[5255]-101

M.E. (Civil) (Construction and Management)
THRUST AREAS IN PROJECT MANAGEMENT
(2008 Course) (Semester-II) (Open Elective - IV) (501112)

Time : 4 Hours]   *[Max. Marks : 100*

Instructions to the candidates:

   1)   *Answer 3 questions from section I and 3 questions from section II.*

   2)   *Answers to the two sections should be written in separate books.*

   3)   *Neat diagrams must be drawn wherever necessary.*

   4)   *Figures to the right indicate full marks.*

   5)   *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

   6)   *Assume suitable data, if necessary.*

SECTION - I

Q1) Explain 8 principles of ISO: 9001 - 2008 series with examples of construction industry. **[18]**

Q2) a)   Draft a charter for project partnering between the client and contractor for the Execution of Multistoreyed building. **[8]**

      b)   Perform SCM for the process of Tendering with an example. **[8]**

Q3) a)   Compare PDRI for industrial buildings with the PDRI for Residential buildings. **[8]**

      b)   Draw a flow diagram representing the complete process of project pre planning. **[8]**

Q4) Perform 'SWOT Analysis' of the Indian Highway sector and recommend measures to convert the weaknesses into strengths. **[16]**

SECTION - II

Q5) a) Explain the concept of "Fast Track construction". **[6]**

   b) Discuss the risks and returns associated with the above method. **[6]**

   c) Explain the concept of 'GMP' with examples. **[6]**

Q6) Explain with examples how the Principle Centered Leadership can be developed by Project Managers of the construction sector, through '7 covey habits'.**[16]**

Q7) Explain the following:

   a) Competency Mapping and Assessment. **[4]**

   b) Strategic Planning. **[4]**

   c) Leadership Styles. **[4]**

   d) Entrepreneurial Qualities. **[4]**

Q8) Discuss advantages and disadvantages of PEB over other types of building construction. Explain the complete process of PEB technology with diagram. **[8 + 8]**

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[5255]-105

M.E. (Civil) (Structures)
DESIGN OF FOUNDATIONS
(2008 Pattern) (Semester - I) (Elective - I)

Time : 4 Hours]   *[Max. Marks : 100*
Instructions to the candidates:
   1)   Answer any TWO questions from each section.
   2)   Answers to the two sections should be written in separate books.
   3)   Neat diagrams must be drawn wherever necessary.
   4)   Your answers will be valued as a whole.
   5)   Use of electronic pocket calculator is allowed & IS codes are not allowed.

SECTION-I

Q1) a)   Explain with example, steps for determination of consolidation settlement.
                                                                                                    [10]

   b)   Discuss   **[15]**

      i)   A-line chart,

      ii)   SSI,

      iii) Teng's correlations,

      iv)   IS-1892-1972, Provisions,

      v)   Proportioning of footing.

Q2) a)   Discuss the needs for different types of raft.   **[9]**

   b)   Explain the steps for 'Design of flat slab raft'.   **[8]**

   c)   Explain the steps for 'Beam & raft (slab) foundation'.   **[8]**

Q3) a)   Compare, design of foundations for Rotary m/c & Impact m/c, wrto
             IS-2974-Pt-II-1966.   **[15]**

   b)   Explain determination of Cu & Amplitude.   **[10]**

SECTION-II

Q4) a) Compare NSF & PSF. **[8]**

b) Explain steps for Design of precast & cast in-situ piles. **[9]**

c) How will you compute settlement of pile group. **[8]**

Q5) a) Discuss the steps for 'Design of RCC precast pile'. **[17]**

b) Explain the steps for 'Rees & Matlock Method'. **[8]**

Q6) a) Explain the steps for 'Design of pile cap'. **[9]**

b) Discuss 'IS code recommendations' for 'shell foundations'. **[8]**

c) Compare 'Hyperbolic & conical RC shell foundations' with & without edge beams. **[8]**

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[5255]-106

M.E. (Civil - Structures)
ADVANCED DESIGN OF METAL STRUCTURES
(2008 Course) (Semester - I)

Time : 4 Hours]   *[Max. Marks : 100*

Instructions to the candidates:

1) *Solve any two questions from each section.*
2) *Answers to the two sections should be written in separate answer books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Use of Calculator and relevant IS codes is allowed.*
6) *Assume Suitable data if necessary.*

SECTION-I

Q1) Suggest structural configuration of hoarding structure to be installed at height of 35 m above ground level. The display board is of dimensions 30 m wide, 15 m height. Calculate the loads due to wind on the members of support structure. Draw free body diagram of structures showing the forces and reactions. **[25]**

Q2) a) Explain fabrication of castellated beam. How does it affect sectional properties. **[10]**

      b) Calculate the sectional properties of castellated beams with ISMB500 converted to castellated beam. **[15]**

Q3) a) Compare steel and aluminum structural sections. And its applications, advantages, disadvantages. **[12]**

      b) Design simply supported beam when loaded with UDL of 25 kN/m on span of 4 m. Use suitable aluminum section. Sketch details of design. **[13]**

SECTION-II

Q4) a) Differentiate by geometry of Microwave tower and a transmission tower carrying high tension electric wire. Indicate all important structural components. **[13]**

b) Draw free body diagram of Transmission tower with high tension wires attached. **[12]**

Q5) a) State advantages and disadvantages of tubular structural sections used in steel structures. **[6]**

b) What are the design considerations of tubular scaffolding structure. **[6]**

c) Design tubular scaffolding support structure for RCC bridge deck slab 300 mm thick, span between beams is 7 m. **[13]**

Q6) a) Explain manufacturing of light gauge structural members. Enlist its advantages over conventional sections. **[10]**

b) Design the light gauge strut to carry axial compression of 200 kN. The effective length of strut is 3.3 take fy=235 N/mm². **[15]**

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[5255] - 107

M.E. (Civil - Structure)
STRUCTURAL DESIGN OF STEEL BRIDGES
(2008 Course) (Semester - I) (Elective - II)

Time : 4 Hours]   *[Max. Marks :100*
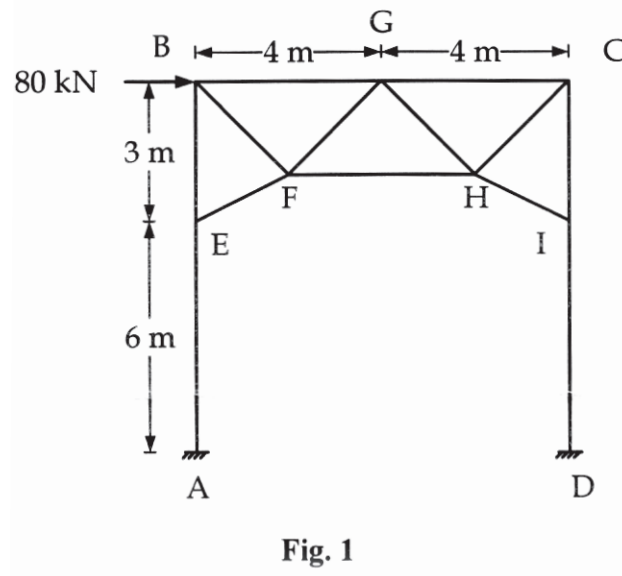
Instructions to the candidates:

   1)   *Attempt any two questions from Section I and Section II.*

   2)   *Answers to the two Sections should be written in separate answer books.*

   3)   *Figures to the right indicate full marks.*

   4)   *Neat diagrams should be drawn where ever necessary.*

   5)   *If necessary, assume suitable data and mention clearly.*

   6)   *Use of nonprogrammable electronic pocket calculator, relevant IS codes and steel table are allowed.*

SECTION - I

Q1) a)   What are the different loads acting on a steel bridge? How are the load combinations made?   **[10]**

    b)   Explain with neat sketches the various components of a railway steel bridge.   **[10]**

    c)   Explain CDA.   **[5]**

Q2) a)   With neat sketches explain stringers, cross-girders in a through type railway bridge.   **[8]**

    b)   A through type plate girder railway bridge carries a single line broad gauge track. The span of the bridge is 20 m. The plate girders are provided at 4.65 m c/c. The stringers are provided at 2 m c/c along the center line. The cross - girders are provided at 1.7 m c/c. The EUDL for BM is 460 kN and for SF is 600 kN and, CDA = 1.0. Design the stringers and the cross - girders.   **[17]**

P.T.O.

Q3) a) Explain the functions of portal bracings with neat sketch. **[10]**

b) Determine the forces in the various members of the portal bracing system shown in Fig. 1 and plot the shear force, bending moment and axial force diagram for the member AB. **[15]**

Fig. 1

SECTION - II

Q4) Design the plate girder for the highway bridge having an effective span of 25m. The bridge carries a carriageway of 7.5 m. The deck slab is 350 mm thick. The thickness of wearing coat is 40 mm. The bridge is to be supported on 3 number of plate girders spaced at equidistance. The bridge is to be designed for IRC class A loading. **[25]**

Q5) The effective span of the through type highway bridge shown in Fig. 2 is 32m. The bridge has a carriage way of 7.5 m along with two footpaths of 1.5 m on either side. The thickness of the deck slab is 300 mm. The thickness of wearing coat is 80 mm. The bridge is required to carry IRC class 70R loading. Design the members L_0U_1; L_1U_1; L_2U_1; and U_1U_2. Design the joint at L_1 Sketch the details of the connections. **[25]**
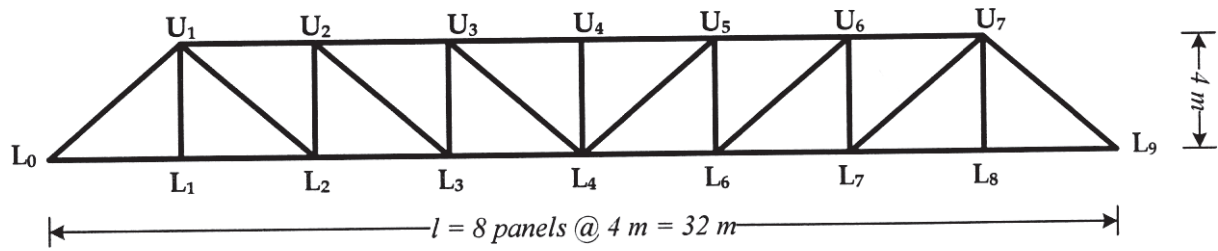
Fig. 2

Q6) a) Explain the design procedure for an elastomeric bearing. **[10]**

b) What are the functions of bracings in a steel bridge? Explain the different types with neat sketches. **[15]**

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Total No. of Questions : 6]

P4446

SEAT No. :

[Total No. of Pages : 2

[5255]-110

M.E. (Civil - Structures)
MECHANICS OF MODERN MATERIALS
(2008 Course) (Elective-IV) (Semester - II)

Time : 4 Hours]

[Max. Marks : 100

Instructions to the candidates:

1) *Answer any two questions from each section.*

2) *Answers to the two sections should be written in separate answer books*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Figures to the right side indicate full marks.*

5) *Use of nonprogrammable pocket Calculator is allowed.*

6) *Assume Suitable data if necessary.*

SECTION-I

Q1) a) State classification of fiber composites useful as construction material.**[8]**

b) Explain Piezoelectric material? And its applications in civil construction.**[8]**

c) Explain classification of materials used in FRC and situations where these class of materials are advantageous. **[9]**

Q2) a) Explain orthotropic, anisotropy of composite material. **[12]**

b) Write compliance and stiffness matrices for plane stress condition, for cross ply laminate material. **[13]**

Q3) a) Explain at least three theories of failure applicable for FRC. **[20]**

b) Explain stress strain behavior of FRC against plain concrete. **[5]**

P.T.O.

Q4) a) Derive Naviers equation for FRP laminate with all side simply supported.
[9]

b) Explain and sketch. **[16]**

　　i) Orthotropic, Anisotropic laminate.

　　ii) Symmetric, balanced laminate.

　　iii) Antisymmetric and cross ply laminate.

Q5) a) Explain factors affecting mechanical properties of composite laminate.
[7]

b) Find coefficient of thermal expansion for a 90 degree orthotropic laminate.

E_1=60 GPa, 　　　E_2=14 GPa, 　　　E_3=14 GPA

μ_{12} = 0.29 = μ_{21}

α_1=0.9*10^{-6} /C° , α_2=27*10^{-6} / C° **[18]**

Q6) a) Explain manufacturing process of composite. **[8]**

b) List tests carried out for determination of mechanical properties of composite. **[9]**

c) State advances in technology for high performance of composites. **[8]**

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[5255] - 112

M.E. (Mechanical) (Common to Design, Heat Power, Automotive and Mechatronics)

TECHNOLOGY AND FINANCIAL MANAGEMENT

(2008 Course) (Semester - I)

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

Instructions to the candidates:

1) Answer any one question from each unit.

2) Answers to the two sections should be written in separate books.

3) Neat diagrams must be drawn wherever necessary.

4) Figures to the right indicate full marks.

5) Use of electronic pocket calculator is allowed.

6) Assume suitable data, if necessary.

SECTION-I

Unit-I

Q1) a) Distinguish between 'Flexible budget' and 'Fixed budget'? What are the main features of a budgetary control system?   **[10]**

b) Prepare a *materials budget* of XY Co. Ltd. for estimated production of 10,000 units and 8,000 units of products C and D, respectively. The production orders of the products show the following consumption for a batch of 1,000 units: **[6]**

Materials	Price/Kg	Product C (Kg)	Product D (Kg)
01	50	40	50
02	40	--	10
03	10	5	20
04	30	3	5
05	20	2	--
Total (Kg)		50	85

OR

Q2) Write short notes on the following: **[16]**

   a)   Flexible budgets.

   b)   Forces driving global economy.

   c)   Sources of shirt term finance.

   d)   Functions of finance.

Unit-II

Q3) a)   What do you mean by marginal costing? Explain with an example how do income statements prepared under the absorption costing and marginal costing concepts differ? **[8]**

   b)   Two manufacturing companies which have the following operating details decide to merge:

	Company No.1	Company No.2
Capacity utilization %	90	60
Sales (Rs. in lakhs)	540	300
Variable costs (Rs. in lakhs)	396	225
Fixed costs (Rs. in lakhs)	80	50

Assuming that the proposal is implemented, calculate

   i)   Break even sales of the merged plant. **[8]**

   ii)   The capacity utilization at that stage. **[2]**

OR

Q4) a)   Explain the different methods of computing profits on contracts, where work is not completed at the close of the accounting year? **[8]**

   b)   XYZ Co. Ltd. proccess a product through two distinct processes-process A and process B. 20,000 units were introduced in process A, at a cost of Rs. 40,000. After processing 18,500 units were transferred to process B, which produced final output of 18,000 units. Other particulars are given below:

	Process A	Process B
Materials cost	Rs. 40,000	Rs. 4,000
Labor cost	12,000	10,000
Overheads	8,000	9,553
Normal loss %	5	4
Sales value of scrap units	Rs.1	Rs.2

There was no opening or closing work in progress. Prepare process accounts for process A and process B. **[10]**

Unit-III

Q5) a) Distinguish between micro economics and macro economics? **[6]**

b) Explain the theory of consumer's demand with the help of indifference curve analysis? Also explain Income effect and substitution effect? **[10]**

OR

Q6) a) How does international trade affects domestic market? Explain in brief the methods to protect domestic trade? **[12]**

b) Distinguish between monopoly and oligopoly types of competition? **[4]**

SECTION-II

Unit-IV

Q7) a) Define Total Quality Management (TQM)? What are the elements and principles of TQM? **[10]**

b) Explain KAIZEN duties in different levels of management? **[6]**

OR

Q8) a) Explain the Deming's 14 point approach to Quality Management? **[8]**

b) Distinguish between *push* and *pull* system? Explain the role of Kanban cards in JIT cycle with the help of a neat line diagram? **[8]**

Unit-V

Q9) A small engineering project consists of set of activities whose three time estimates in *days* are given below:

Activity	Optimistic time	Most likely time	Pessimistic time
1-2	2	5	14
1-6	2	5	8
2-3	5	11	28
2-4	1	4	7
3-5	5	11	17
4-5	3	5	14
6-7	3	9	27
5-8	2	2	8
7-8	7	13	23

a) Draw the PERT network diagram and identify the critical path and critical path duration. **[7]**

b) Calculate the standard deviation, variance, EST, LST, total slack for each activity. **[8]**

c) Calculate the variance of critical path. **[3]**

OR

Q10) a) Explain the stages involved in project life cycle with a neat line diagram? **[6]**

b) Explain the concept of BOT in brief? **[6]**

c) Distinguish between PERT and CPM? **[6]**

Unit-VI

*Q11)*a) How does training differ from development? Discuss the role of training and development in the present business environment? **[8]**

b) Discuss the process of organizing human resource functions. How can this process be completed effectively? **[8]**

OR

*Q12)*a) Distinguish between autocratic and supportive models of organizational behavior? **[6]**

b) Discuss the following in brief: **[10]**

i) Management by Objectives.

ii) Any two methods of merit rating practices.

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[5255] - 114

M.E. (Mechanical) (Design Engg)
PROCESS EQUIPMENT DESIGN
(2008 Pattern) (Semester - I) (Elective - II) (502205 B)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*

2) *Answers to two sections should be written in separate books.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Figures to the right indicate full marks.*

5) *Your answer will be valued as a whole.*

6) *Use of logarithmic tables, slide rules, Mollier chart, electronic steam table and electronic pocket calculator and steam table is allowed.*

7) *Assume suitable data, if necessary giving reasons.*

SECTION - I

Q1) a) Explain significance of following preliminaries in process equipment design. **[8]**

   i) Dilation of pressure vessel.

   ii) Design stress.

   iii) Weld joint efficiency.

   iv) Corrosion allowance.

   b) A storage tank 8 m in diameter and 9.5 m in height has to be provided with self supported conical roof. The slope of self supported conical roof is 1 in 5. Roof is subjected to a superimposed load of 118 kg/m². Density of plate material is 7500 kg/m³. E = 2 × 10⁶ kg/cm². Calculate minimum thickness required for fabrication of self supported conical roof. **[8]**

Q2) a) What is intragranular corrosion and stress corrosion? Explain the ways to avoid or reduce these types of corrosion. **[8]**

b) Explain the method for calculating thickness of torispherical head subjected to i. internal and external pressure. **[8]**

Q3) a) Explain skirt supports and design aspect related t them. **[8]**

b) Describe gasket factor? Explain gasket selection and classification. **[8]**

Q4) a) A pressure vessel is to be designed for an internal pressure of $0.8N/mm^2$. The vessel has nominal diameter of 1.3 m. The material used for vessel has permissible stress of $150N/mm^2$. If the weight of vessel and its content is 3000kg and torque due to offset piping is 550 N.m. Find stresses due to combined loading. **[10]**

b) Explain reinforcement of nozzles. **[6]**

Q5) Write short notes on **[18]**

a) Expansion joint used in process piping systems.

b) Floating roof type storage tank.

c) Protective coatings and their applications.

SECTION - II

Q6) a) Explain design considerations for shell and tube heat exchanger. **[8]**

b) Differentiate between vacuum filters and centrifugal filters. Explain either rotary disc filter or leaf filter. **[8]**

Q7) a) What are the types of baffles used in heat exchanger? **[6]**

b) Explain effect of wind load and seismic load on tall vessels. **[6]**

c) What types of loses are possible in storage of volatile liquids. **[4]**

Q8 a) Explain important features of packed or plate columns. **[8]**

b) With neat sketches explain construction, working and main design considerations of rotary drier. Give it's applications. **[8]**

Q9) a) Give classification of vacuum pumps or explain any one metering pump.**[8]**

b) What are integral, fabricated and formed nozzles. **[8]**

Q10) Write short note on: **[18]**

a) Types of agitators.

b) Vacuum Crystallizer.

c) Process flow diagrams.

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[5255] - 115

M.E. (Mechanical) (Design Engg.)
RELIABILITY ENGINEERING
(2008 Course) (Elective - III) (Semester - II) (502211 (A))

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

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Use of electronic pocket calculator is allowed.*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Define Reliability. Calculate the reliability for the system shown in Fig. 1. **[8]**
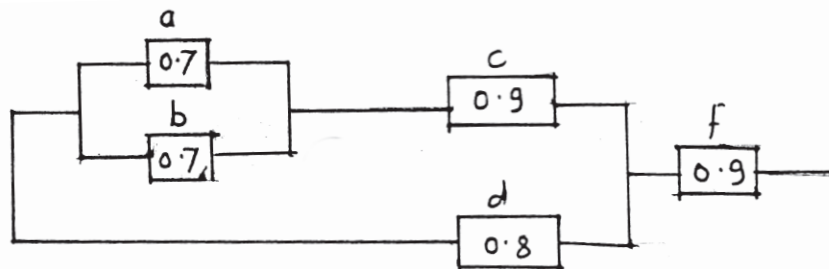

Fig 1

b) Explain MTBF & MTTF. **[8]**

Q2) a) Explain failure density and failure rate. Describe the main features of bathtub failure rate curve, explain each region with its curve. **[8]**

b) How the probability density and probability distribution functions are Related? What is the significance of probability distribution function. **[8]**

P.T.O.

Q3) a) What is meant by redundancy in system? Explain the significance difference between active partially active & passive redundancy. **[6]**

b) A hard plastic box designed to house a multi meter is tested for its impact strength by dropping it from a fixed height and observing for any damage. A total of 500 boxes were tested and the results are as tabulated here: **[10]**

No. of Drops	10	12	13	15	17	20	21	23	25
No. of boxes damaged	30	50	30	110	90	130	17	35	8

Q4) a) Explain the difference between predictive preventive maintenance and periodic preventive maintenance. **[8]**
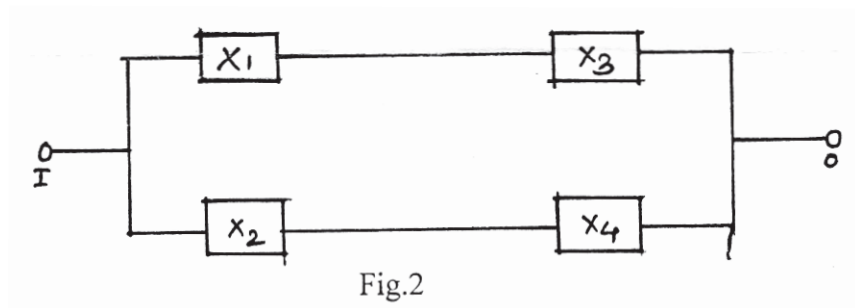
b) Explain FMECA with its sheet. **[8]**

Q5) Write the short note on following (Any Three) **[18]**

a) Risk Priority Number (RPN)

b) Safety factor and safety margin.

c) Reliability Engineering and Robust Design.

d) Reliability Engineering Tools.

e) Safety factor and safety margin.

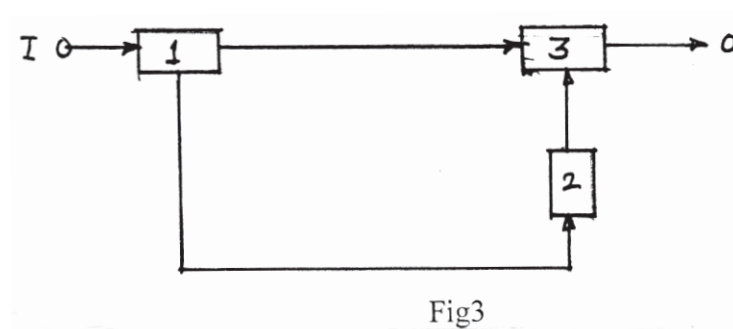## SECTION - II

Q6) a) Explain the designing for maintainability. **[8]**

b) A system consists of three units connected in series, with reliabilities R1 = 0.70, R2 = 0.80, and R3 = 0.90. It is desired that the reliability of the system be 0.65. How should this be apportioned among the three units. **[8]**

Q7) a) Explain ARINC method of reliability allocation. **[8]**

b) For the logic diagram shown in fig.2 construct the fault tree. **[8]**

Fig.2

Q8) a) Discuss the method of obtaining criticality of component or a sub system using RPN. **[6]**

b) For the system represented by fig 3, calculate the reliability using the tie-set and Cut-set methods. **[10]**

Fig3

Q9) a) What is 'Redundancy' in a system? Explain the active and stand by redundant system. **[8]**

b) Explain Tie set and cut set method of reliability evaluation. **[8]**

Q10) Write the short note on following (Any Three). **[18]**

a) AGREE method of reliability allocation.

b) Reliability of complex system.

c) Ishikawa diagram.

d) Markov Model.

e) Methods of finding reliability of complex system.

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[5255] - 115   3

Total No. of Questions : 8]

SEAT No. :

P4450

[Total No. of Pages : 2]

[5255]-116

M.E. (Mechanical) (Design Engineering)
INDUSTRIAL TRIBOLOGY
(Elective-IV) (2008 Course) (Semester - II) (502212B)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

1) *Answer any 3 questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Use of Calculator is allowed.*
6) *Assume Suitable data if necessary.*

SECTION-I

Q1) a) Explain the following theories of friction. **[10]**

   i) Tomlinson's theory of molecular attraction.

   ii) Coulomb's classical theory.

   b) Explain Tribology and discuss the tribological properties of bearing materials. **[6]**

Q2) a) Derive Petroff's equation for hydrodynamic journal bearing. State the conditions under which Petroff's equation can be used. What are its limitations? **[10]**

   b) Explain stick-slip friction. **[6]**

Q3) a) What is infinitely short Journal bearing? State the conditions and write Reynold's equation for short journal bearings. **[10]**

   b) The following data is given for a hydrostatic thrust bearing: **[8]**

   Thrust load : 500 kN

   Shaft speed: 720 rpm

   Shaft diameter: 500 mm

   Recess diameter : 300 mm

   Film thickness: 0.15 mm

   Viscosity of lubricant : 29.3 cP

   Calculate supply pressure, power loss in pumping and friction and flow requirement in *l*/min.

P.T.O.

Q4) Write short note on: **[16]**
    a)   Methods of calculating heat in bearings.
    b)   Idealized bearings.

SECTION-II

Q5) a)   Two parallel plates 40 mm long and infinitely wide are separated by an oil film 30 μm thick having viscosity of 0.75 Ns/m². If load per unit width of 18000 N/m is applied to the plates, find the time required to reduce the film thickness to 3 μm and the maximum pressure. **[10]**

    b)   Explain any four situations where hydrostatic squeeze film exists. **[6]**

Q6) a)   Using modified Reynold's equation for Elasto-hydrodynamic lubrication, derive Ertel-Grubin equation. **[10]**

    b)   Explain thrust bearing with air lubrication. **[6]**

Q7) a)   Derive the equation for pressure and load carrying capacity for flat plate thrust bearing. **[12]**

    b)   Explain lubrication of spheres. **[4]**

Q8) Write short notes on any three below: **[18]**
    a)   Explain Vehicle tyre and rolling mode of resistance.
    b)   Tribological aspects of wheel and rail contact.
    c)   Explain Hertz theory.
    d)   Air lubricated bearings.

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[5255] - 118

M.E. (Mech.) (Heat Power)
INTERNAL COMBUSTION ENGINES FUELS
(2008 Course) (502111 A) (Semester- II) (Elective - III)

Time : 3 Hours]   [Max. Marks : 100

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
6) *Assume suitable data, if necessary.*

SECTION-I

Q1) a) Explain the effect of volatility, antiknock quality, gun deposit, sulphur content in fuel on SI and CI engine.   **[8]**

     b) Discuss the suitability of the alternative fuel in SI Engine.   **[8]**

Q2) a) Explain the basic requirements of a good combustion chamber of engine and draw a neat sketch of open combustion chamber.   **[8]**

     b) Explain the phenomenon of pre-ignition. How pre-ignition leads to detonation and vice-versa? Explain how pre-ignition can be detected?**[8]**

Q3) a) Explain fuel rating of CI and SI Engine.   **[8]**

     b) Describe the SI engine combustion on P-θ graph.   **[8]**

Q4) a) What are the potential sources of biodiesel in India? Explain feasibility of it in India.   **[8]**

     b) What are the potential sources engine variables to optimize the combustion in SI engine?   **[10]**

SECTION-II

Q5) a) Compare induction swirl and compression swirl in CI engine. **[8]**

b) Explain the stage of combustion in CI engine. **[8]**

Q6) a) Explain the effect of engine variables on knocking for CI Engine. **[8]**

b) Explain with neat sketches the different types of turbo charger agreements for power boosting for CI engine. **[8]**

Q7) a) What are the air-fuel mixture requirements during the following range of operations of SI engine. **[8]**

   i) Idling and no low load.

   ii) Normal power range.

   iii) Maximum power range.

b) Explain the limitation of turbocharging for CI engine. **[8]**

Q8) a) Explain the latest trends in IC engine for performance enhancement and emission reduction. **[10]**

b) Explain the various methods to control knock in the SI engine? **[8]**

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[5255] - 119

M.E. (Computer Engineering)
DISTRIBUTED SYSTEMS
(2008 Course) (510108) (Semester - II)

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

Instructions to the candidates:
1) *Answer any 3 questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*

SECTION-I

Q1) a) Resources in the World Wide Web and other services are named by URLs. What do the initials URL denote? Give examples of three different sorts of web resources that can be named by URLs. **[6]**

b) Describe possible occurrences of each of the main types of security threat (threats to processes, threats to communication channels, denial of service) that might occure in the Internet. **[6]**

c) Compare and contrast cloud computing with more traditional client-server computing? What is novel about cloud computing as a concept? **[4]**

Q2) a) What do you mean by physical model of distributed system? Explain following physical models in details- **[8]**
   i) Baseline physical model.
   ii) Early distributed model.

b) Show that Byzantine agreement can be reached for three generals, with one of them faulty, if the generals digitally sign their messages. **[8]**

Q3) a) Why is computer clock synchronization necessary? Describe the design requirements for a system to synchronize the clocks in a distributed system. **[8]**

b) Why can't binary data be represented directly in XML, for example, by representing it as Unicode byte values? XML elements can carry strings represented as base 64. Discuss the advantages or disadvantages of using this method to represent binary data. **[8]**

P.T.O.

Q4) Write notes on any THREE: **[18]**

   a) Marshalling.

   b) Distributed objects.

   c) Process states.

   d) Peer-to-Peer systems.

SECTION-II

Q5) a) Why should UFIDs be unique across all possible file systems? How is uniqueness of UFIDs ensured? **[8]**

   b) Explain release consistency model in detail. **[8]**

Q6) a) Draw schematic of File Service Architecture. Explain in detail. **[8]**

   b) Explain design principles for distributed system security. **[8]**

Q7) a) Compare RPC call semantics with the semantics of WS-Reliable Messaging: **[8]**

     i) State the entities to which each refers.

     ii) Compare the differing meanings of the available semantics (for example, at-least-once, at-most-once, exactly-once).

   b) Outline the main difference between TLS and XML security. Explain why XML is particularly suitable for the role it plays, in terms of these differences. **[8]**

Q8) Explain any THREE: **[18]**

   a) Cryptography.

   b) Sun network file system.

   c) WSDL.

   d) Authentication mechanisms.

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[5255]-120

M.E (Computer Engg./ Computer (Computer Networks))
HIGH PERFORMANCE DATABASE SYSTEMS
(2008 Course) (Semester - II) (510109 & 510309)

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

Instructions to the candidates:
   1)   Answer any three questions from each Section.
   2)   Answer to each Section should be written in separate answer-books.
   3)   Figures to the right indicate full marks.
   4)   Assume suitable data, if necessary.

SECTION-I

Q1) a)   Explain TPC monitor with different architectures.   **[6]**

   b)   Describe the heuristic processing strategies for query optimization.   **[6]**

   c)   What are the important factors that influence physical database design?**[6]**

Q2) a)   Explain two pessimistic & two optimistic locking protocols in Database transaction management.   **[12]**

   b)   Explain Object Oriented Database Benchmarks.   **[4]**

Q3) a)   Explain different transaction models.   **[8]**

   b)   Explain three phase protocol and how the three phase commit protocol is a non blocking protocol.   **[8]**

Q4) a)   Consider following schema

   Property (propertyno, city) 10,000 records stored in London.

   Client (clientno, maxprice) 1,00,000 records stored in Glasgow.

   Viewing (propertyno, clientno) 10,00,000 records stored in London.

   To list property in XYZ those have been viewed by clients who have a maximum price limit greater than 20,00,000.

Query is

select p.propertyno gtom property p inner join (client c inner join viewing v on c. clientno = v. clientno) on p.propertyno = v. propertyno where p.city = 'XYZ' and c.maxprice > 20,00,000;

Suggest any two strategies for performing query processing. **[8]**

b) Discuss different methods of Multi-attribute indexing. **[8]**

SECTION-II

Q5) a) Consider the following set of transactions:

T01 {X,Z}   T02 {U,X,Y,Z}

T03 {U,V,W,Y}   T04 {V,X,Z}

T05 {U,Y}   T06 {W,X,Y}

T07 {V,Y}   T08 {V,W,X}

T09 {X,Z,U}   T10 {U,V,W,Z}

Compute the support and confidence for each of the following:

i) $V \rightarrow W$ ii) $X \rightarrow Z$ iii) $U \rightarrow Y$ iv) $Z \rightarrow V$ v) $W \rightarrow U$

Assume minimum Support of 40%, calculate the frequent k-itemsets.**[10]**

b) Explain KDD process. **[8]**

Q6) a) Explain with example different data warehouse Schemas. **[10]**

b) Discuss differences in OLTP & data warehouse applications. **[6]**

Q7) a) Write short note on Business Intelligence. **[6]**

b) Compare Active & Deductive databases. **[4]**

c) Explain OR databases. **[6]**

Q8) a) Explain with example SQL Aggregation. **[6]**

b) Explain XML schema representation using DTD. **[4]**

c) Explain Materialized views and its importance in data warehouse. **[6]**

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[5255] - 121

M.E. (Computer) (Computer Networking)
NETWORK DESIGN, MODELING AND ANALYSIS
(2008 Pattern) (Semester - II)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*

2) *Answers to the two sections should be written in separate books.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Figures to the right indicate full marks.*

5) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a)   Explain in detail Binomial distribution with its suitable application?   **[7]**

b)   Messages arrive independently to a system at the rate of 12 messages per minute. The lengths of messages are exponentially distributed with an average 4800 characters. The channel used for transmission has rate of 9600 bps, character is represented by ASCII format. Find,   **[8]**

   i)   Average service time.

   ii)   Arrival rate.

   iii)   Service rate.

   iv)   Utilization of server.

   v)   Average number of messages.

c)   Explain traffic requirement with respect to design of computer network.**[3]**

Q2) a) Explain in detail Gaussian Probability function with its suitable application. **[6]**

b) There are 150 terminals feeding a network node. Each terminal sends one transaction every 3 minutes, while the node can only process 60 transactions per minute. What is the probability that there are no more than 60 transactions per minute. What is the probability that there are no more than 60 transactions arrival per minute? **[6]**

c) Explain relation between CDF and pdf with suitable diagram. **[4]**

Q3) a) Explain & Analyze in detail queuing system with infinite servers? Give its Applications. **[8]**

b) What is terminal concentrator? Explain in detail features of terminal concentrator in computer network? **[8]**

Q4) Write short notes on (any three): **[16]**

a) Little's Theorem.

b) Priority Queuing.

c) Random variables.

d) Network design tools.

SECTION - II

Q5) a) Describe in detail network analysis. Explain the importance of network analysis process. **[6]**

b) Explain subnetworking in brief.
Given a Host A with IP address 192.168.2.10 and Host B with IP address 192.168.4.10. What subnet mask one should use to bring these two hosts on same network and on two different networks. Justify. **[10]**

Q6) a) Explain following performance characteristics of network and /or network components. **[4]**

     i)   Capacity.

     ii)   Delay.

     iii)   Reliability, maintainability and availability.

     b) Solve following terminal assignment problem using augmentation path algorithm. Weight of each node is 01

     Maximum capacity of concentrator is 02 **[12]**

<div align="center">Concentrator</div>

		G	H	I
Terminal	a	6	3	8
	b	2	9	4
	c	3	1	4
	d	2	5	9
	e	1	6	3
	f	2	7	9

Q7) a) Explain duties and responsibilities of network Administrator. **[8]**

     b) Internet connectivity of 8 mbps is to be distributed to 6 different networks. What parameters will you consider and suggest a way to distribute. **[8]**

Q8) Write short notes (any three) : **[18]**

     a) Subnetting.

     b) Sharma's Algorithm.

     c) CMST.

     d) Role of Network Administrator.

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M.E. (Computer & Computer Network)
PRINCIPLES AND PRACTICES FOR IT MANAGEMENT
(2008 Course) (Semester-I)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answer to the two sections should be written in seperate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*

SECTION-I

Q1) a) Write important points that are essential part of SRS document. Explain it with suitable example and its significance in project management. **[8]**

b) What is a project charter? Explain its main elements with significance.**[6]**

c) Enlist different stakeholders included in requirements gathering. **[2]**

Q2) a) How will you write a project scope statement? Explain with example of 'Online Railway reservation system'. **[8]**

b) Explain various methods of estimating the project costs. How will you assess the financial health of your project at any particular time during the progress of the project? **[8]**

Q3) You are an IT project manager of a network upgrade project. The network will consist of 187 work stations, 5 servers and 17 printers. Network will be segmented through switches. You have to create one 100 meter wifi zone with 40 work stations. You have to upgrade these 40 machines for wifi zone. These 40 machines can be in LAN as well as with wifi access. **[16]**

a) Create WBS.

b) Create PND and find out critical path and slack time.

Q4) a) What are the various reasons that call for a revision of project plan? What are the effects of project plan revision. **[6]**

b) Explain PERT with suitable example. **[4]**

c) Write a note on -

   i) Zero based budget. **[4]**

   ii) Matrix organization. **[4]**

SECTION-II

Q5) a) Explain the different phases of team development with suitable diagram or example. What is the difference between Teams and Groups? **[8]**

b) Explain various reasons for conflict and various approaches to conflict resolution. **[8]**

Q6) a) Assuming you are an IT project manager. Which process and project standards you will apply to your project? Explain giving its significance.**[8]**

b) Explain the change management process with relevant flow chart as applied to an IT project. **[8]**

Q7) a) Assume that Government has to provide subsidized health care facilities to all the citizens as per their income group. Identify all the stakeholders and prepare a feasibility report for such an IT project. **[8]**

b) If Higher Technical Education is to be provided as a service, what will be the risks associated with it? How will you manage these risks? **[8]**

Q8) Write short notes on - **[18]**

a) Energy management and energy audit.

b) Intellectual property rights.

c) Product design and development issues in IT industry.

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[5255]-123

M.E. (Computer Networks)
WIRELESS TECHNOLOGY
(2008 Course) (Semester - I) (Elective - II) (510305 A)

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

Instructions to the candidates:
 1) *Answer any 3 questions from each section.*
 2) *Answers to the two sections should be written in separate Books.*
 3) *Figures to the right indicate full marks.*

SECTION-I

Q1) a) Differentiate between guided media & unguided media. What is direct broadcast satellite (DBS)? **[8]**

   b) Draw and explain GSM system architecture in detail. **[10]**

Q2) a) What is Isotropic antenna? What is the advantage of parabolic reflective antenna? **[8]**

   b) Explain the different techniques of improving coverage & capacity in cellular system. **[8]**

Q3) a) Indicate some significant differences between broadcast radio & microwave. **[8]**

   b) State and explain various network services provided by 802.11 network. **[8]**

Q4) Write short note on following: (any two) **[16]**

   a) Diversity technique

   b) CSMA/CA

   c) Enterprise Authentication Protocol

SECTION-II

Q5) a) Draw and explain 802.11 MAC frame showing various fields. Expand the frame control field into subfields. What is the significance of type, subtype fields and TODS & DS bits. **[10]**

b) Explain contention based access using the DCF. **[8]**

Q6) Write short note on: (any two) **[16]**

a) Frequency Translation

b) Wi-Max

c) Tunneling & reverse tunneling in mobile node.

Q7) a) Explain the errors in wireless network with degrade TCP performance. Briefly explain how TCP snooping can improve the situation? **[8]**

b) State & explain basic location update procedure in a GSM network. **[8]**

Q8) Compare the following **[16]**

a) Diffraction and Scattering

b) Fast fadding & Slow fadding

c) Flat fadding & selective fadding

d) Frequency diversity & time diversity.

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[5255]-124

M.E. (E & TC - Microwave & IT)
HIGH PERFORMANCE COMPUTER NETWORKS
(2008 Course) (Semester-II)

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

Instructions to the candidates:
1) *Solve any three questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a)   Explain various protocols of HPN.   **[8]**

   b)   Explain High - speed switching and routing - internet in HPCN.   **[8]**

Q2) a)   Explain architecture of Gigabit Ethernet.   **[8]**

   b)   Discuss various Gigabit Ethernet cabling. Also explain various encoding rules used in it.   **[8]**

Q3) a)   Explain functional architecture and protocol architecture of B-ISDN. **[10]**

   b)   Explain ATM cell format.   **[6]**

Q4) Give short note (any 3):   **[18]**

   a)   Queuing system.

   b)   ATM services

   c)   SRP protocol and Authentication

   d)   QoS in HPCN

Q5) a) Explain DMT with neat block diagram. **[8]**

   b) Compare different DSL technologies. **[8]**

Q6) a) Explain gigabit Capable Passive Optical Network (GPON). **[8]**

   b) Compare 802.11 w.r.t. 802.16 **[8]**

Q7) a) Explain 3G technologies along with their applications. **[8]**

   b) Explain in detail architecture of GSM. Also explain security in GSM.**[8]**

Q8) Write short notes on (Any 3): **[18]**

   a) DWDM

   b) GSM architecture

   c) CDMA

   d) Mobile IP

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[5255] - 125

M.E. (E & TC) (Signal Processing)
LINEAR ALGEBRA & RANDOM PROCESSESS
(2008 Course) (Semester- I)

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

Instructions to the candidates:
1) *Answer any 3 questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Figures to the right indicate full marks.*

SECTION-I

Q1) a) Prove that orthogonal set of non-zeros is linearly independent. **[8]**

     b) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 6 \\ 0 & -2 \end{bmatrix}$ show if the matrix is commutative or not. **[8]**

Q2) a) Find the inverse of the matrix A.

$$A = \begin{bmatrix} 1 & 2 & -4 \\ -1 & -1 & 5 \\ 2 & 7 & -3 \end{bmatrix}.$$ **[8]**

     b) If A is any non-singular matrix & B is a matrix such that product AB exists, then show that AB and B have the same rank. **[8]**

Q3) a) Consider the complex matrix A. Prove if A is unitary or not.

$$A = \frac{1}{2} \begin{bmatrix} 1 & -i & -1+i \\ i & 1 & 1+i \\ 1+i & -1+i & 0 \end{bmatrix}$$ **[8]**

     b) Consider any 3 matrix A, B and C. Prove that (AB). C = A(BC). **[8]**

Q4) a) Let $u = \begin{bmatrix} 5 \\ 3 \\ -4 \end{bmatrix}$ $v = \begin{bmatrix} -1 \\ 5 \\ 2 \end{bmatrix}$ $w = \begin{bmatrix} 3 \\ -1 \\ -2 \end{bmatrix}$. Find $5u - 2v$. **[8]**

b) Evaluate the determinant of the following matrices.

$$A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 4 & -1 \\ 1 & 5 & -2 \end{bmatrix} \text{ and } B = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 4 & 3 \\ 1 & 2 & 1 \end{bmatrix}. \quad \textbf{[10]}$$

SECTION-II

Q5) a) Define and list the properties of CDF and PDF. **[8]**

b) Define mean and variance for continuous random variable. Prove that variance is equal to mean square value minus square of mean. **[8]**

Q6) a) X and Y are two continuous identically distributed random variables with mean = 7/12 and variance = 11/144. The joint probability density function is given by **[10]**

$$f(x, y) = x + y \quad 0 < x < 1, \ 0 < y < 1$$
$$= 0 \qquad \text{elsewhere}$$

Determine correlation, covariance and correlation between X & Y.

b) Write a short note on white Gaussian noise. **[6]**

Q7) a) A 2D random variable is given by P(1, 1) = 0.3 P(2, 2) = 0.5 P(3, 3) = 0.2. Plot its CDF and PDF. **[8]**

b) Define a random process. What are the different types of random processess. **[8]**

Q8) a) PDF is given by $f(x) = 12x^3 - 21x^2 + 10x$ for $0 <= x <= 1$ and zero otherwise. Find **[10]**

      i)   P $(x <= \frac{1}{2})$ and P $(x > \frac{1}{2})$.

      ii)   Obtain a number K such that P $(x <= k) = \frac{1}{2}$.

      iii)   Probability that outcome lies between l and 2.

  b) Write a short note on Binominal and Poissons distribution function. **[8]**

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[5255] - 126

M.E. (E & TC) (Signal Processing)

ADVANCED DIGITAL SIGNAL PROCESSING

(2008 Course) (504508) (Semester - II)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answers to the two sections should be written in separate books.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Your answers will be valued as a whole.*
6) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
7) *Assume suitable data, if necessary.*

SECTION-I

Q1) a) What is interpolation? Draw the block schematic for interpolator. Derive the expression for output of interpolator. **[8]**

b) Implement two stage decimator for following specifications **[10]**

Sampling Rate of input signal : 20 kHz

D = 100

Pass band = 0 to 40 Hz

Transition band = 40 to 50 Hz

Pass band ripple = 0.01

Stop band ripple = 0.002

Q2) a) Draw the block diagram of a system for sampling rate conversion by a non-integer factor and explain operation of each block, with diagrams & mathematical expressions. Can the positions of decimator & interpolator be interchanged? Justify your answer. **[8]**

b) Explain with example polyphase filter structure in detail. **[8]**

P.T.O.

Q3) a) Explain widrow LMS algorithm. **[8]**

b) Explain the use of adaptive filter in Echo cancellation in data transmission over telephone line. **[8]**

Q4) a) Discuss in detail prediction & deconvolution in least square method.**[8]**

b) Describe imaging in up-sampler and aliasing in down-sampler. **[8]**

SECTION-II

Q5) a) Explain Gradient adaptive lattice filter design. **[8]**

b) Explain application of adaptive filter design in sonar. **[8]**

Q6) a) Compare microprocessor & digital signal processor. Hence explain the need of Digital Signal Processor. **[8]**

b) How All-Pole (AR) model is used for system identification. **[8]**

Q7) a) Define AR, MA and ARMA processes. Explain any one of them in detial. **[8]**

b) Discuss the features of TMS 320C54XX in detial. **[8]**

Q8) Write short notes on (Any three): **[18]**

a) Application of multirate DSP.

b) Stability & performance of LMS algorithm.

c) Modified Harvard architecture for DSP.

d) Adaptive beam former & its application.

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[5255] - 127

M.E. (E & TC) (Signal Processing)
VLSI IN SIGNAL PROCESSING
(2008 Course) (Semester - II)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answers to the two sections must be written in separate sheets.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*
6) *Use of logarithmic tables, slide rules, electronic pocket calculator and steam table is allowed.*

SECTION - I

Q1) a) Explain need of vector quantization. Also explain encoding & decoding process with tree structured vector quantization. **[8]**

b) Explain Loop bound and iteration bound and their computation. **[8]**

Q2) a) Explain with the example, the algorithm to retime DFG for clock period minimization. **[8]**

b) Explain properties of Retiming. **[8]**

Q3) a) Explain mathematically how pipelining can achieve low power. **[8]**

b) Explain the properties of Unfolding. **[8]**

Q4) Write short note on the following. **[18]**

    a)   List the Retiming techniques & explain cut set retiming.

    b)   Parallel processing and pipelining architecture.

    c)   Design B2 for FIR systolic arrays.

SECTION - II

Q5) a)   Explain Baugh-Wooley Multiplier and draw its architecture. **[8]**

    b)   Explain bit serial multiplier using systolic mapping. **[8]**

Q6) a)   Describe various clock distribution strategies. Explain in brief the merits and demerits of each. **[8]**

    b)   Explain how floating point arithmetic is implemented on FPGA. **[8]**

Q7) a)   With the help of neat diagram explain Io block, CLB slice and interconnection matrix of FPGA. **[8]**

    b)   Explain with neat schematic 4∗4 Baugh Wooley multiplier. **[8]**

Q8) Write short note on any three of following: **[18]**

    a)   Bit Serial Multiplier.

    b)   Carry free radix-2 addition and subtraction.

    c)   Scaled CMOS Technology to meet DSP application.

    d)   FPGA design flow.

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[5255] - 128

M.E. (E & TC) (Signal Processing)

DIGITAL SIGNAL COMPRESSION

(2008 Pattern) (Semester - II) (Elective - III)

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

Instructions to the candidates:

1) *Answers to the two sections should be written in separate answer books.*
2) *Answer any three questions from each section.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Figures to the right side indicate full marks.*
5) *Use of Calculator is allowed.*
6) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) What is a prefix code? Explain how to check if a code is a prefix code using a root tree. Define self-information associated with the event. **[8]**

b) For the wavelet decomposition shown below,   **[10]**

26	6	13	10
−7	7	6	4
4	−4	4	−2
2	−2	−3	0

Find the bit stream generated after first and second pass by SPIHT coder.

Q2) a) Explain Linear Predictive coding for speech. How to select the order of the predictor. **[8]**

b) Consider a source with symbol probabilities $P(a1) = 0.7$, $P(a2) = 0.05$ and $P(a3) = 0.25$. Find the tag using arithmetic coding for a sequence a1, a3, a2. **[8]**

Q3) a) What is adaptive quantization? How step size will adaptively change by tracking the statistics of signal? How to select optimal delta?   **[8]**

b) Explain rate distortion theory? How it minimizes distortion?   **[8]**

Q4) a) Explain how MIDI is used for interfacing musical instruments.   **[8]**

b) What are advantages of ADPCM over PCM technique? Explain ADPCM with block schematic in detail.   **[8]**

SECTION - II

Q5) a) What is adaptive quantization? How step size will adaptively change by tracking the statistics of signal? How to select optimal delta?   **[8]**

b) What is streaming video? How to decide buffer size?   **[8]**

Q6) a) What are the features of MP3? Explain with suitable block diagram the structure of MP3 audio coder.   **[8]**

b) What is subband coding? What is its advantage? Describe the filters used for subband coding.   **[8]**

Q7) a) Explain Discrete Cosine transform and its properties. How the image compression is achieved by coding of DCT coefficients.   **[8]**

b) Explain how to decide the transmission rate if the tolerable distortion is given.   **[8]**

Q8) a) Explain block diagram of Video Coding Layer (VCL) for motion estimation & compression.   **[9]**

b) With the help of suitable block diagram explain the encoding and decoding process in JPEG 2000.   **[9]**

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[5255]-129

M.E. (E&TC/ Electronics)
(Microwave/ VLSI Embedded Systems/ Communication Network/ Signal Processing/ Digital Systems)
PRINCIPLES AND PRACTICES FOR IT MANAGEMENT
(2008 Course) (Semester-I) (504182)

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

Instructions to the candidates:

    1)   *Answer any three Questions from each section.*

    2)   *Answer to the two sections should be written in separate books.*

    3)   *Neat diagrams must be drawn wherever necessary.*

    4)   *Figures to the right side indicate full marks.*

    5)   *Assume Suitable data if necessary.*

SECTION - I

Q1) a)   Discuss the following functions of Management. **[10]**

       i)   Planning

       ii)   Staffing

       iii)   Organizing

       iv)   Directing

       v)   Controlling

    b)   Discuss the various skills required for the manager. **[6]**

Q2) a)   Explain the process of creating work break down structure (WBS). **[8]**

    b)   Explain the role & importance of business policy. **[8]**

Q3) a)   Write short notes on tracking project progress and financial obligations.**[8]**

    b)   State the strategies for resolving the destructive conflict. **[8]**

P.T.O.

Q4) Write short note on any three **[18]**

    a)   Six Sigma

    b)   Business ethics & social responsibility

    c)   Team Management

    d)   Theories of group formation

SECTION - II

Q5) a)   Discuss in details stress management. **[8]**

    b)   Discuss supply chain management (SCM) as modern approach to management. **[8]**

Q6) a)   State and explain various project quality standards. **[8]**

    b)   Explain the concept of knowledge management. **[8]**

Q7) a)   Explain the process of creating budget in details. **[8]**

    b)   Establish the relation between project estimation and risk management.**[8]**

Q8) a)   Write short notes on IPR and Cyber law. **[9]**

    b)   Explain the application of IT in Banking & insurance. **[9]**

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[5255] - 130

M.E. (E & TC) (VLSI & Embedded System)
REAL TIME OPERATING SYSTEM
(2008 Course) (Semester - II)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*

2) *Answer to the two sections should be written in separate answer book.*

3) *Assume suitable data if necessary.*

SECTION-I

Q1) a) What are the different techniques used to solve shared data problem?**[10]**

   b) What are the features of RTOS? Differentiate between traditional O.S &
       RTOS.   **[8]**

Q2) a) Describe the different software development tools used in embedded
       system development.   **[8]**

   b) Explain task scheduling, task synchronization, context switching, mutual
       exclusion.   **[8]**

Q3) a) What are the techniques used for time delay generation in RTOS? Explain
       why accurate delay generation is difficult in RTOS?   **[8]**

   b) Explain important guidelines for optimization of memory need/code
       optimization.   **[8]**

Q4) a) Describe the priority inversion & priority inheritance related with RTOS.**[8]**

   b) Explain memory management in RTOS.   **[8]**

SECTION-II

Q5) a) What are the strength & weakness of μcos-II operating system. **[8]**

      b) Describe features of Vx work operating system. **[8]**

Q6) a) Describe rate monotonic scheduling algorithm. **[8]**

      b) Explain the different functions used in μcos-II to handle message queue. **[8]**

Q7) a) Describe critical section of code. How it is handled in μcos-II. **[8]**

      b) What is meant by dynamic priority? How it is useful in solving priority inversion problem. **[8]**

Q8) Write short notes on the following (Any three): **[18]**

      a) Monotonic scheduler.

      b) Functions used to handle semaphore in μcos-II.

      c) Soft & hard real time system.

      d) Inter task communication.

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[5255]-131

M.E. (E & T/C) (VLSI & Embedded Systems)
ANALOG AND DIGITAL CMOS IC DESIGN
(2008 Course) (Semester - I) (504181)

Time : 3 Hours]   *[Max. Marks : 100*
Instructions to the candidates:
  1) *Answer any 3 questions from each section.*
  2) *Answers to the two sections should be written in separate books.*
  3) *Neat diagrams must be drawn wherever necessary.*
  4) *Figures to the right indicate full marks.*
  5) *Assume suitable data, if necessary.*

SECTION-I

Q1) a) Explain in short: Implementation of current sink and current source using MOSFET. What are the voltage compliances? How to improve them?**[8]**

   b) Calculate W/L for MOSFET to offer dynamic resistance of $10k\Omega$. Assume suitable data. **[8]**

Q2) Design current mirror of 50μA. Assume suitable data. What are the techniques to improve output resistance? Give mathematical analysis to support. **[16]**

Q3) a) What are the performance parameters of voltage reference circuit? Explore in brief. What is state of art? **[8]**

   b) Explain various architectures of High gain amplifier. **[8]**

Q4) Write short notes on any three: **[18]**

   a) Cascade amplifier.

   b) Macro model of op-amp.

   c) BGR.

   d) Output amplifiers.

Q5) a) Explain MOS Parasitic and its effect on performance of CMOS circuits.
[8]

b) Explain power dissipations and its minimization techniques in CMOS.**[8]**

Q6) a) Design XOR gate using transmission gate and CMOS inverter. **[8]**

b) Explain domino logic in detail. **[8]**

Q7) a) Explain with suitable examples sources of static & dynamic hazards. Explain how to eliminate hazards. **[8]**

b) Draw state diagram, write a VHDL code and test bench for 111 Moore sequence Detector. **[8]**

Q8) Write short notes on any three: **[18]**

a) Technology Scaling

b) λ Parameter and DRC

c) NORA Logic.

d) Stick Diagram and CMOS Layout.

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[5255] - 132

M.E. (E & TC) (VLSI & Embedded Systems)

RF IC DESIGN

(2008 Course) (Semester - II) (504190)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*

2) *Answers to the two sections should be written in separate books.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Figures to the right indicate full marks.*

5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a) What is EMC? What are the techniques to achieve EMC for ASIC? Explain in brief. **[8]**

b) With the help of suitable schematics, explain crosstalk mitigation techniques in brief. **[8]**

Q2) a) List characteristics of LNA. Compare Single ended & differential LNA. **[8]**

b) What do you mean by cross talk? What are the sources of crosstalk? Explain in brief. **[8]**

Q3) a) Explain ASIC design flow. At what stage will you care for Cross talk? **[8]**

b) Derive an expression for conversion gain of single ended MOSFET mixer. MOSFET is operated in CS mode. **[10]**

Q4) a) With suitable example explain back gate bias effect. **[8]**

b) Write short note on S Parameters. **[8]**

P.T.O.

SECTION - II

Q5) a) Comment on Effects of technology scaling on RF amplifiers. **[8]**

b) What is substrates bias effect? Explain it with equivalent circuit model. Give the typical component values for those models. **[8]**

Q6) a) Using the method of open circuit time constant and incremental model. Derive the expression for input resistance, output resistance & voltage gain of CS amplifier. **[8]**

b) Design cascade amplifier for voltage gain of 50. Assume suitable data Comment Ro & BW. **[8]**

Q7) a) Explain BW enhancement technique of HF amplifiers. **[8]**

b) Discuss Role of Poles in amplifier. **[8]**

Q8) Write short notes on (any Three): **[18]**

a) MOSFET capacitance and their comparisons.

b) AM-PM Conversion.

c) Short Channel Effect.

d) Neutralization techniques.

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[5255] - 133

M.E. (E & TC) (VLSI and Embedded System)
MEMORY TECHNOLOGIES
(2008 Pattern) (Semester - I) (Elective - II) (504185 B)

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

Instructions to the candidates:

1) *Answer any three questions from each section.*
2) *Answers to the two sections should be written in a separate books.*
3) *Neat diagram must be drawn wherever necessary.*
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*

SECTION - I

Q1) a)   What is non-volatile semiconductor memory? Give the classification of non - volatile memory.   **[6]**

b)   Draw and explain various SRAM circuit elements.   **[6]**

c)   Explain SOI Technology.   **[6]**

Q2) a)   Draw the DRAM 3T cell structure and explain its operation.   **[8]**

b)   Explain trench cell and stacked capacitor cell structure of DRAM.   **[8]**

Q3) a)   Explain with block diagram Application Specific DRAM.   **[8]**

b)   Explain with block diagram OTP EPROM.   **[8]**

Q4) a)   Explain in detail FLOTOX (Floating Gate Tunneling Oxide Technology).   **[8]**

b)   Explain March Test Algorithm? What types of fault it covers and explain in brief.   **[8]**

Q5) Write short notes on

    a)   Significance of testing of semiconductor memory.   **[6]**

    b)   Explain Single stuck fault model (SSF).   **[6]**

    c)   Antifuse, explain in brief.   **[4]**

SECTION - II

Q6) a)   Explain in detail the general design for testability techniques?   **[8]**

    b)   Explain BIST (Built in self Test) and built in self repair architecture? **[8]**

Q7) a)   Explain Analog memory and enumerate applications of Analog memory.**[8]**

    b)   Compare FRAM, SRAM and DRAM.   **[8]**

Q8) Write short notes on three.   **[18]**

    a)   SEU (Single Event Upset) hardening.

    b)   Radiation hardening techniques.

    c)   Analog memory.

    d)   MRAMs.

Q9) a)   What are memory cards? Explain Flash memory card.   **[8]**

    b)   Enlist commonly used packages for SMT (Surface Mounting Technology).   **[8]**

Q10) Write short notes on

    a)   Digital Tablet PC.   **[6]**

    b)   VCOS technology (VLSI chip on Silicon)   **[6]**

    c)   Memory cards.   **[4]**

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[5255]-134

M.E. (Electronics) (Digital System)
DIGITAL SIGNAL COMPRESSION
(2008 Course) (Semester-II) (Elective-IV)

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

Instructions to the candidates:

1)   Answers to the two sections should be written in separate answer books.

2)   Answer any three Questions from each section.

3)   Neat diagrams must be drawn wherever necessary.

4)   Figures to the right side indicate full marks.

5)   Use of Calculator is allowed.

6)   Assume suitable data, if necessary.

SECTION - I

Q1) a)   Explain lossless and lossy compression techniques.   **[8]**

b)   The probabilities of the source symbols are given below   **[8]**

$P(a1) = 0.1$ $P(a2) = 0.4$

$P(a3) = 0.06$ $P(a4) = 0.1$

$P(a5) = 0.04$ $P(a6) = 0.3$

Generate optimal Huffman code and find the average bit length.

Q2) a)   What is adaptive quantization? How step size will adaptively change by tracking the statistics of signal? How to select optimal delta?   **[8]**

b)   Explain Arithmetic coding technique with example.   **[8]**

Q3) a)   Explain in details midtread and mid rise quantization?   **[8]**

b)   Explain rate distortion theory? How it minimizes distortion?   **[8]**

Q4) a) With the help of block diagram explain the process of lossy predictive encoding and decoding. **[10]**

b) What is Vector Quantization (VQ)? How image or signal is compressed using VQ. What are the advantages and disadvantages of VQ? **[8]**

SECTION - II

Q5) a) Explain the effect of variance mismatch on the performance of a uniform quantizer. Plot SNR Vs. ratio of input to design variance. **[9]**

b) Explain set partitioning in hierarchical tree (SPIHT)? Explain how wavelet coefficient can be classified in LSP and LIP? **[9]**

Q6) a) Explain how to decide the transmission rate if the tolerable distortion is given. **[8]**

b) Explain the compression method for silence part, voiced and unvoiced part? Explain A-law and µ-law. **[8]**

Q7) a) Explain and compare sub-band and transform coding techniques? **[8]**

b) What is streaming video? How it is achieved? **[8]**

Q8) Explain block based motion estimation and motion compensation technique. What are the advantages of block based motion compensation. **[16]**

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