part – **B**.*

PART – A

1. Distinguish between programmable automation and fixed automation.
2. Describe the CAD system architecture.
3. Classify the CAD system software based on technology used.
4. What is a data processing unit in a numerical control ? What are the components of a data processing unit ?
5. What are the different type of manufacturing systems based on type of operations performed by a manufacturing system ? What are the parameters that play a role in determining the design of manufacturing system ?
6. Explain the characteristics of a manufacturing system that is flexible.
7. What is product-mix flexibility ?
8. What are the general types of integration present in an FMS and how is it achieved ?
9. Distinguish between static and real-time scheduling in FMS.
10. Discuss the various approaches used in the modelling of FMS. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – 1

11. Write the part program to drill the holes in the part shown in Figure 1. The part is 12 mm thick. Cutting speed = 100 m/min and feed = 0.06 mm/rev. Use the lower left corner of the part as the origin in the x-y axis system. Write the part program in the word address format with TAB separation and variable word order.

OR

12. Write the complete APT part program to perform the drilling operations for the part drawing in Figure 1. Cutting speed = 0.4 m/sec., feed = 0.10 mm/rev., and table travel speed between holes = 500 mm/min. Postprocessor call statement is MACHIN/DRILL, 04.

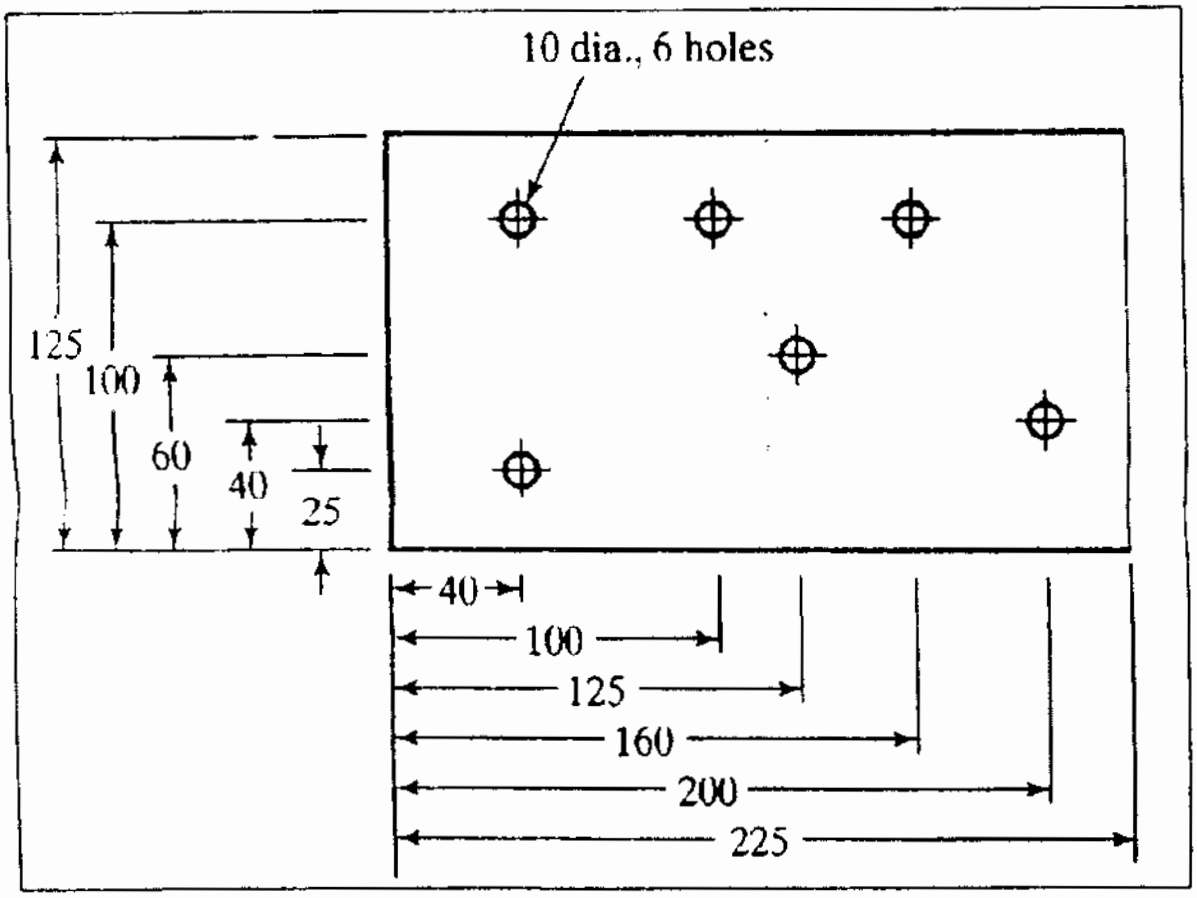


Figure 1 : Part Drawing. Dimensions are in millimeters

Module – 2

13. a) Discuss the application of the Part coding and classification system in manufacturing.

    b) Six manufactured components and their machine sequence are given below.

Component	P1	P2	P3	P4	P5	P6
Machine sequence	Q, S, T	X, Q, S	X, M, Q, S	X, M	Q, T	T

Create a part-machine incidence matrix. Form a block-diagonal structure for the incidence matrix. Determine the number of machine required to have independent cells.

OR

14. Explain the benefits derived by the implementation of an FMS for a production system which is managed by a batch type manual production system. Discuss basically the enablers of flexibility in an automated system.

Module – 3

15. a) Explain the role of group technology in the design of FMS.

    b) Discuss the importance of tool management in an FMS. Explain the roll of tool magazine and quick tool changeover in the performance of FMS.

OR

16. a) Describe the automated operation of FMS using flow chart.

    b) Explain the need for a tool monitoring system in FMS.

(3×20=60 Marks)

(Pages : 2) **5717**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, October 2014

(2008 Scheme)

08.804 : COMPUTER INTEGRATED MANUFACTURING (MU)

Time: 3 Hours Max. Marks: 100

PART – A

Answer **all** questions :

1. Explain the working of CAM software.
2. Briefly describe the different layers of MAP.
3. What are the advantages of CAPP ?
4. Differentiate between CNC and DNC.
5. What are stepper motors ?
6. State the working principle of a resolver.
7. What is a canned cycle ?
8. What is an expert system ?
9. What are the advantages of concurrent engineering ?
10. Write notes on computer vision. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one full** question from **each** Module :

Module – 1

11. a) Describe the retrieval and generative CAPP in detail. **10**

    b) Explain the different applications of CAD. **10**

12. a) Discuss on DBMS and RDBMS. **10**

    b) Explain different types of CIM manufacturing systems. **10**

Module – 2

13. a) Differentiate between preparatory and miscellaneous function codes. Explain any three 'G' codes. **10**

    b) What are the different types of optical encoders ? Explain with detailed diagrams. **10**

14. a) What are recirculating ball screw mechanisms ? Explain preloading of ball screws. **10**

    b) Differentiate between point to point, straight cut and continuous path type NC machines. **10**

Module – 3

15. a) What is Group Technology ? Explain its advantages and applications. **10**

    b) Discuss the different programming method for robots. **10**

16. a) Explain the different components of FMS. **10**

    b) Enlighten the concept of JIT. **10**

(Pages : 2) **6753**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.804 : COMPUTER INTEGRATED MANUFACTURING (MU)

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer **all** questions of Part – **A**.*
*2) Answer **one** question from **each** Module of Part – **B**.*

PART – A

1. Explain integration in manufacturing technology.
2. Differentiate between DBMS and RDBMS.
3. Bring out the benefits of CAPP System.
4. How can we avoid stick-slip and back lash in machine tools ?
5. Describe the significance of MAP in CIM environment.
6. Explain briefly about the APT language.
7. Enumerate the factors to be considered in selecting a suitable material handling method for a particular manufacturing operation.
8. Describe the role of management in CIM.
9. What are basic robot motions ? Explain briefly.
10. Give the basic structure of an expert system. **(10×4=40 Marks)**

PART – B

Module – I

11. a) In what ways have computers had an impact on manufacturing ? **10**
    b) Explain the CAD/CAM system activities. **10**

OR

12. a) Give a specific example in which the variant system of CAPP is desirable, and one in which generative system is desirable. Explain. **10**

    b) Explain the role of computers in MRP. **10**

Module – II

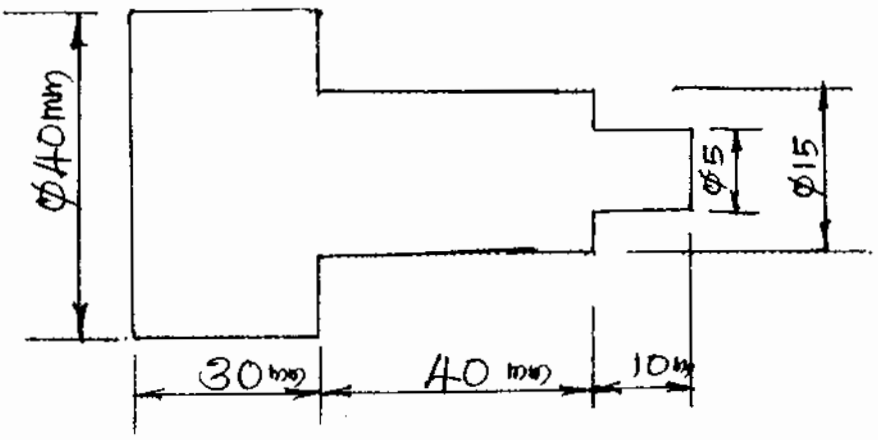
13. a) List the steps involved to produce an NC program. Briefly explain sequence number, preparatory function, miscellaneous function and canned cycle. **10**

    b) Describe the open loop and closed loop controls with examples. **10**

OR

14. a) Explain with block diagrams the application of an adaptive control suitable for a turning operation. **10**

    b) Prepare a CNC program to machine the component shown in figure. Billet size $\phi 40 \times 80$ mm. **10**



Module – III

15. a) Explain in detail the communication networks in manufacturing. **10**

    b) How are robots programmed to follow a certain path ? **10**

OR

16. a) What factors have led to the development to automated guided vehicles ? Do they have any disadvantages ? Explain in detail. **10**

    b) Explain the operation of a machine vision system. **10**

(Pages : 2) **6751**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.802 : INDUSTRIAL ENGINEERING (MPU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions ; **each** question carries **4** marks.

1. What is industrial engineering ? Explain the applications of it in service industries.
2. What is a break even chart ?
3. What are the advantages of Flexible Manufacturing System ?
4. Explain a two handed process chart.
5. What are Therbligs ?
6. What are the essentials of a good wage incentive plan ?
7. Explain the causes and effects of industrial disputes.
8. What is a GANTT-chart ?
9. Explain various non destructive testing methods.
10. What is a quality circle ? **(10×4=40 Marks)**

PART – B

Answer **any one** full question from **each** module, each question carries **20** marks.

Module – I

11. a) Explain the importance of product development in the modern world. **8**
    b) Explain different steps involved in product development. **12**
12. a) What is value engineering ? Explain the applicaitons of it. **10**
    b) What are the steps in value engineering ? **10**

P.T.O.

Module – II

13. a) Explain different types of process charts. **10**

    b) Explain any two types of Wage Incentive Plans. **10**

14. a) What are the applications of industrial psychology ? Explain motivation and perception. **12**

    b) Explain the role of workers in improving productivity in an industry. **8**

Module – III

15. a) Derive an expression for Economic Order Quantity. **10**

    b) Distinguish between batch production and mass production. **10**

16. Write short notes on :

    a) O.C. Curves

    b) Bath Tub Curve

    c) TQM

    d) ISO 9000 series. **(5×4=20 Marks)**

(3×20=60 Marks)

(Pages : 2) **6750**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.801 : ENERGY MANAGEMENT (MPU)

Time : 3 Hours Max. Marks : 100

***Instruction** : Answer **all** questions in Part **A** and **any one** full question from **each** Module in Part **B**.*

PART – A

ow are biogas plants classified ?

st the principles of MHD generation.

xplain the significance of load curves.

hat do you understand by energy optimization ?

5. hat are the objectives of energy management ?

6. xplain site selection criterias for a nuclear power plant.

7. Explain pinch technology.

8. What are heat recoupators ?

9. Explain energy conservation through demand side management.

10. Explain the methods of energy conservation in agriculture.

(10×4=40 Marks)

P.T.O.

PART – B

MODULE – I

11. a) Discuss about nonconventional energy conversion plants. **10**

    b) Explain the significance of energy plantation. **10**

OR

12. a) Write notes on energy storage plants and their significance. **10**

    b) Explain energy conversion plants for different load requirements. **10**

MODULE – II

13. a) Discuss about the energy strategies adopted in Indian context. **10**

    b) Explain energy audit. **10**

OR

14. a) Explain the objectives of energy management. **10**

    b) Discuss about energy management control system. **1(**

MODULE – III

15. a) Discuss the principles of energy conservation. **10**

    b) Explain waste heat recovery in Industries and Automobiles. **10**

OR

16. a) Discuss about ECO in residential and commercial buildings. **10**

    b) Explain combined cycle power generation and its significance. **10**

(Pages : 2)

6766

Reg. No. : ....

Name : ....

Eighth Semester B.Tech. Degree Examination, December 2013

(2008 Scheme)

08-805.13 : CRYOGENIC ENGINEERING (MNP)

Elective – IV

Time : 3 Hours Max. Marks : 100

***Instruction** : **Use** of thermodynamic charts and table **permitted**.*

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Name the scientists who are associated with the liquefactions of the following gases :

   a) Oxygen b) Nitrogen

2. Describe fountain effect for liquid Helium – II.

3. What do you mean by superconductivity ?

4. Will Linde Hampson system for gas liquefaction work for all gases ? If not give reasons.

5. Define FOM and liquid yield for a gas liquefaction system.

6. Define isothermal efficiency of a compressor and mechanical efficiency of an expander.

7. Briefly describe Cryopumping.

8. Name a few heat exchangers used in Cryogenic systems.

9. Sketch any four methods of supporting the inner vessel within the outer vessel in a dewar.

10. Sketch the T-S diagram for Carnot refrigerator and give its expression for COP.

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Explain the properties of liquid hydrogen. **10**

    b) Briefly explain the historical development of Cryogenics. **10**

OR

12. a) Explain the various mechanical properties of materials at cryogenic temperatures. **10**

    b) Describe the application of Cryogenics in the field of space technology. **10**

Module – II

13. a) Determine the ideal work requirement for the liquefaction of Nitrogen beginning at 101.3 kPa and 300 K. Also determine the heat rejected per unit mass in the ideal isothermal compressor. **10**

    b) Explain the Claude system for liquefaction of hydrogen. **10**

OR

14. a) What do you mean by adiabatic demagnetization ? Explain adiabatic demagnetization process with schematic diagram of its apparatus. **10**

    b) What type of liquefaction system you will use for liquefying neon or hydrogen ? Describe with figure. **10**

Module – III

15. a) With the help of neat sketch explain a Dewar vessel. **10**

    b) Determine the refrigeration effect, COP and figure of merit for a simple Linde-Hampson refrigerator operating from 300 K $(80^{\circ}F)$ and 101.3 kPa (1 atm) to 10.13 MPa (100 atm). The overall efficiency of the compressor is 75 percent and the heat exchanger effectiveness is 0.960. The working fluid for the refrigerator is nitrogen. **10**

OR

16. a) Compare the advantages and disadvantages of different types of insulations used in cryogenic systems. **12**

    b) Describe the working of Turbine flow meter with neat sketches. **8**

(3×20=60 Marks)

(Pages : 2) **6780**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08.806.1 : PROPULSION ENGINEERING (MPU)

Time: 3 Hours Max. Marks: 100

Instruction: *Answer **all** questions from Part – **A** and **one** question from **each** Module of Part – **B**.*

PART – A

1. What do you mean by propulsion ? List different types of propulsive devices.
2. Write notes on pulse-jet engine.
3. What are three ways of using a gas turbine engine to power an airplane ?
4. What is the function of the inlet duct ? Why the design is so important ?
5. Name and briefly explain two basic types of gas turbine compressors.
6. What are the requirements for a good combustion chamber ?
7. List the different rocket propulsion systems.
8. What are general types of solid propellants ?
9. What are the functions of injectors in liquid engine rockets ?
10. Explain about hybrid rocket engine system. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Explain with sketch the working principle of air-screw engine. What are its limitations ? **7**

    b) Make a table that lists the characteristics and uses of turbojet, turbofan and turboprop engines. **13**

P.T.O.

12. a) Derive an expression for thrust, thrust power and propulsive power of a turbojet engine. **10**

    b) With h-s and T-s diagram explain about thermodynamics analysis of airbreathing engines. **10**

Module – II

13. a) Explain the phenomenon of compressor stall. How may the stall problem be reduced ? **8**

    b) A turbojet engine propels an aircraft at 900 km/hr. The calorific value of fuel is 44000 kJ/kg and airfuel ratio is 50 : 1. The speed ratio is 0.5. Calculate the ideal propulsive efficiency, thermal efficiency and overall efficiency. **12**

14. a) List the three basic type combustion chamber and explain with sketch. **10**

    b) What is thrust reversers ? Explain with sketch the different types of thrust reversers. **10**

Module – III

15. a) Explain with sketch the gas pressure feed system of liquid propellant rocket engine. **7**

    b) i) Explain the terms applied to rocket engines thrust, total impulse and specific impulse. **3**

    ii) With the aid of energy balance diagram for chemical rockets, discuss various efficiencies of rocket engines. **10**

16. a) Describe with sketches different methods of thrust vector control for liquid rocket engine. **10**

    b) What is the function of igniters in solid propellant motors ? Explain different types of igniters used in solid motors and phases of ignition processes with diagrams. **10**

(Pages : 2) **6766**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, December 2013
(2008 Scheme)
08-805.13 : CRYOGENIC ENGINEERING (MNP)
Elective – IV

Time : 3 Hours Max. Marks : 100

***Instruction** : **Use** of thermodynamic charts and table **permitted**.*

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Name the scientists who are associated with the liquefactions of the following gases :
   a) Oxygen b) Nitrogen
2. Describe fountain effect for liquid Helium – II.
3. What do you mean by superconductivity ?
4. Will Linde Hampson system for gas liquefaction work for all gases ? If not give reasons.
5. Define FOM and liquid yield for a gas liquefaction system.
6. Define isothermal efficiency of a compressor and mechanical efficiency of an expander.
7. Briefly describe Cryopumping.
8. Name a few heat exchangers used in Cryogenic systems.
9. Sketch any four methods of supporting the inner vessel within the outer vessel in a dewar.
10. Sketch the T-S diagram for Carnot refrigerator and give its expression for COP.

P.T.O.

PART – B

Answer **any one** question from **each** Module. **Each** question carries **20** marks.

Module – I

11. a) Explain the properties of liquid hydrogen. **10**

    b) Briefly explain the historical development of Cryogenics. **10**

OR

12. a) Explain the various mechanical properties of materials at cryogenic temperatures. **10**

    b) Describe the application of Cryogenics in the field of space technology. **10**

Module – II

13. a) Determine the ideal work requirement for the liquefaction of Nitrogen beginning at 101.3 kPa and 300 K. Also determine the heat rejected per unit mass in the ideal isothermal compressor. **10**

    b) Explain the Claude system for liquefaction of hydrogen. **10**

OR

14. a) What do you mean by adiabatic demagnetization ? Explain adiabatic demagnetization process with schematic diagram of its apparatus. **10**

    b) What type of liquefaction system you will use for liquefying neon or hydrogen ? Describe with figure. **10**

Module – III

15. a) With the help of neat sketch explain a Dewar vessel. **10**

    b) Determine the refrigeration effect, COP and figure of merit for a simple Linde-Hampson refrigerator operating from 300 K $(80^{\circ}F)$ and 101.3 kPa (1 atm) to 10.13 MPa (100 atm). The overall efficiency of the compressor is 75 percent and the heat exchanger effectiveness is 0.960. The working fluid for the refrigerator is nitrogen. **10**

OR

16. a) Compare the advantages and disadvantages of different types of insulations used in cryogenic systems. **12**

    b) Describe the working of Turbine flow meter with neat sketches. **8**

(3×20=60 Marks)

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : INDUSTRIAL ENGINEERING (MPU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. State the objectives of value engineering.
2. Explain human factors in design.
3. With the help of an example, explain any two methods for calculating depreciation for an equipment.
4. What is a string diagram ?
5. What is micromotion study ?
6. Explain the causes of industrial fatigue.
7. Distinguish between variable control chart and attribute control chart.
8. What is a quality circle ?
9. What is GANTT chart ?
10. Explain the various elements of TQM. **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

MODULE – I

11. a) Define industrial engineering. Describe its evolution. **10**

    b) Explain C-V-P analysis. What are its applications ? **10**

12. a) Explain the procedure for establishing or improving materials handling system. **12**

    b) What do you mean by economic life of an equipment ? How will you determine it ? **8**

MODULE – II

13. a) What is a man-machine chart ? **10**

    b) "Critical examination is a motive force to develop a new method". Justify. **10**

14. a) Explain the causes and effect of industrial disputes. **10**

    b) Describe any two group incentive plans with suitable examples. **10**

MODULE – III

15. a) Describe briefly the ABC, HML and VED analysis of inventory control. **9**

    b) A company needs 600 units per month, the procurement cost is Rs. 36 per order, the cost of holding it in stock is Rs. 1.20 per unit per year. Determine the quantity that should be procured at a time to optimise the cost involved. If the consumption of the above item increases to 40 numbers per day and its actual inventory cost is Rs. 0.50 per unit per month. What will be the revised EOQ ? **11**

16. Write short notes on :

    i) O C curve

    ii) Control Charts

    iii) Bench marking

    iv) ISO 14000 series. **(3×20=60 Marks)**

(Pages : 2) **1728**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.805.18 : RESEARCH METHODOLOGY (MPU)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer* ***all*** *questions from Part* ***A*** *and* ***one*** *question from* ***each*** *Module of Part* ***B****.*

PART – A

1. What are the desirable requirements of a research output ?
2. Differentiate between fundamental and applied research.
3. Discuss the motivations for doing a research.
4. Explain the meaning and significance of research design.
5. Name any four data analysis techniques.
6. Define standard deviation of a data. Write down an equation for the same.
7. What is the importance of interpretation of a research output ?
8. Name different type of technical reports. Discuss briefly each one.
9. Discuss the importance of effective communication using illustrations.
10. Discuss the importance of usual aids in presentations.

(10×4=40 Marks)

P.T.O.

PART – B

MODULE – I

11. a) Discuss the procedure for selecting the problem for a research. **10**

    b) Discuss the significances of doing research. **10**

12. a) Discuss the different steps in carrying out a research. **10**

    b) Discuss the importance of literature. Mention the sources of literature. **10**

MODULE – II

13. Discuss the importance of sampling as a research method. Explain how a sampling data can be used to extrapolate the result for a population. **20**

14. a) Discuss different types of data analysis techniques. Explain the use of correlation coefficient. **10**

    b) Discuss different data collection methods. **10**

MODULE – III

15. a) Explain the methods for publishing the results of a research slidy. Describe the important contents of a research article. **15**

    b) Discuss the important points to be considered while fixing the title of a research work. **5**

16. a) Explain the points to be considered while making a presentation and answering questions. Explain the importance of graphic illustrations. **12**

    b) Describe the importance of language quoting atleast two examples in the preparation of a research report. **8**

5965

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.802 : INDUSTRIAL ENGINEERING (MPU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. State the objectives of value engineering.
2. Explain human factors in design.
3. With the help of an example, explain any two methods for calculating depreciation for an equipment.
4. What is a string diagram ?
5. What is micromotion study ?
6. Explain the causes of industrial fatigue.
7. Distinguish between variable control chart and attribute control chart.
8. What is a quality circle ?
9. What is GANTT chart ?
10. Explain the various elements of TQM. **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module.

MODULE – I

11. a) Define industrial engineering. Describe its evolution. **10**

    b) Explain C-V-P analysis. What are its applications ? **10**

12. a) Explain the procedure for establishing or improving materials handling system. **12**

    b) What do you mean by economic life of an equipment ? How will you determine it ? **8**

MODULE – II

13. a) What is a man-machine chart ? **10**

    b) "Critical examination is a motive force to develop a new method". Justify. **10**

14. a) Explain the causes and effect of industrial disputes. **1(**

    b) Describe any two group incentive plans with suitable examples. **1**

MODULE – III

15. a) Describe briefly the ABC, HML and VED analysis of inventory control.

    b) A company needs 600 units per month, the procurement cost is Rs. 36 per order, the cost of holding it in stock is Rs. 1.20 per unit per year. Determine the quantity that should be procured at a time to optimise the cost involved. If the consumption of the above item increases to 40 numbers per day and its actual inventory cost is Rs. 0.50 per unit per month. What will be the revised EOQ ? **11**

16. Write short notes on :

    i) O C curve

    ii) Control Charts

    iii) Bench marking

    iv) ISO 14000 series. **(3x20=60 Marks)**

(Pages : 2) **5985**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.805.18 : RESEARCH METHODOLOGY (MPU)

Time : 3 Hours Marks : 100

Instruction : *Answer **all** questions from Part **A**. Answer **one** question from **each** Module in Part **B**.*

PART – A

1. Differentiate between exploratory and descriptive research.
2. Write down four important characteristics of a good research.
3. Reinventing wheel is not a research. Discuss this and thus give a definition to research.
4. Differentiate between research methods and research methodology.
5. List out important features of a research design.
6. What is data editing ? Explain its use.
7. Differentiate between primary and secondary data.
8. Name the different type of technical articles published in technical journals. Briefly explain the purpose of each one.
9. List the important contents of a technical report.
10. Indicate the main contents required to be presented in a research proposal.

(4×10=40 Marks)

PART – B

Module – I

11 a) Discuss the method for setting the objectives of a research programme. **10**

b) Discuss the motivations for doing research. **10**

12. a) What are the sources of materials for literature survey ? **5**

b) Explain the importance of literature survey in research. **10**

c) What do you mean by identifying the gap areas with reference to research ? **5**

P.T.O.

Module – II

13. a) Discuss about the different methods for collecting data for a research. **10**

    b) Describe the techniques for
       i) Editing
       ii) Classifying and
       iii) Analysing the data of a research. **10**

14. Describe the important points to be considered for a research design. Explain how a research plan is developed. **20**

Module – III

15. What is a research report layout ? Prepare an impressive layout and indicate its features. **20**

16. a) Indicate the sources of getting funds for doing a research. Write in detail how a proposal for a research is prepared. **12**

    b) Discuss the importance of effective communication with the help of illustrations during an oral presentation. **8**

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Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.806.10 : FLEXIBLE MANUFACTURING METHODS (MPU)

Time : 3 Hours Max. Marks : 100

Instructions *: 1) Answer* ***all*** *questions from Part – **A**.*

2) Answer ***one*** *question from* ***each*** *Module in Part – **B**.*

PART – A

1. Explain mini/micro computers.
2. Write about the design process in CAD.
3. Enlist various input/output devices.
4. Enlist various types of FMS.
5. Write a note on FMS workstation.
6. What are the benefits of GT ?
7. Why FMS is known as cutting of CIM ?
8. What is the difference between CNC and DNC ?
9. How the movement of AGV's are controlled in shop floor ?
10. What is meant by simulation ? **(10×4=40 Marks)**

PART – B

Module – I

11. a) Describe motion control system of NC.
    b) Explain computer arristed part programming.
12. a) Explain about NC part programming and NC programming with interactive graphics.
    b) Explain various applications of Numerical Control.

P.T.O.

Module – II

13. a) With a neat sketch explain various elements of FMS host computer.

    b) Explain about work heading equipments and storage systems.

14. a) Explain about robot programming.

    b) Describe about tools and tooling in FMS.

Module – III

15. a) Differentiate between FMS and FMC with sketch.

    b) Describe various steps to plan and implement FMS.

16. Prepare a detailed analysis of FMS used in manufacturing industries with special emphasis to future prospects. **(3×20=60 Marks)**

(Pages : 2) **1708**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.802 : INDUSTRIAL ENGINEERING (MPU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. What is industrial engineering ? Explain the various fields of application of it.
2. What is C-V-P analysis ?
3. Explain briefly the elements of FMS.
4. Distinguish between preventive and breakdown maintenance.
5. What are Therbligs ?
6. What is value engineering ?
7. Explain the need for effective communication in industries.
8. Explain bath tub curve.
9. What is bench marking ?
10. Explain different dimensions of quality. **(10×4=40 Marks)**

P.T.O.

PART – B

(Answer **any one** question from **each** Module.)

Module – 1

11. a) Explain in detail the evolution of industrial engineering. What are the functions of Industrial engineering ? **12**

    b) How will you take a make or buy decision ? **8**

12. a) Explain the need for accelerated product development in modern world. **10**

    b) What are the different stages in product development ? **10**

Module – 2

13. a) Explain the relationship between method study and work measurement. How do they differ ? **10**

    b) Explain the basic steps in method study. **10**

14. a) Explain in detail the essentials of a good wage incentive plan. **10**

    b) Explain the principles of motion economy related to use of tools. **10**

Module – 3

15. a) Explain various functions of production planning and control. **12**

    b) Derive an expression for Economic Order Quantity (EOQ). What are its assumptions ? **8**

16. Write short notes on the following :

    a) ISO 9000 series.

    b) Quality circles.

    c) Defects charts and defectives chart.

    d) Six sigma **(4×5=20 Marks)**

(3×20=60 Marks)

(Pages : 3) **1710**

Reg. No. : .....

Name : .....

VIII Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
Branch : MECHANICAL
08.804: Computer Integrated Manufacturing (MU)

Time : 3 Hours Max. Marks: 100

Instruction** : Answer **all** questions in Part – **A** and **one** question from **each** Module in Part – **B

PART – A

I. a) What is concurrent engineering ?

b) What are the advantages of implementing CAD system ?

c) Give the scope of CAD/CAM in an industry.

d) List the three methods used to group parts into families.

e) Explain the working of a DNC system.

f) Explain the terms stick slip and back-lash.

g) Differentiate between absolute and incremental system in CNC.

h) List any four mechanical joints commonly used in Industrial robot.

i) What is canned cycle ?

j) Give the benefits of FMS. **(10×4=40 Marks)**

P.T.O.

PART – B

Module – I

II. a) What are the components of CIM ? Explain the role of CIM in manufacturing . **10**

b) What is Manufacturing Automation Protocol ? Explain. **10**

OR

III. a) Explain the different elements of computer aided process planning. Give the benefits of CAPP over manual process. **10**

b) Differentiate between Primary key and foreign key in a database. Explain the advantages of RDBMS. **10**

Module – II

IV. a) Explain basic components of an NC system. **10**

b) Explain the working of antifriction bearing and Ball screws. **10**

OR

V. a) Explain Miscellaneous and Preparatory codes in manual part programming. **10**

b) Fig. 1 shows a matrix of holes to be drilled in a job. The number of holes in the x-direction is 5 and number of holes in the y-direction is 7. Write an APT program using MACRO feature to establish the hole coordinates. **10**

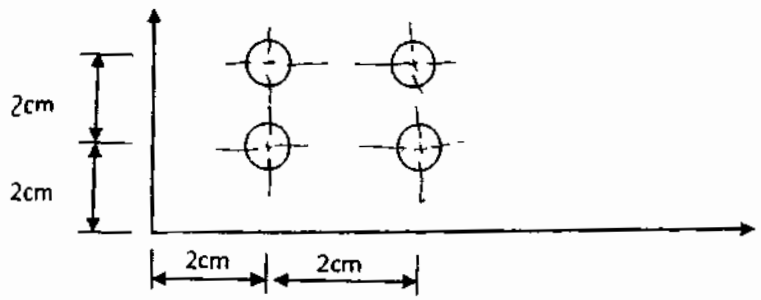

Fig. 1

Module – III

VI. a) Explain the four programming methods of a robot. **10**

b) Briefly discuss the various benefits of implementing a GT in a firm. Also bring out the advantages and limitations of using GT. **10**

OR

VII. Write short notes on :

a) Computer Vision **5**

b) FMS **5**

c) Cellular manufacturing **5**

d) AGV. **5**

15x3 = 45

(Pages : 2) **1707**

Reg. No. : .....

Name : .....

Eighth Semester B-Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.801 : ENERGY MANAGEMENT (MPU)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part **A** and **any three** from Part **B**. Answer any **one** question from **each** Module.*

PART – A

1. Write short note on heat pump.
2. What are the methods to improve the efficiency of a thermal power plant ?
3. Explain pumped storage system.
4. What is meant by enrichment of uranium ?
5. List the various waste heat recovery systems.
6. What are the factors affecting the performance of an MHD generator ?
7. What is the significance of energy management ?
8. What are the energy conservation measures in an HVAC system ?
9. Briefly explain the supply side and demand side energy management.
10. Discuss the electrical ECO's in a commercial building. **(4×10=40 Marks)**

PART – B

Module – I

11. a) Explain the different biomass conversion technologies. **10**

    b) Write short note on peak load, base load and intermediate load power plants. **10**

12. a) Explain the working of a PHWR. **10**

    b) Write short note on micro hydel stations. **10**

P.T.O.

Module – II

13. a) What are energy management control systems ? **10**

    b) Briefly explain the intermediate energy auditing. **10**

14. a) Discuss the importance of energy strategy and energy planning. **10**

    b) What are the common instruments required for conducting energy audit ? **10**

Module – III

15. a) Explain the working of an IC engine based cogeneration system. **10**

    b) What are the various modes of distributed generation ? **10**

16. a) What are the thermodynamic energy conservation opportunities in a steam turbine plant ? **10**

    b) Sketch and explain the working of a combined cycle power plant. **10**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.803 : AUTOMOBILE ENGINEERING (M)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. How do you classify automobiles in general ?
2. Explain the function of radiator pressure cap.
3. Explain MPFT system.
4. Describe the working of any one type of wind screen wiper.
5. What are the essential properties of lubricants used in automobiles ?
6. Describe the function of slip joint in transmission system.
7. Explain the over drive mechanism.
8. Explain under steering and over steering phenomina and its causes.
9. Explain the constructional details of a vehicle tyre.
10. Explain the function of catalytic converter in exhaust system. **(10×4=40 Marks)**

PART – B

Answer **any one** question from each Module. **Each** question carries **20** marks.

Module – I

11. a) Explain the working of side cam shaft and over head cam shaft types of valve actuating mechanisms.

    b) Discuss in detail the different materials and their properties used for the following :

    i) Cylinder liners ii) Piston rings iii) Connecting rod.

P.T.O.

12. a) Explain liquid cooling systems used in automobiles. Describe the need and working of thermostat in the system.

    b) Explain the working of bendix drive starting mechanism.

Module – II

13. a) Explain the need and function of various parts of power transmission system of a car.

    b) Describe the working of multiple plate wet clutch with neat figure. Give its advantages and limitations.

14. a) Draw a neat sketch and explain the working of a synchromesh gear box in second gear engaged position. Also show the power transmission path.

    b) Distinguish between semifloating and three quarter floating type of rear axles.

Module – III

15. a) Sketch and explain the working of tandem master cylinder used in hydraulic brakes. Give the advantages of this over conventional master cylinder.

    b) Explain the working of air brake system. Give its advantages, disadvantages and precautions needed.

16. a) Describe the function and requirements of good steering system. Explain camber, castor and king pin inclination along with their functions.

    b) What are the benefits of power steering ? Explain electronic power steering system.

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.801 : ENERGY MANAGEMENT (MPU)

Time : 3 Hours Max. Marks : 100

***Instruction**: Answer **all** questions from Part **A** and **any three** from Part **B**.*

PART – A

1. Briefly explain the electrical energy storage using a compressor system.
2. Write short note on energy plantation.
3. What are the objectives of Energy Management ?
4. Write short note on heat pipe.
5. What is meant by distributed generation ? Give two examples.
6. What do you mean by energy conservation ?
7. What are the ECO's in an industrial boiler ?
8. What are the environmental issues of hydro-power plant ?
9. What are the various means by which nuclear waste can be disposed ?
10. What are the main factors which affect the performance of a biomass digester ?

(4×10=40 Marks)

PART – B

Module – I

11. a) Explain the working of an open cycle MHD generator. **10**

    b) Explain the thermo-chemical process for the conversion of biomass as an energy source. **10**

12. a) With the help of a neat sketch, explain the working of a hydrogen-oxygen fuel cell. **10**

    b) Sketch and explain different types of load curves. **10**

P.T.O.

Module – II

13. a) Write short on the energy policy in India. **10**

    b) Mention the computer applications of energy management. **10**

14. What is meant by energy audit ? Explain the different types of energy audit. **20**

Module – III

15. a) Explain the working of a combined cycle cogeneration system. **10**

    b) How ECO's are classified ? Explain. **10**

16. a) Sketch and explain the working of a recuperator. **10**

    b) What is meant by Pinch Technology ? **10**

(Pages : 2) **1709**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme)
08.803 : AUTOMOBILE ENGINEERING (M)

Time : 3 Hours Max. Marks : 100

Instructions : *Each question in Part – **A** carries **4** marks. Answer **all** questions from Part – **A**. **Each** question in Part – **B** carries **20** marks. Answer **any one** question from **each** Module in Part – **B**.*

PART – A

1. How automobiles are classified ?
2. Describe various types of pistons.
3. What is variable valve timing ?
4. Briefly describe pressurized cooling system.
5. Give the constructional details of diaphragm clutch.
6. Explain the working of non slip differential.
7. What is hypoid drive ?
8. What is the function of recirculating ball in steering system ?
9. Describe briefly about tyres.
10. Discuss mist lubrication system. **(10×4=40 Marks)**

PART – B

Module – I

11. a) Describe crank case, cylinder liners and cylinder head. **10**

    b) Discuss requirement of cooling system. **10**

12. a) Differentiate between MPFI and CRDI systems. **10**

    b) Describe properties of good lubricants. **10**

P.T.O.

Module – II

13. a) Explain the working of semi-centrifugal clutch. **10**

    b) Describe the working of synchro mesh gear box. **10**

14. a) Explain the working of Hobbs and Smiths transmission. **10**

    b) Describe the working of semi automatic gear box. **10**

Module – III

15. a) Explain the working of hydraulic braking system. **10**

    b) Describe various elements of steering geometry. **10**

16. a) Discuss exhaust emission and pollution control. **10**

    b) Explain construction of chassis and frame. **10**

(Pages : 3) **1751**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, April/May 2012
(2008 Scheme) (Elective V)
(08.806.15) : PROJECT MANAGEMENT (M,P,U)

Time : 3 Hours Max. Marks : 100

Note : *Use of Statistical table and interest tables are* ***permitted.***

PART – A

Answer **all** questions :

1. Explain the relevance of project management in the modern world.
2. Explain project life cycle.
3. Explain the preliminary screening of project ideas.
4. Explain how net present value is utilised in project selection ?
5. What are the steps in a sample survey ?
6. Explain project priority matrix.
7. What is a Break-Even chart ?
8. What are the different methods of obtaining technology for a project ?
9. Explain working capital cycle.
10. What is meant by post project evaluation ? **(10×4=40 Marks)**

P.T.O.

PART – B

Answer **any one** question from **each** Module

Module 1

11. Explain in detail the capital budgeting process.

12. a) Explain project development cycle.

    b) Find the trend by least square method for the data as follows :

Year	2001	2002	2003	2004	2005	2006	2007
Demand in 1000 units	185	175	118	172	165	160	155

Also find the demand for the year 2008 and 2012

Module 2

13. a) Explain in detail the need for working capital.

    b) What are the different sources of finance for a project ?

14. a) Distinguish between discounting and non discounting methods in financial analysis.

    b) The cash flow stream for a project is given below. Calculate the following at a discounting rate of 10%.
    1) Pay back period
    2) NPV
    3) IRR

Year	0	1	2	3	4	5
Cash flow (Rs.)	-500,000	100,000	250,000	300,000	250,000	320,000

Module 3

15. a) Distinguish between PERT and CPM.

b) A project consists of 12 activities. The activities and their time estimates are shown below.

Activity	Optimistic time (Weeks)	Most likely time (Weeks)	Pessimistic time (Weeks)
1-2	4	6	10
1-3	3	7	12
1-4	5	6	9
1-7	2	4	6
2-4	6	10	20
2-6	3	4	7
2-7	5	9	15
3-4	3	7	12
4-5	2	4	5
5-6	1	3	6
3-7	2	5	8
6-7	1	2	6

a) Draw the network diagram.

b) Determine the critical path

c) Compute the probability of the project being completed within 30 weeks.

16. a) What do you mean by crashing of networks ?

b) Explain the important features of any 3 project management soft wares.

(3×20=60 Marks)

PART – B

Answer **any one** question from **each** Module

Module 1

11. Explain in detail the capital budgeting process.

12. a) Explain project development cycle.

    b) Find the trend by least square method for the data as follows :

Year	2001	2002	2003	2004	2005	2006	2007
Demand in 1000 units	185	175	118	172	165	160	155

Also find the demand for the year 2008 and 2012

Module 2

13. a) Explain in detail the need for working capital.

    b) What are the different sources of finance for a project ?

14. a) Distinguish between discounting and non discounting methods in financial analysis.

    b) The cash flow stream for a project is given below. Calculate the following at a discounting rate of 10%.
    1) Pay back period
    2) NPV
    3) IRR

Year	0	1	2	3	4	5
Cash flow (Rs.)	-500,000	100,000	250,000	300,000	250,000	320,000

(Pages : 3) **6008**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
Elective V
(08.806.15) PROJECT MANAGEMENT (M,P,U)

Time : 3 Hours Max. Marks : 100

Note : *Use of Statistical table and interest tables are* ***permitted.***

PART – A

Answer **all** questions.

1. Explain the important characteristics of a project.
2. Distinguish between modernization project and diversification project.
3. Explain the preliminary screening of project ideas.
4. Describe the aspects covered in market planning.
5. What is SWOT analysis ?
6. What is Environmental Impact Assessment ? Explain its relevance in projects.
7. What are the different types of risks associated with a project ?
8. Explain WBS.
9. Explain project organization structure and its advantages.
10. What do you mean by post project evaluation ? **(10×4=40 Marks)**

PART – B

Answer **any one** question from **each** Module.

Module – 1

11. a) Explain in detail different types of projects.

    b) Explain project life cycle.

12. a) What are the different methods of getting ideas for projects ?

    b) Explain in detail the technical analysis of projects.

Module – 2

13. a) What are the different components of cost of a project ?

    b) Explain various means of financing.

14. a) What is meant by social cost benefit analysis ?

    b) How would you compute internal rate of Return (IRR) of a project ? What is the IRR of an investment, which involves a current outlay of Rs. 3,00,000 and results in an annual cash flow of Rs. 60,000 for seven years ?

Module – 3

15. a) Distinguish between PERT and CPM.

    b) A project consists of following activities. Duration and precedence relationship are given below :

Activity	A	B	C	D	E	F	G	H	I	J
Immediate predecessor	-	-	A	B	C, D	B	F	E, G	E, G	H
Duration (weeks)	3	2	6	3	7	4	3	25	10	20

    a) Draw the network

    b) Find out the critical path and compute the project duration.

16. a) Explain the importance of Time-Cost trade off decision in projects.

b) The normal and crashed duration with cost for various activities is given below. The indirect cost of the project is Rs. 2000 per day.

Activity	Normal Time (Days)	Crash Time (Days)	Normal Cost (Rs.)	Crash Cost (Rs.)
1-2	6	2	5,000	8,000
1-3	8	3	3,000	6,000
2-4	7	4	2,800	4,000
3-4	12	8	9,000	11,000
4-6	3	1	10,000	13,000
5-6	5	2	4,900	7,000
3-5	7	3	1,800	5,000
5-7	11	5	6,600	12,000
6-7	10	6	4,000	8,400

i) Draw the Network diagram indicating EST and LFT.

ii) What is the normal and ultimate crash duration ?

iii) Find the optimum cost for duration of 26 days. **(3×20=60 Marks)**

Reg. No. : .....

Name : .....

Eighth Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
Branch : Mechanical
08.804 : COMPUTER INTEGRATED MANUFACTURING (MU)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions in Part – **A** and **one** question from **each** Module in Part – **B**.*

PART – A

I. a) Differentiate between wire frame and solid model.

b) Give the scope of CIM in an industry.

c) Define the terms Design attribute and manufacturing attribute.

d) Define part families.

e) Give a typical process sequence to fabricate an individual part.

f) List the basic components in a CNC system.

g) Explain any four Miscellaneous codes used in CNC system.

h) Give the capabilities that a manufacturing system possesses that make it flexible.

i) List any four basic configurations available in a robot.

j) Describe the use of AGV. **(10×4=40 Marks)**

PART – B

Module – I

II. a) Explain the use of Computer in CAD. **10**

b) Explain different types of manufacturing systems. **10**

OR

III. a) What are the steps involved in Computer aided Process planning. Explain retrieval type CAPP. **10**

b) What are the applications of CIM in manufacturing planning and control ? **10**

Module – II

IV. a) Explain open loop and closed loop control in NC machine. **10**

b) Explain the ACO and ACC approaches in adaptive control. **10**

OR

V. a) Explain the four types of statements in APT language. **10**

b) Fig.1 is a PTP job. Write the ATP geometry and motion statements necessary to perform the drilling portion of this job. Assume suitable dimensions. **10**

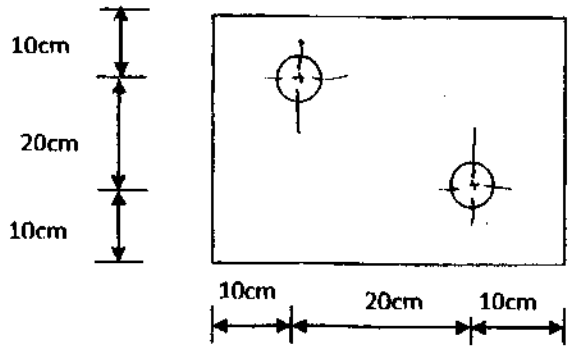

Fig.1

Module – III

VI. a) Explain robot physical configurations. Also explain the six basic motion of a robot. **10**

b) Explain the component of FMS and FMS layout configuration. **10**

OR

VII. a) Write short notes on various materials handling equipment that are commonly used in FMS. **10**

b) Write short notes on cellular manufacturing cell design. Give its advantages. **10**

(Pages : 2)

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, April 2015
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. What is system concept ? Explain.
2. Discuss about induction training.
3. Explain about scalar organizations.
4. Discuss about break even analysis.
5. Explain the procedural steps of SLP.
6. What is travel chart ? Explain.
7. Explain collective bargaining.
8. Explain the concept of quality vs. cost.
9. Discuss about benchmarking.
10. Briefly explain QIS.

PART – B

Answer **one full** question from **each** Module. **Each** sub question carries **ten** marks.

Module – I

11. a) Discuss about POSDCORB in a manufacturing organization.

    b) Explain the advantages of different organizational structures.

OR

12. a) Discuss about break even analysis with an example.

    b) Explain any three methods of calculating depreciation.

Module – II

13. a) Explain about computerized planning techniques.

    b) Discuss in detail about material handling equipments.

OR

14. a) Explain job evaluation and merit rating.

    b) How allowances can be determined ? Discuss the methods.

Module – III

15. a) Explain about production planning control.

    b) Derive EOQ formula mentioning all assumptions.

OR

16. a) Discuss about ISO series with its significance.

    b) Explain about total quality management.

(Pages : 2) **7758**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Explain the concept of Break even analysis.
2. Distinguish between recruitment and selection.
3. What is reliability ?
4. Distinguish between flow diagram and string diagram.
5. Explain the different process chart symbols.
6. Explain the procedure for job evaluation.
7. What is collective bargaining ?
8. What is bench marking ?
9. Explain the concept of marketing mix.
10. Write a short note on six sigma. **(10×4=40 Marks)**

PART – B

Answer **one full** question from **each** Module.

Module – 1

11. Discuss the evolution of scientific management giving in detail the contributions of any three pioneers in the field. **20**

12. Discuss in detail the different types of companies and their formation. **20**

Module – 2

13. a) What are the factors to be considered while selecting an industrial site ? Explain. **10**

    b) Explain with neat sketches the different types of plant layouts. **10**

14. Explain in detail the different types of wage incentive plans. **20**

Module – 3

15. a) Explain the causes, effects and methods to eliminate industrial fatigue. **10**

    b) Explain the need and types for workers participation in management level. **10**

16. a) Explain in detail the various functions of production planning and control system. **10**

    b) Distinguish between continuous production system and intermittent production system. **10**

(3×20 = 60 Marks)

(Pages : 2) **5578**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2014
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. State objectives of personnel management.
2. What is system concept ? Explain.
3. Discuss about induction training.
4. Explain about scalar organizations.
5. What are the essentials of a sound wage incentive plan ?
6. Discuss about break even analysis.
7. Explain collective bargaining.
8. Explain the concept of quality vs. cost.
9. Discuss about benchmarking.
10. Differentiate between marketing and selling. **(10×4=40 Marks)**

PART – B

Answer **one full** question from **each** Module. **Each** sub question carries **ten** marks.

Module – I

11. a) Explain the selection procedure and list various methods involved in it.
    b) Explain the advantages of different organizational structures.

OR

12. a) Discuss about break even analysis with an example.
    b) Explain any three methods of calculating depreciation.

P.T.O.

Module – II

13. a) What are the factors that are considered for selecting a site for an industrial unit ?

    b) Discuss in detail about material handling equipments.

OR

14. a) Explain job evaluation and merit rating.

    b) How allowances can be determined ? Discuss the methods.

Module – III

15. a) Explain about production planning and control.

    b) What are the marketing mix variable ? Explain.

OR

16. a) Discuss about ISO series with its significance.

    b) Explain about total quality management. **(3×20=60 Marks)**

(Pages : 2) **5937**

Reg. No. : .....

Name : .....

PATTOOR, NOORANAD

Seventh Semester B.Tech. Degree Examination, November 2013
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

Instructions: *1) Part – **A** : Answer **all** questions. **Each** question carries **4** marks.*
*2) Part – **B** : Answer **one** full question from **each** Module. **Each** full question carries **20** marks.*

PART – A

1. Explain the functions of management.
2. What are the significances of break-even analysis in industrial engineering ?
3. Explain exponential method of finding out depreciation.
4. Discuss different material handling equipments.
5. Enlist the steps in method study. What are the tools that help in each step ?
6. What are the different allowances and how do they contribute to the standard time ?
7. What is 'fatigue' ? How is it eliminated ?
8. Explain batch production and job production.
9. Explain cost of quality.
10. Discuss different ISO standards in environmental protection. **(10×4=40 Marks)**

P.T.O.

PART – B

MODULE – I

11. a) Explain the functions of personal management.

    b) Explain any two functions of management.

OR

12. a) Discuss the process of employee selection and training.

    b) Explain break-even analysis with the help of a neat diagram. Mark the region of loss and profit in the diagram.

MODULE – II

13. a) Explain systematic layout planning. What are the software packages available for layout planning ?

    b) Explain how work measurement is established for an existing job.

OR

14. a) Explain principles of material handling.

    b) Discuss different charts, diagrams, and their use in method study.

MODULE – III

15. a) What are the features of mass and continuous production ? What type of layout are preferred in each case ? Why ?

    b) Derive the basic EOQ equation from the basic principles.

OR

16. Write notes on :

    a) TQM

    b) Six Sigma

    c) Quality circles

    d) Product life cycle.

PART – B

MODULE – I

11. a) Explain the functions of personal management. **10**

    b) Explain any two functions of management. **10**

OR

12. a) Discuss the process of employee selection and training. **10**

    b) Explain break-even analysis with the help of a neat diagram. Mark the region of loss and profit in the diagram. **10**

MODULE – II

13. a) Explain systematic layout planning. What are the software packages available for layout planning ? **10**

    b) Explain how work measurement is established for an existing job. **10**

OR

14. a) Explain principles of material handling. **10**

    b) Discuss different charts, diagrams, and their use in method study. **10**

MODULE – III

15. a) What are the features of mass and continuous production ? What type of layout are preferred in each case ? Why ? **10**

    b) Derive the basic EOQ equation from the basic principles. **10**

OR

16. Write notes on : **20**

    a) TQM

    b) Six Sigma

    c) Quality circles

    d) Product life cycle.

(Pages : 2) **1604**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. What are the major contributions of F.W. Taylor?
2. What are the objectives of an organization ?
3. Explain various principles of plant layout.
4. Discuss about planning function of management.
5. Explain REL chart and its applications.
6. What is work study ? Explain.
7. What are the methods of eliminating fatigue ?
8. Explain ABC analysis.
9. Write notes on product life cycle.
10. What are various costs associated with inventory ? **(10×4=40 Marks)**

PART – B

Answer **one full** question from **each** Module. **Each** sub question carries **ten** marks.

Module – I

11. a) Explain the evolution of Industrial Engineering.
    b) Discuss in brief the line and staff type of organization giving its merits and demerits.

OR

(Pages : 2) **1604**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, May 2012
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **four** marks.

1. What are the major contributions of F.W. Taylor?
2. What are the objectives of an organization ?
3. Explain various principles of plant layout.
4. Discuss about planning function of management.
5. Explain REL chart and its applications.
6. What is work study ? Explain.
7. What are the methods of eliminating fatigue ?
8. Explain ABC analysis.
9. Write notes on product life cycle.
10. What are various costs associated with inventory ? **(10×4=40 Marks)**

PART – B

Answer **one full** question from **each** Module. **Each** sub question carries **ten** marks.

Module – I

11. a) Explain the evolution of Industrial Engineering.
    b) Discuss in brief the line and staff type of organization giving its merits and demerits.

OR

12. a) Explain the important functions of scientific management.

    b) Discuss about various training concepts and techniques.

Module – II

13. a) Discuss the factors to be considered in site selection.

    b) Give any three important wage incentive plans for direct workers. Give advantage and limitation of each of them.

OR

14. a) Discuss the procedural steps of work study.

    b) Discuss the factors affecting the selection of material handling equipment in a production shop.

Module – III

15. a) What are the objectives of inventory control ? Derive the expression for EOQ.

    b) Discuss the methods and techniques of industrial safety.

OR

16. a) Discuss the procedural steps for constructing two variable charts.

    b) Explain in detail about marketing and market mix. **(3×20=60 Marks)**

(Pages : 2) **5858**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **(10×4=40 Marks)**

1. Explain POSDCORB.
2. Differentiate recruitment from selection.
3. Explain ABC system in inventory control.
4. Discuss community and site related factors in plant location.
5. Do you need stop watch for work sampling ? Explain.
6. Differentiate wage from incentive.
7. Differentiate Job and continuous production systems stating advantages and disadvantages of each.
8. Explain P – System and Q – System in inventory.
9. Discuss Product Life Cycle using suitable diagram.
10. Explain the steps involved in method study.

PART – B

Answer **one full** question from **each** Module. **(3×20=60 Marks)**

11. a) Which are the common types of ownership of firms ? Explain the advantages and disadvantages of each.

    b) What is matrix organization ? State its advantages.

OR

a) Calculate depreciation for each year using the sum of the digits method.
Life of the equipment = 5 years
Salvage value = Nil
Initial cost of equipment = Rs. 10,000/-
What is its advantage over other methods used in depreciation computation ?

b) Explain different types of training methods. Stating advantages and disadvantages of each.

12. a) Explain :
i) Therbligs
ii) String diagram
iii) Process chart symbols.

b) Discuss any two job evaluation methods in detail.

OR

a) Determine warehouse location if x and y coordinates of destinations are (2, 2), (3, 5), (5, 4) and (8, 5). Using centre of gravity method assuming equal quantity shipments.

b) Explain :
i) TMU
ii) Rating
iii) Process layout
iv) Line balancing

13. a) Discuss the importance of safety in organizations.

b) Differentiate between craft, mass and lean production systems.

OR

a) Explain :
i) TQM
ii) ISO 9000
iii) Six sigma
iv) House of quality

b) "DMAIC" means some steps. Which are they ? Where is it used ?

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2012
(2008 Scheme)
08.706.4 PLANT ENGINEERING AND MAINTENANCE (MPU)

Time : 3 Hours Max. Marks : 100

Instructions : *i) Answer **all** questions from Part **A**.*
*ii) Answer **one** question from **each** Module in Part **B**.*

PART – A

(Answer **all** questions)

1. Distinguish between scuffing and pitting.
2. What do you mean by viscosity Index ?
3. What is meant by Hard Facing ?
4. What are the advantages of solid lubricants ?
5. Distinguish between Reliability and Quality.
6. Justify the statement, 'more failures occur in series as compared to parallel system'.
7. What are the different factors which responsible to replace the equipment, although it may be running ?
8. What do you understand by RCM and what are its unique features ?
9. What are the general conditions for which preventive maintenance is appropriate for a single machine ?
10. What are the safety instructions for use of Hand tools ? **(10×4=40 Marks)**

P.T.O.

PART – B

(Answer **any one** question)

Module – I

11. a) Discuss the method adopted for determining flash point and fire point of oils. **10**

    b) Give an account on additives for lubricating oils. **10**

12. a) Explain how wear is analytically treated ? **10**

    b) Distinguish between PVD and CVD. **10**

Module – II

13. Machine A operated manually costs Rs. 2,000 has a life of 2 years, while an automatic machine B costs Rs. 3,000 has a life of 4 years. Operating cost of machine A is Rs. 4,000 per year while of machine B is Rs. 3,000 only. Which should be purchased ? Consider 10% interest. **20**

14. Prepare short notes on following :

    a) Types of availability

    b) Reliability allocation

    c) MAPI method

    d) Group Replacement. **(4×5=20 Marks)**

Module – III

15. a) Describe in brief the 'Economic Aspects of Maintenance'. How you can select an optimum maintenance programme ? **10**

    b) Describe in brief the use of computers in maintenance management. **10**

16. a) Discuss the legal provisions for safety in industries. **10**

    b) Enumerate the procedure for investigation of accidents in industries. **10**

(3×20=60 Marks)

(Pages : 2) **6214**

Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, October 2011
(2008 Scheme)
08.701 : INDUSTRIAL MANAGEMENT (TA)

Time : 3 Hours Max. Marks : 100

***Instructions** : 1) Part-**A** : Answer **all** questions. **Each** question carries **4** marks.*
*2) Part-**B** : Answer **one full** question from **each** Module. **Each** full question carries **20** marks.*

PART – A **(10×4=40 Marks)**

1. How did Industrial Engineering emerge ?
2. What are different types of facilities layout ? Explain.
3. Enlist the different organizational structures with neat sketches.
4. What are the different types of companies ?
5. How do the factors of site selection are classified ?
6. What are the properties of line layout ?
7. What are the components of standard time ? Use graphical representation.
8. Explain any four assumptions in basic inventory model.
9. How do Six Sigma help to achieve competitiveness ?
10. What are quality circles ?

PART – B

Module – I

11. a) Explain the evolution of scientific management. **10**

    b) Discuss the objectives and functions of management. **10**

OR

12. a) The total sales of M/s. XYZ company were Rs. 30,000 from which they earned a profit of Rs. 800 in a week. Next week sales amounted to Rs. 38,000 producing a profit of Rs. 2400. What should be the break-even point ? If the profit has to be Rs. 4,000, what should be the sales revenue ? **10**

b) In how many ways the reliability of an assembled product can be improved ? Explain with illustrations. **10**

Module – II

13. a) Explain the factors influencing supply chain facility decisions. **10**

b) Discuss transportation modes, styles and networks. **10**

OR

14. a) Explain any five objective factors influencing the selection of facility location for an automobile assembly unit. **10**

b) Compare and contrast process layout and product layout to bring about the benefits and drawbacks. **10**

Module – III

15. a) Explain workers' participation in management in Indian context. **10**

b) Discuss total quality management in the success of an industry. **10**

OR

16. Write notes on : **20**

a) Industrial disputes and methods to solve disputes.

b) Health hazards and industrial safety.

c) Selective inventory control techniques.

d) Control charts for variables.