SLR-EQ – 1

Seat No.	

M.E. (Civil-Structures Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
THEORY OF ELASTICITY AND PLASTICITY (Paper – I)

Day and Date : Thursday, 15-12-2016 Total Marks : 70
Time : 11.00 a.m. to 3.00 p.m.

Instructions : *1) Solve **any two** questions from **each** Section.*
*2) **Use** of non-programmable **calculators** are **allowed**.*

SECTION – I

1. a) Derive Generalized Hooke's Law. **7**

   b) Derive Differential Equilibrium of 3-D problem of elasticity in rectangular coordinates. **10**

2. a) By ignoring, is the equilibrium of following state of stress is possible

   $\sigma_x = 10x^2\,yz, \quad \sigma_y = 20xy^3z, \quad \sigma_z = 3x^3 + y^3 - 5yz$

   $\tau_{xz} = 0, \tau_{xy} = -3xy^2z, \tau_{yz} = -12\,z^2\,xy^2 + 14x^2$

   If Not, what body forces will satisfy the equilibrium equations ? **12**

   b) Write differential equilibrium equation of 3-D cylindrical coordinate systems. **6**

3. a) Find stress distribution in a thick cylinder subjected to internal bursting pressure 5 Mpa. Take inner and outer radii as 130 mm and 230mm respectively. Hence find the maximum shear stress developed. **11**

   b) Find stress distribution in ring $a \le r \le b$ given by proposed stress function $\phi = C\theta$. Comment on results obtained. **6**

P.T.O.

SECTION – II

4. Write notes on : **(3×6=18)**

   a) Prandtl-Reuss Relations

   b) Drucker's Postulate

   c) Idealized material behaviour in plasticity.

5. a) Write a note on "Membrane Analogy". **5**

   b) Establish the relation of torsion of a bar with elliptical cross section subjected to end torsion. **12**

6. a) Discuss significant difference in approach of theory of elasticity and plasticity. **5**

   b) Find and compare yield stress in uni-directionally loaded material using Mises and Tresca criteria for the state of stress given below :

   $\sigma_x = 126$ MPa, $\sigma_y = -59$ MPa, $\tau_{xy} = 74$ Mpa . **13**

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SLR-EQ – 2

Seat No.	

M.E. (Civil Structures) (Semester – I) (CBCS/CGPA) Examination, 2016
MECHANICS OF STRUCTURES (Paper – II)

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 11.00 a.m. to 3.00 p.m.

Instructions *: 1) Solve* ***any 3*** *questions from* ***each*** *Section.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data* ***if necessary****.*

SECTION – I

1. A two span continuous beam ABC is having span AB = 4 m and span BC = 6 m. MI of span AB is 2.5 I and that of BC is 5 I. The beam is fixed at A and continuous over B and simply supported at end C. Draw ILD for BM and SF at midpoint of span BC. **12**

2. A quadrant of circle of radius R having uniform c/s is curved in plan. It is fixed at B and free at A. It carries vertically downward point load of 'P' at free end. Draw SFD, BMD and TMD. Also find vertical deflection of point A. **12**

3. A semicircular beam curved in plan of radius 5 m is supported on 3 columns as shown in Fig. 1. Draw SFD, BMD and TMD if beam is subjected to UDL of 25 kN/m throughout its circumference. **11**

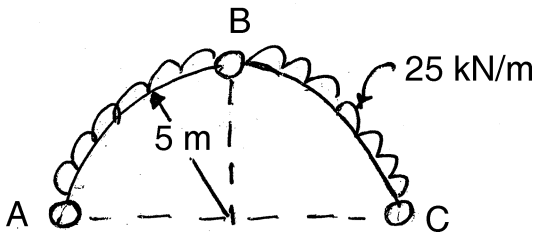

Fig. 1

4. An infinitely long beam supported on elastic foundation is subjected to an uniformly distributed load 'w' over a short length of 'l' of the beam. Draw SFD, BMD, deflection and foundation pressure diagram. **11**

P.T.O.

SECTION – II

5. A fixed beam column is subjected to an axial compressive force 'P' at both the ends and carries udl of 'w' throughout the span. Derive expression for fixed end moment. Assume beam column is prismatic. **12**

6. Analyze the beam shown in Fig. 2 by stiffness method. **12**

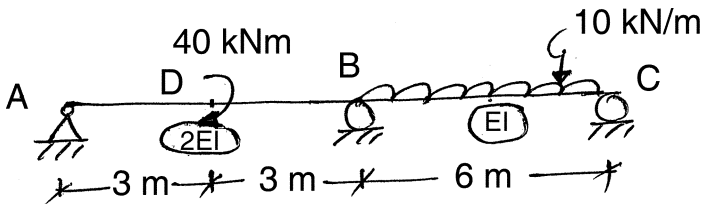

Fig. 2

7. Analyze the frame shown in Fig. 3 by stiffness method. Draw BMD. **11**

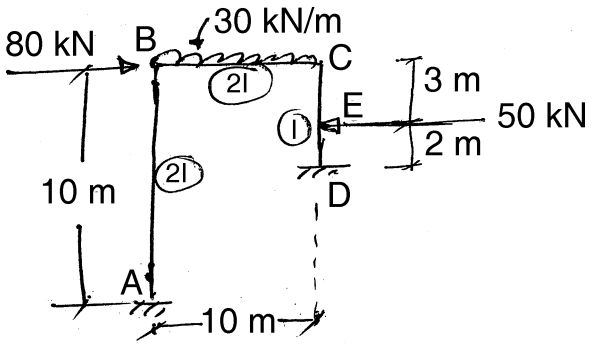

Fig. 3

8. Analyze the truss shown in Fig. 4 by member oriented stiffness method. Assume area of all the member as 100 cm^2 and E = 200 GPa. **11**

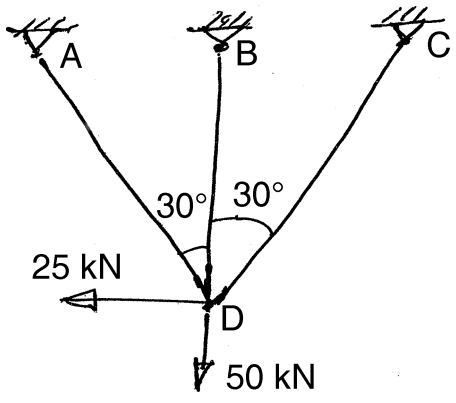

Fig. 4

Member	Length (m)
AD, CD	3.0
BD	2.598

SLR-EQ – 3

Seat No.	

M.E. (Civil-Structures) (Semester – I) (CBCS/CGPA) Examination, 2016
ADVANCED DESIGN OF CONCRETE STRUCTURES (Paper – III)

Day and Date : Monday, 19-12-2016 Total Marks : 70
Time : 11.00 a.m. to 3.00 p.m.

Instructions : *1) Answer **any two** questions from **each** Section.*
*2) Assume suitable data **if necessary**.*
*3) Use of calculator and **IS 456**, **Is 3370** Part **IV** are allowed.*
*4) **Neat** sketch should be drawn **wherever** necessary.*

SECTION – I

1. Design a rectangular water tank of size 6 m × 4 m × 3 m deep resting on firm ground. Use M_{25} concrete and Fe_{415} steel. Assume tank is open at the top. **17**

2. Design a simply supported circular slab of diameter 5 m to support a super imposed load of 4 kN/m^2. Use M_{20} concrete and Fe_{415} steel. Sketch the reinforcement details. **17**

3. Design a combined rectangular footing for columns located at distance of 4.5 m centre to centre. Column is 400 mm × 400 mm and 600 mm × 600 mm in size and carries a load of 700 kN and 1000 kN respectively. The safe bearing capacity of the soil is 150 kN/m^2. Use M_{20} concrete and Fe_{500} steel. Sketch the reinforcement details. **18**

SECTION – II

4. a) Design prestressed concrete beam of I section to the following particulars.
   i) Span = 18 m
   ii) Super imposed load = 32 kN/m
   iii) Safe stress in concrete in compression at transfer at stress = 0.5 f_{ck}
   iv) Safe stress in concrete in compression at service = 0.4 f_{ck}
   v) Allowable tensile stress in concrete = 0.129 $\sqrt{f_{ck}}$
   vi) Total loss of stress = 18 %

P.T.O.

vii) Ultimate stress in steel = 1500 N/mm^2

viii) Safe stress in steel = 60% of ultimate stress

ix) Cube strength of concrete at 28 days = 35 N/mm^2. **11**

b) The end block of a port tensioned member is 300 mm wide and 600 mm deep is subjected to an axial prestress force 1250 kN. Design the end block by Guyon's method. **7**

5. a) Explain the advantages and disadvantages of prestressed concrete over reinforced concrete. **6**

b) A PSC beam provided with parabolic profile tendon has a simply supported span of 6 m. The beam has a rectangular cross section of 400 mm × 600 mm. The total external load on the beam is 40 kN/m on whole span and the tendon carries a prestressing force of 1000 kN. The parabolic tendon has 120 mm eccentricity at mid span. Calculate the extreme fiber stresses for mid span section using stress concept, strength concept and load balancing concept. **11**

6. A prestressed tank of diameter 20m has to resist an internal head of 5m of water. Find the reinforcement required per meter height and the thickness of concrete required. Take ultimate strength of concrete as 35 Mpa, safe stress in concrete at transfer as 0.5 fck, safe stress in concrete at service condition shall remain compressive, stress in steel 1000 N/mm^2, loss of prestress is 18%, modular ratio is 8. **17**

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SLR-EQ – 4

Seat No.	

M.E. (Civil Structures) (Semester – I) (CBCS / CGPA) Examination, 2016
DYNAMICS OF STRUCTURES (Paper – IV)

Day and Date : Wednesday, 21-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 3.00 p.m.

Instructions : *1) Solve **any two** questions from **each** Section.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume suitable data **if** necessary and mention it **clearly**.*

SECTION – I

1. From the first principle derive the governing differential equation for damped free vibrations. Obtain the complete solution of differential equation if the system is under critically damped. **18**

2. A sensitive instrument of weight 450. N is to be installed at a location where the vertical acceleration of the ground is 0.1 g at a frequency of 11 Hz. The instrument is mounted on a rubber pad of stiffness 16.1 N/mm and damping such that the damping ratio of the system is 10%. Determine :

   a) What acceleration is transmitted to the instrument ?

   b) If the instrument can tolerate only an acceleration of 0.005 g. Suggest a solution assuming that same rubber pad is to be used. Provide numerical results. **17**

3. Derive the expression for Duhamel's integral for damped system. From this expression derive the expression for Duhamel's integral for the undamped system. **17**

SECTION – II

4. What is MDOF system ? Derive generalized equation of motion for MDOF system for damped forced vibration. **18**

5. a) Explain the stodola method of fundamental mode of analysis. **5**

   b) What do you mean by modal participation factors ? Discuss the criteria for selecting number of modes to be considered in analysis. **12**

6. a) Develop a basic differential equation of motion for a simply supported beam of span 'L' and mass 'm' per unit length. **9**

   b) Explain the Rayleigh method of analysis for extracting frequencies and mode shapes. **8**

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SLR-EQ – 5

Seat No.	

M.E. (Civil-Structures) (Semester – I) (CBCS/CGPA) Examination, 2016
Elective – I : DESIGN OF FOUNDATIONS (Paper – V)

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 3.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumption is ***necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. A) Explain plate load test with neat sketches. **5**

   B) A strip footing 2 m wide carries a load intensity of 400 kN/m^2 at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m^2 and unit weight above water table is 16.8 kN/m^2, Cohesion = 0, $\phi = 35^\circ$. Determine the factor of safety with respect to shear failure for the following cases of location of water table. **7**

   a) Water table is 4 m below ground level.

   b) Water table is 1.2 m below ground level.

2. A) Enumerate the procedure for design of strap footing. **5**

   B) A trapezoidal footing is to be produced to support 2 square columns of 35 cm and 55 cm sides respectively. Columns are 6 m apart and the safe bearing capacity of the soil is 400 kN/m^2. The bigger column carries 5500 kN and the smaller one carries 3500 kN. Design a suitable size of the footing so that it does not extend beyond the faces of the column. **6**

3. A) Discuss the situations in which raft foundations is advantageously used. **5**

   B) Design a raft foundation for 4 columns spaced at a distance of 4.5 m c/c in either direction (Square pattern). All four columns carry an equal load of 750 kN. SBC = 110 kN/m^2. Use M20 Concrete and Fe 415 steel. **7**

P.T.O.

SECTION – II

4. A) Explain how the load carrying capacity of a single pile is calculated using dynamic formula and static formula. **5**

   B) 200 mm diameter 8 m long piles are used as foundation for column in a uniform deposit of medium clay. Unconfined compressive strength is 100 kN/m^2. Adhesion factor is 0.9. There are nine piles arranged in square pattern of 3×3. For a group efficiency = 1, find the spacing between the piles. (Neglect end bearing). **7**

5. A) Explain use and construction of drilled piers. **5**

   B) Explain the well sinking in pneumatic caisson with neat sketch. **6**

6. A) Write a note on permissible amplitude of vibration for machines. **4**

   B) Discuss the criteria for satisfactory performance of machine foundations. **4**

   C) Explain the various types of Machine foundation with neat sketches. **4**

SLR-EQ – 6

Seat No.	

M.E. (Civil Structures) (Semester – I) (CBCS/CGPA) Examination, 2016
ADVANCES IN CONCRETE COMPOSITES (Elective – I) (Paper – V)

Day and Date : Friday, 23-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 3.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

2) Draw neat sketches ***whenever*** *necessary.*

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

SECTION – I

1. Attempt **any two** :

   a) What is fiber reinforced concrete ? Explain the properties of freshly mixed of fiber reinforced concrete. **9**

   b) Explain the applications of fiber reinforced concrete. Also explain the casting methods of fiber reinforced concrete. **8**

   c) Explain the advantages and disadvantages of fiber reinforced concrete. Also explain any one important workability test of fiber reinforced concrete. **8**

2. Attempt **any two** :

   a) Explain the behaviour of ferrocement under tesile stresses along with stress strain curve. **9**

   b) Explain casting techniques used for ferrocement. Also explain the applications of ferrocement. **8**

   c) Explain mechanical properties of ferrocement how it vary from those of reinforced cement concrete. **8**

P.T.O.

SECTION – II

3. Attempt **any two** :

   a) What is silica fume concrete ? Explain physical and chemical properties of silica fume concrete. **9**

   b) Explain the influence of silica fume on properties of freshly mixed silica fume concrete. **8**

   c) Explain the mechanical properties of silica fume concrete. Also explain the durability of silica fume concrete. **8**

4. Attempt **any two** :

   a) What is polymer concrete ? Explain the types of polymer concrete. **9**

   b) Explain the properties of polymer impregnated concrete. **8**

   c) Explain the applications of polymer impregnated concrete. **8**

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SLR-EQ – 8

Seat No.	

M.E. (Civil Structures) (Semester – II) Examination, 2016
(CBCS/CGPA)
THEORY OF PLATES AND SHELLS (New) (Paper – VI)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 3.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Figures to the ***right****, indicate* ***full*** *marks.*
3) Assume ***suitable*** *data, if required and mention it* ***clearly****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

1. a) Differentiate between behaviour of plates and shells under the effect of external loading. **6**

   b) How are the plates classified according to their thicknesses ? Give the assumptions made in the study of Theory of Plates. **7**

2. a) How the bending moment and curvature, in case of thin plates, are related with each other ? Obtain the relation. **5**

   b) Using Navier's solution obtain expression for deflection of a simply supported rectangular plate of size 'a × b' subjected to concentrated load P at centre. **6**

3. A simply supported square plate with side 'a' is subjected to uniformly distributed load of intensity 'w' all around. Using Finite difference method, find max. deflection and moment at centre of the plate. **11**

4. Write notes on **any two** : **12**

   1) Stress distribution in circular plate with central hole.

   2) Energy methods used for solution of plate problems.

   3) Levy's solution for finding deflection, shear and moment at any point in rectangular plates.

   4) Effect of boundary conditions on stress distribution in case of circular plates.

P.T.O.

SECTION – II

5. a) Define Shells. Give their classification according to geometry. **6**

   b) Describe load carrying mechanism of shells. **6**

6. Derive D. E. of equilibrium for an arbitrarily loaded shell of revolution. Use Membrane theory. **11**

7. Obtain Finsterwalder's equation for bending of cylindrical shells. **11**

8. Write short notes (**Any two**) : **12**

   1) D. K. J. theory.

   2) Schorer's theory.

   3) Advantages of shell structures.

   4) Assumptions in Finsterwalder's theory.

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SLR-EQ – 9

Seat No.	

M.E. (Civil Structures) (Semester – II) Examination, 2016
(CBCS/CGPA)
Paper – VII : FINITE ELEMENT METHOD (New)

Day and Date : Friday, 9-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 3.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from Section –* ***I****.*

2) In Section – ***II****, question number* ***4*** *is* ***compulsory****. Solve* ***any one*** *from the remaining* ***two*** *questions.*

3) Use of non-programmable calculator is ***allowed****.*

4) Assume additional data if necessary and mention it ***clearly****.*

SECTION – I

1. a) Determine displacement in nodes 1 and 2, in the spring system as shown in Fig. 1, by using minimum of potential energy approach to assemble equations of equilibrium. **12**

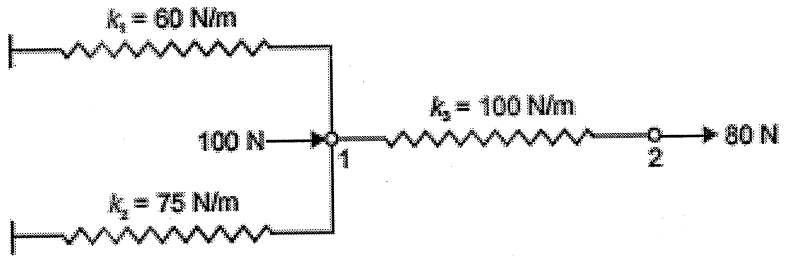

Fig. 1

b) Explain CST, LST and QST elements. **5**

P.T.O.

2. a) Obtain the displacements and reactions of the plane truss shown in Fig. 2 Young's modulus = 200 GPa, area of each element 2000 mm^2. **12**

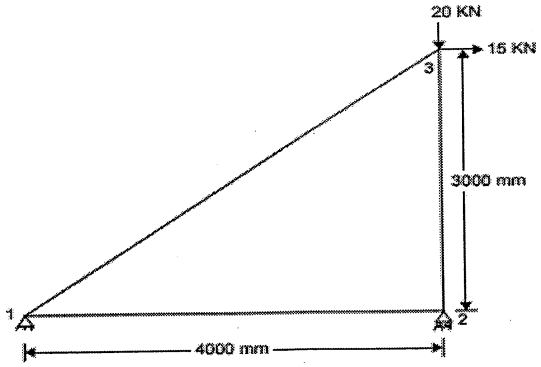

Fig. 2

b) Determine shape functions for 3 noded bar element using Lagrange Polynomials. **6**

3. a) A beam of length 10 m, fixed at one end and supported by roller at the other end carries a 20 kN concentrated load at the centre of the span. Young's modulus is 200 GPa and moment of inertia is 24×10^{-6} m^4. Determine deflection and rotation under the load using FEM. **10**

b) Determine the shape functions for a 4 noded rectangle with nodes (– a, – b), (0, – b), (0, 0), (– a, 0). **7**

SECTION – II

4. A problem of plane stress is analysed using a 4 noded quadrilateral element. The co-ordinates are (100, 50), (400, 150), (350, 350), (150, 250). Find strain displacement matrix [B] at gauss point (0.57735, – 0.57735). **18**

5. a) Write short notes on Jacobian matrix. **5**

b) Explain the formulation of any one plate bending element for element stiffness matrix. **12**

6. a) Discuss the use of FEM in axis symmetric problems. **5**

b) Explain various shell elements used in FEM. **12**

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SLR-EQ – 10

Seat No.	

M.E. (Civil-Structure) (Semester – II) (New) Examination, 2016
Paper – VIII : EARTHQUAKE ENGINEERING (CBCS/CGPA)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 3.00 p.m.

***Instructions**: 1) Solve **any two** questions from **each** Section.*
*2) Use if IS 1893 is **permitted**.*
*3) Figures to **right** indicate **full** marks.*
*4) Assume suitable data if **necessary** and state it **clearly**.*

SECTION – I

1. Write short notes on : **18**
   a) Seismograph.
   b) Modified Mercalli scale.
   c) Seismic design theory.
2. Derive an expression for the force transmitted to the foundation in a damped SDOF due to harmonic force $F(t) = F_0 \sin \omega t$. **17**
3. Compute the natural frequencies and modes for the shear frame as shown in figure and prove the orthogonality of modes. The $EI = 5 \times 10^6$ Nm^2, $m = 501 \times 10^3$ kg, storey height = 3.05 m, span = 5.1 m. **17**

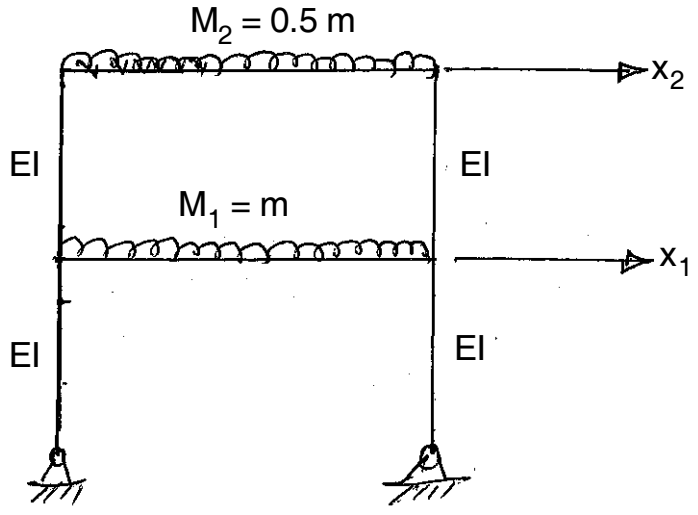

Figure 3

P.T.O.

SECTION – II

4. Discuss the factors required for accessing **17**

   a) The lateral design forces

   b) The design response spectrum.

5. A four storied RCC special moment resisting frame conforming to ductile detailing provisions school building is located in zone IV. The height of each storey is 3 m. The dead load plus live load of each floor is 3000 kN and the load for the roof is 2500 kN. The structure is founded on hard rock. Determine and distribute the design seismic forces on the structure in vertical and horizontal directions. **18**

6. Compare the base isolation system and tuned mass dampers. Explain the suitability of the both systems. **17**

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SLR-EQ – 11

Seat No.	

M.E. (Civil-Structures) (Semester – II) (New) Examination, 2016
(CBCS/CGPA)
Paper – IX : ADVANCED DESIGN OF STEEL STRUCTURES

Day and Date: Tuesday, 13-12-2016 Total Marks: 70

Time: 11.00 a.m. to 3.00 p.m.

Instructions *: i) Answer* ***any two*** *questions from* ***each*** *Section.*

ii) ***Use*** *of* ***IS 800****, steel table, calculator,* ***IS 811*** *allowed.*

iii) Assume suitable data if ***necessary****.*

iv) Draw ***neat*** *sketches* ***wherever*** *necessary.*

SECTION – I

1. The effective span of a through type girder railway bridge is 50 m for a single lane B.G. track. The cross girders a spaced at 5.5 m apart. The stringers are spaced at 2.2 m between centre line. The weight of stock and check rails are 0.5 kN/m and 0.4 kN/m. Sleepers are placed 0.45 m c/c and are of size 2.5 m × 0.25 m × 0.3 m weight of timber may be assumed as 7.5 kN/m^3. The main girders are provided at 6.0 m apart, determine the design forces in top, bottom, vertical and diagonal members of central panel. Design the bottom chord member and vertical member. The bridges is to carry a equivalent U.D.L. live load of 4300 kN for B.M. and 4700 for shear force. **18**

P.T.O.

2. Determine the shears and moments in columns and beams of a building frame with moment resisting joints in figure 1, by factored method. Assume the MI of storey column and beams as shown in figure 1. **17**

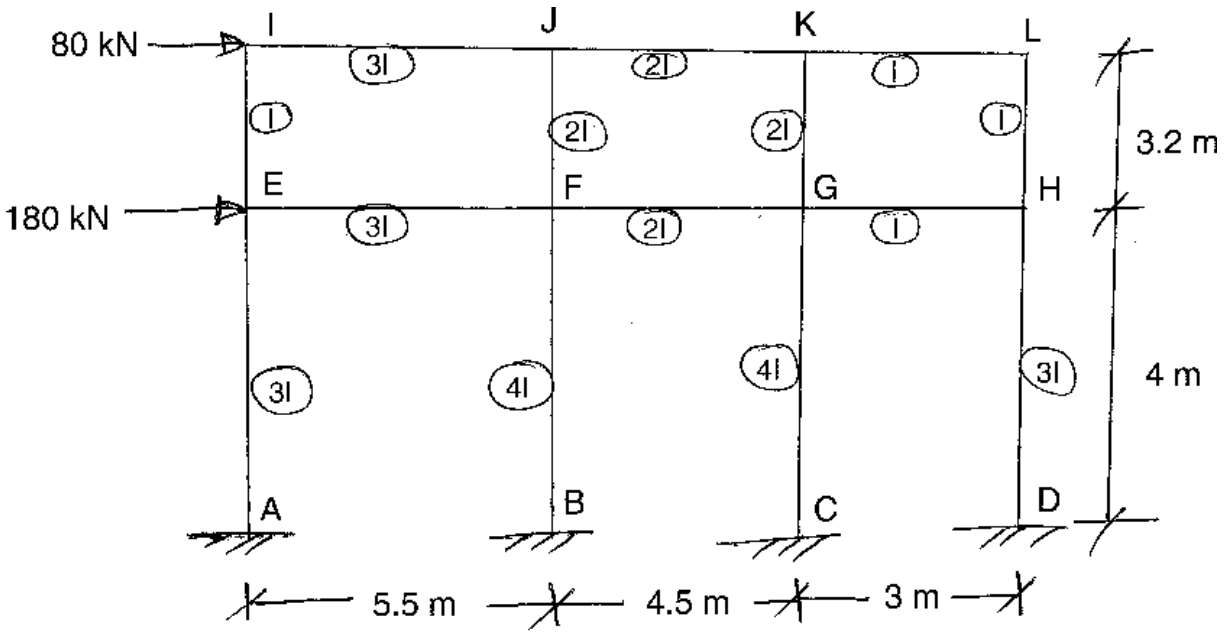


Figure - 1. Q.No. 2

3. a) Write on design procedure for light gauge beams. **5**

   b) Write on high rise tabular frames. **5**

   c) Find moment of resistance of the hot section 100 mm × 125 mm × 4 mm with lip 30 mm. **7**

SECTION – II

4. a) A fixed beam of span 5 m carries a uniform distributed load 5.2 kN/m on the right hand 4.2 m portion of the beam. The load factor is 1.75 and the shape factor is 1.15. The yield stress is 250 MPa. Calculate the section modulus of the beam and locate the position of plastic hinges. **12**

   b) Explain different collapse mechanisms. **5**

5. a) Design a composite foot bridge having clear width of 3.2 m and effective span of 12 m. The bridge is to be designed for live load of 4 kN/m^2. Assume kerb 45 cm × 35 cm and two steel girders at 2 m c/c are provided. **9**

   b) Design a cased column to carry a load of 1200 kN. The effective length of column is 4.2 m. **9**

6. a) Write the design procedure of composite beams. **5**

   b) Determine the values of fully plastic moment of the frame, when loaded up to portal collapse. The portal frame has vertical portion AB = 2.5 m, CD = 5 m and horizontal portion BC = 5.5 m. The end A is fixed and is also fixed. A horizontal load of 35 kN towards B is acting at B and a vertical load of 45 kN acting downwards is a 2 m from B on BC portion. The plastic moment of the frame is uniform throughout. Draw BMD also. **12**

SLR-EQ – 13

Seat No.	

M.E. (Civil Structures) (Semester – II) Examination, 2016
(New-CBCS/CGPA)
Elective – II : DESIGN OF RCC BRIDGES (Paper – X)

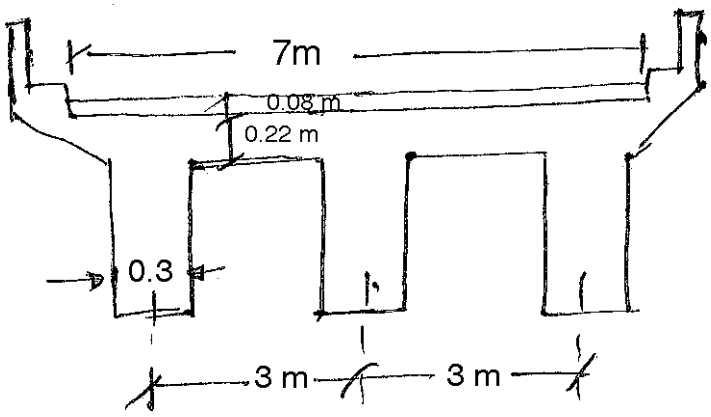
Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 3.00 p.m.

Instructions *: 1) Solve* ***any three*** *questions from* ***each*** *Section.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*
3) Assume additional data if ***required*** *and mention it* ***clearly****.*

SECTION – I

1. Design a RCC slab for culvert of span 8 m. The culvert is to be constructed for two lane road. Consider 1 RC class AA tracked loading. Use M25 and Fe-415 steel. Show the reinforcement detailing with heat sketch. **12**

2. A 'T' beam bridge has to be provided across the channel having following data.
   1) Span = 16 m
   2) Live load – 1 RC class AA tracked.
   3) Cross girder - 4 m centre to centre refer following Fig. **11**



P.T.O.

3. Design a slab panel of 'T' beam bridge for following data.
   a) Panel size – 2.5 m × 6.25 m
   b) Live load – 1 RC class AA tracked
   c) Use M25 concrete and Fe-415 steel.

   Draw the reinforcement details.

   Take Piegud's coefficient as below :

   A) For DL – $m_1 = 0.045$, $m_2 = 0.015$

   B) For LL – $m_1 = 0.08$, $m_2 = 0.0075$. **11**

4. Write a note on :
   1) Economic span
   2) Effective width method
   3) Courbon's theory
   4) 1RC class A loading. **12**

SECTION – II

5. Comment on adequacy of pier with following data.
   1) Height of pier upto springing level = 9.5 m
   2) Side batter = 1 : 12
   3) Top width = 1.75 m
   4) C/c of bearing on either side = 1m
   5) HFL = 1.5 m below bearing level.
   6) Span of bridge = 15 m
   7) Two lane bridge with IRC class AA trached loading.
   8) Material of pier-M-20 concrete. **12**

6. A) Explain various types of abutment and give a list of various forces acting on it. **6**

   B) What is reinforced earth abutment ? What is its advantage ? **5**

7. A) It is required to design an elastomeric reinforced bearing to suit the following data. Sustained load = 200 kN (vertical), Dynamic load = 50 kN (vertical), Horizontal force = 45 kN. Modulus of rigidity of elastomer = 1 N/mm^2, coefficient of friction = 0.3. **6**

   B) Write a note on different types of bearing. **5**

8. Write a note on :

   a) Caisson foundation

   b) Expansion joints

   c) Incremental push launching method

   d) Inspection of bridges. **12**

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SLR-EQ – 16

Seat No.	

M.E. (Mech. Design Engg.) (Semester – I) (CBCS/CGPA) Examination, 2016
COMPUTATIONAL TECHNIQUES IN DESIGN ENGG. (Paper – I)

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of calculator is **allowed**.*
*4) **Assume** suitable data if **necessary**.*

SECTION – I

1. a) Derive normal equations for evaluating the parameters a and b to fit the data to straight line y = a + bx in curve fitting. **6**

   b) Solve the following equation by Gauss-Seidal method. **6**

   $28x + 4y - z = 32$

   $x + 3y + 10z = 24$

   $2x + 17y + 4z = 35$

   c) A river is 80 meters wide. The depth d in metres at distance x metres from one bank is given by the following table : **6**

x :	0	10	20	30	40	50	60	70	80
d :	0	4	7	9	12	15	14	8	3

   Find approximately the area of cross section by

   i) Trapezoidal rule

   ii) Simpson's $\frac{1}{3}^{rd}$ rule.

P.T.O.

2. a) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. Find the initial acceleration using the entire data. **6**

Time t (sec.)	:	0	5	10	15	20
Velocity V(m/sec.)	:	0	3	14	69	228

b) Fit a parabola, by the method of least squares to the following data : **6**

x :	1	2	3	4	5
y :	5	12	26	60	97

c) Evaluate $\int_{0.1}^{1} (1+x^3)dx$, using Simpson's $3/8^{th}$ rule with step size 0.1. **5**

3. a) The following values of x and y are given

x :	1	2	3	4
y :	1	2	5	11

Find the cubic splines and evaluate y(1.5). **9**

b) Using Jacobi's method find all the eigen values and the eigen vectors of the matrix $A = \begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$. **8**

SECTION – II

4. a) Solve the initial value problem $\frac{dy}{dx} = 1+xy^2$, y(0) = 1, for x = 0.4 by using Milnes method, when it is given that

x :	0.1	0.2	0.3
y :	1.105	1.223	1.355

6

b) Using Picard's method, obtain a solution up to the fifth approximation of the equation $\frac{dy}{dx} + y = e^x$, y(0) = 0. **6**

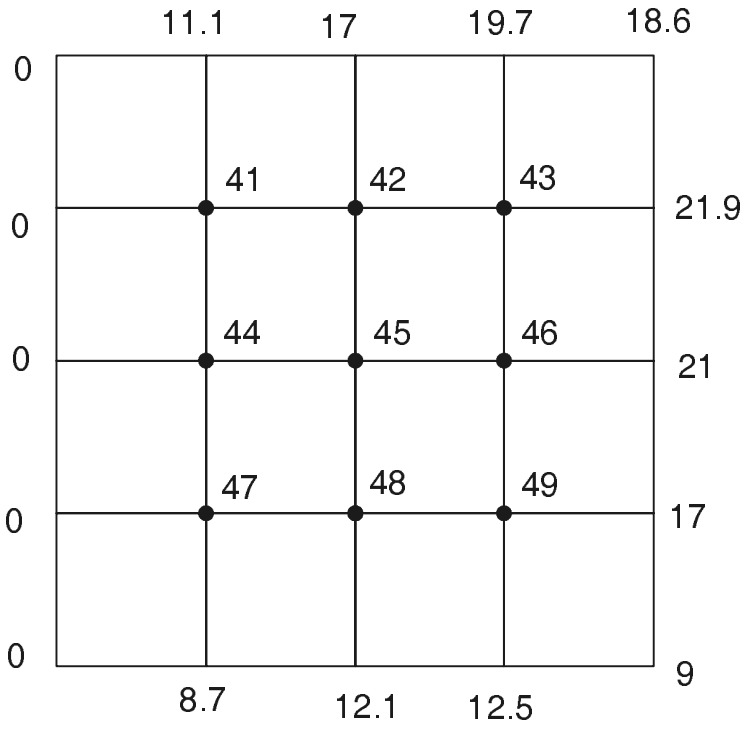
c) Explain mathematical modelling through linear diff. equation. **6**

5. a) Solve $\frac{d^2y}{dx^2} - y = x$, $x \in (0, 1)$ given y(0) = y(1) = 0, using finite differences dividing the interval into 4 equal parts. **9**

b) Solve $U_t = U_{xx}$, subject to u(0, t) = 0 u(1, t) = 0 and $u(x, 0) = \sin \pi x$, $0 < x < 1$ take h = 0.2 and k = 0.02. **8**

6. a) Using modified Euler's method, find y(0.2) and y(0.4), given $\frac{dy}{dx} = \log(x + y)$, $y(0) = 2$. **5**

   b) Solve the Laplace equation $U_{xx} + U_{yy} = 0$ given that (carry out three iterations). **12**



SLR-EQ – 17

Seat No.	

M.E. (Mechanical-Design Engg.) (Semester – I) (CBCS/CGPA) Examination, 2016
MACHINE DYNAMICS (Paper – II)

Day and Date : Saturday, 17-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1) Solve **any five** questions.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume suitable data if **necessary**.*

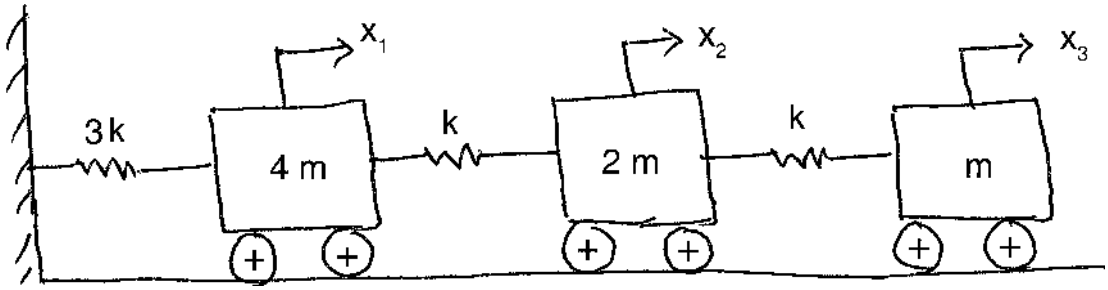
1. a) Explain free vibrations with viscous damping. **7**

   b) Explain response of single degree of freedom system with impulsive input. **7**

2. a) Write a note on torsional system with two degrees of freedom. **7**

   b) Explain principle of working of dynamic vibration absorber. **7**

3. a) A three degree of freedom system is shown below. Write down three differential equations of motion. Put these equations in matrix form. **7**



   b) Write note on Lagrange's equation to derive equation of motion of multidegree freedom system. **7**

4. a) Write note on matrix iteration method. **7**

   b) Derive the equation of motion for vibration of strings. **7**

P.T.O.

5. a) What are nonlinear vibrations ? Explain difference between linear and nonlinear vibrations. **7**

   b) Write a note on phase plane method. **7**

6. a) Write a note on power spectral density. **7**

   b) Explain random vibrations. **7**

7. a) Write a note on FFT Analyzer. **7**

   b) Explain whirling of shaft/rotor system. **7**

SLR-EQ – 18

Seat No.	

M.E. (Mechanical Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
SOLID MECHANICS (Paper – III)

Day and Date : Monday, 19-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
3) Make necessary assumptions if required.

SECTION – I

1. a) Explain the plane stress and plane strain conditions with suitable examples. **4**

   b) Derive the compatibility equation for plane stress problem in polar coordinates. **7**

2. Prove that the following are the Airy stress functions and examine the stress distribution represented by them. **12**

   i) $\phi = Ax^2 + By^2$

   ii) $\phi = Ax^3$.

3. a) Derive the expression for the torsion of non circular prismatic bar. **8**

   b) What are the assumptions made in theory of elasticity ? **3**

4. a) Derive the expression for stresses induced in the rotating disc of uniform thickness. **8**

   b) Write a note on shell of uniform strength. **4**

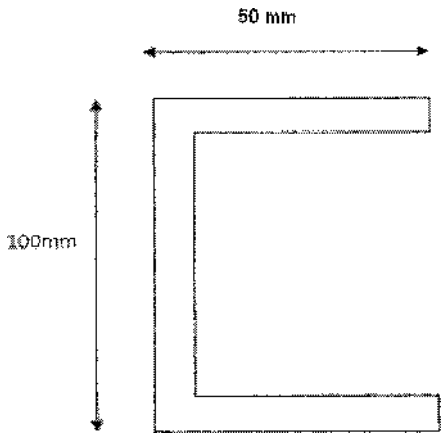
P.T.O.

SECTION – II

5. What are the membrane stresses ? Derive the equilibrium equation for membrane stresses for shells of revolution. **11**

6. a) Explain the importance of shear centre. **3**

   b) Locate the shear centre for the following cross section having uniform thickness of 4 mm by computing shear flow. **9**



7. Derive the expression for pressure and area of contact between two cylindrical bodies subjected to compressive load. **11**

8. a) Explain the membrane analogy used in torsion problems. **8**

   b) What are the assumptions made in theory of contact stresses. **4**

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SLR-EQ – 19

Seat No.	

M.E. (Mechanical Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016

DESIGN OF EXPERIMENT AND RESEARCH METHODOLOGY

(Paper – IV)

Day and Date : Wednesday, 21-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions**: 1) Solve **any three** questions from **each** Section.*

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

*3) Assume suitable data **wherever** necessary and state it **clearly**.*

SECTION – I

1. a) Explain the process of research using flow chart. **6**

   b) Differentiate between research methods and research methodology. **5**

2. a) Explain the data collection methods. **6**

   b) Explain literature survey in detail. **6**

3. a) Explain types of problem solving processes. **5**

   b) What is modeling and simulation ? Explain. **6**

4. Write short notes on **any 3** of the following : **12**

   a) Use of graphs in mathematical modeling.

   b) Cause effect relations.

   c) Research hypothesis and testing.

   d) Error in research.

   e) Design of feedback form.

P.T.O.

SECTION – II

5. a) What is creativity and management of creativity ? **6**

   b) What is the significance of design of experiments ? **5**

6. a) Explain the contents of synopsis of any research work. **6**

   b) Explain the procedure of writing a research paper. **6**

7. a) Explain Taguchi approach to parameter design. **6**

   b) Define report. Comment on various elements of report. **5**

8. Write short notes on **any 3** of the following : **12**

   a) Regression Analysis.

   b) Parametric and nonparametric data.

   c) Readability of report.

   d) Processing the results of experiments.

   e) Convergent and divergent thinking.

SLR-EQ – 20

Seat No.	

M.E. (Mechanical Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
SYNTHESIS AND ANALYSIS OF MECHANISMS AND MACHINES
(Elective – I) (Paper – V)

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***if necessary*** *and mention it* ***clearly****.*
4) Use non programmable calculators is ***allowed****.*

SECTION – I

1. a) Explain Kutzbach and Grubler criteria. **4**

   b) A bar mechanism is to be designed to generate the function $y = x^{1.8}$ for an interval in x from 1 to 5. The input link is to start from 315° and is to range of 90°, the output link is to start from 20° and is to have a range of 70°. Use three point Chebyshev spacing by algebraic method. **8**

2. a) Explain cam and follower synthesis by three accuracy point. **6**

   b) Explain Algebraic method of synthesis using complex number. **6**

3. a) Explain pole triangle. **6**

   b) Explain the procedure to find circle point and circle point curves. **6**

4. Write notes on the following : **11**

   a) Task of kinematic synthesis.

   b) Roberts-Chebyshev theorem.

P.T.O.

SECTION – II

5. a) Explain the symmetrical coupler curve. **6**

   b) Discuss the concept of Denavit-Harternberg parameters and their use in the study of spatial mechanism. **6**

6. a) Explain crank follower synthesis of five accuracy point. **6**

   b) Derive Euler-Savary equation for a four-bar linkage. **6**

7. a) Explain cubic of stationary curvature. **6**

   b) Explain Bobillier construction. **6**

8. Write notes on the following : **11**

   a) Computer Added design of mechanism used in synthesis.

   b) Denavit-Harternberg Parameter.

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SLR-EQ – 21

Seat No.	

M.E. Mech. (Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V Elective – I : INDUSTRIAL INSTRUMENTATION

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** :1) Solve **any three** questions from **each** Section.*
*2) Figures to **right** indicate **full** marks.*
*3) Draw neat diagrams **wherever** necessary.*
*4) Assume **additional** suitable data if necessary and state it clearly.*

SECTION – I

1. a) Define measurement. Describe 'Classification of Instruments'. **8**
   b) Explain advantages and disadvantages of microprocessor based instrumentations. **4**

2. a) Explain the terms hysteresis, accuracy and linearity of instrument. **6**
   b) Derive the expression for dynamic response of second order of an instrument with periodic harmonic input. **6**

3. a) Explain optical amplifying element with neat sketch. **5**
   b) Explain the principle of electrical resistance strain gauge. Derive the relation of 'Gauge factor' for it. **6**

4. a) Describe absorption type dynamometer. **5**
   b) Explain LVDT type force transducer and cantilever type load cell. **6**

P.T.O.

SECTION – II

5. a) Explain with a neat sketch Knudsen Gauge. **6**

   b) Discuss Hot wire anemometer with neat sketch. **5**

6. a) What are the materials used for manufacture of Thermistors ? Explain its working with necessary equations and advantages. **8**

   b) Explain the terms sound pressure level and sound power level. **4**

7. a) Explain system analysis by Harmonic testing. **6**

   b) Describe Corrosion monitoring. **5**

8. Write short note on (**any four**) : **12**

   1) Data acquisition system.
   2) Particle counter.
   3) Seismic instrument.
   4) Optical pyrometer.
   5) Bourdon pressure gauge.
   6) Eddy current transducer.

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SLR-EQ – 22

Seat No.	

M.E. (Mechanical) Design Engg. (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : Elective – (I) : RELIABILITY ENGG.

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data, **if** necessary.*
*3) Figures to **right** indicates **full** marks.*

SECTION – I

1. a) What are the three mathematical approaches for obtaining an items mean time to failure ? **5**

   b) In an accelerated test to determine the time to failure of friction clutches, the results shows that, minimum duration = 5 hrs. max. duration = 10 hrs, mean duration = 7 hrs coefficient of variation = 0.1. Assuming a beta distribution, determine the probability that clutch, during the accelerated test, will fail within 9 hrs. **6**

2. a) A bread stuffing producer is comparing the calorie content of the original process with a new process. Which has the lower content and what is the deference ? **6**

Original	130	135	128	127
Light	115	112	120	113

   b) The time to failure density function (PDF) for a system is given

   $f(t) = 0.01 \quad 0 \leq t \leq 100$ days.

   Find I) R(t) II) Hazard Rate functions III) MTTF IV) std. deviation

   V) mean time of failure. **6**

P.T.O.

3. Write a short notes **(any three)**. **(4×3=12)**
   1) Taguchis approach to quality
   2) Reyleigh and Weibull distribution
   3) Life cycle of product
   4) Compare FMEA and FTA.

SECTION – II

4. a) Describe the steps associated with the RCM process. **5**

   b) Consider a system composed of three subsystem with estimated failure rates of $\lambda_1 = 0.005$, $\lambda_2 = 0.003$ and $\lambda_3 = 0.001$ failure per hours, respectively. The system has a mission time of 20 hrs. A system reliability of 0.95 is required. Find the reliability requirement for the subsystem. **6**

5. a) Compare the two equipment condition monitoring technique

      I) X-ray Radiography II) Infrared spectroscopy. **6**

   b) Write down the maintainability function for Erlangian distribution. **6**

6. Write short note (**any three**). **(4×3=12)**
   1) Reliability evaluation methods.
   2) Assumption associated with Markov method.
   3) Maintainability versus reliability.
   4) Disadvantages of delta-star method.

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SLR-EQ – 23

Seat No.	

M.E. Mechanical (Design Engineering) (Part – I) (Semester – I) (CBCS/CGPA) Examination, 2016
(Paper – V) Elective – I : MECHANICAL SYSTEM DESIGN

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Qu. **1** and Qu. **5** are **compulsory**.*
*2) Solve **any two** questions from the **remaining** questions in Section – **I** and Section – **II**.*
*3) Figures to the **right** indicate **full** marks.*
*4) **Use** of non-programmable calculator is **allowed**.*
*5) **Assume** suitable data **if necessary**.*

SECTION – I

1. Solve **any four** : **(5×4=20)**
   a) Explain characteristics of a system in MSD.
   b) Explain identification and analysis of need.
   c) Explain system analysis view point.
   d) Write in brief about iconic, analogue and mathematical models.
   e) Explain graph modeling and analysis process.

2. A leather belt is required to transmit 0.2 KW from a pulley 150 mm diameter, running speed 3000 rpm. The angle embraced is 180° and coefficient of friction between the belt and the pulley is 0.2. The safe working stress for the leather belt is 0.198 Kgf/mm^2, density of leather is 0.00108 Kg/mm^3. Find the :
   i) tension in the tight and slack side of belt
   ii) velocity and
   iii) minimum belt area. **8**

P.T.O.

3. Draw a figure of compound bar system model and explain it. **7**

4. For the network shown in fig. IV find the longest path from node 1 to node 8. The figures adjacent to the arcs denote their lengths. **7**

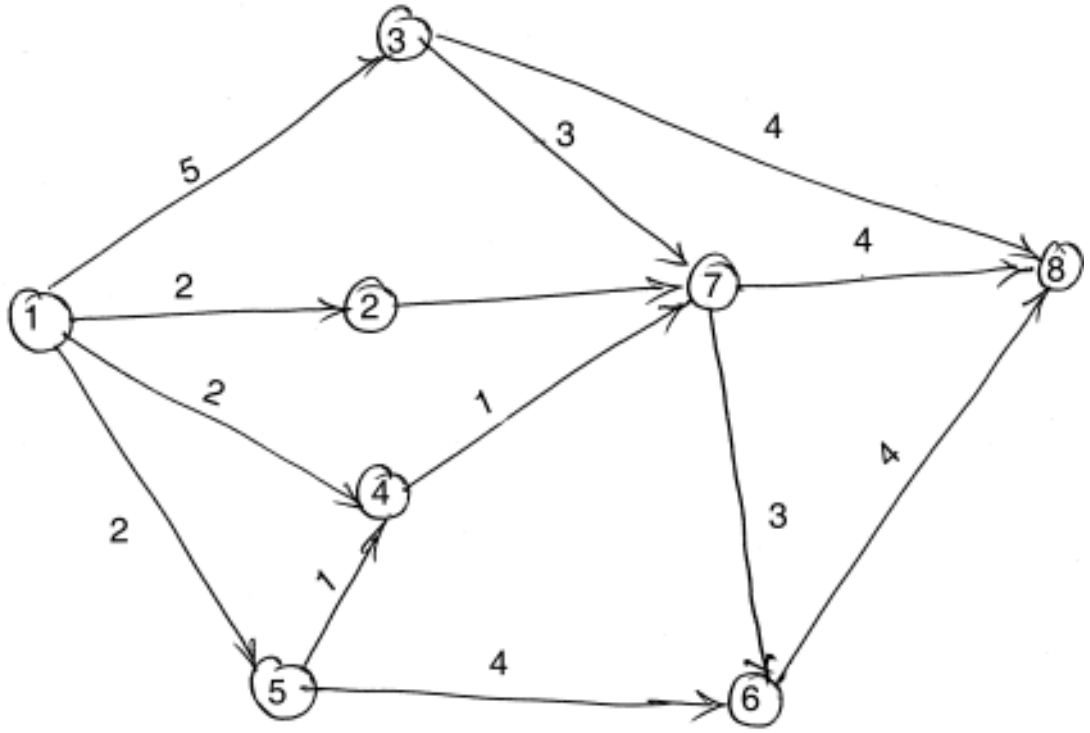


Fig. IV

SECTION – II

5. Solve **any four** : **(5×4=20)**

   a) Explain goals and objectives criteria with suitable example.

   b) Write note on Time value of money.

   c) Explain the model with two variables with equality constraint by calculus methods for optimization.

d) Explain advantages and limitations of Decision Tree approach.

e) What is simulation ? When to use simulation ?

6. Determine the rate of periodic payment, the amount of annuity so that in 20 years one can get Rs. 1,00,000; payments to be made quarterly; the interest rate is 8% compounded. **7**

7. Find the dimensions of a cylindrical tin with top and bottom made up of sheet metal to maximize its volume such that the total surface area is equal to $A_0 = 24\pi$. **8**

8. Give the probability that A can solve problem is 2/3 and the probability that B can solve problem is 3/5, find the probability that :

   i) at least one of A and B will be able to solve the problem.

   ii) none of the two will be able to solve the problem. **7**

SLR-EQ – 24

Seat No.	

M.E. (Mechanical) (Design Engineering) (Semester – II) (New) Examination, 2016
(CBCS/CGPA)
ADVANCED DESIGN ENGINEERING (Paper – VI)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Assume** necessary data **if required** and state **it clearly**.*

SECTION – I

1. a) Derive an expression for a response of a single degree of freedom cam and follower system subjected to a ramp input. **6**

   b) Compare the kinematics of SHM and Cycloidal motion cam with the help of SVAJ diagrams. **6**

2. a) Synthesize a double dwell 3-4-5 cam for following data :

   Dwell at zero displacement for 90°

   Rise of 25 mm in 90°

   Dwell at 25 mm for 90°

   Fall by 25 mm for 90°

   Cam velocity is 2π rad/sec. **6**

   b) What is friction ? List various theories of friction and explain any one theory in detail. **5**

P.T.O.

3. A hydrodynamic journal bearing has a journal diameter of 80 mm and a bearing length of 40 mm. The radial clearance between journal and bearing is 50 microns, while the minimum oil film thickness is 15 microns. The journal rotates at 1800 rpm. The viscosity of the lubricating oil is 30×10^{-9} Ns/mm^2. Assuming the narrow approximation : **11**

   i) Plot the pressure distribution in a plane perpendicular to the axis and passing through the midpoint of the bearing length.

   ii) Find the location and magnitude of maximum pressure.

4. Write short notes on : **12**

   i) Comparison between long and short hydrodynamic journal bearing

   ii) Regimes of hydrodynamic lubrication.

SECTION – II

5. a) In a test involving continuous satisfactory performance of 110 electronic instruments under excessive vibration conditions, the following failure frequencies were observed. The total test period being 8 hours. **6**

Time Interval	0 – 1	1 – 2	2 – 3	3 – 4	4 – 5	5 – 6	6 – 7	7 – 8
No. of Failures	3	16	22	42	11	9	4	3

   Determine :

   i) Failure Density

   ii) Hazard rate

   iii) Reliability.

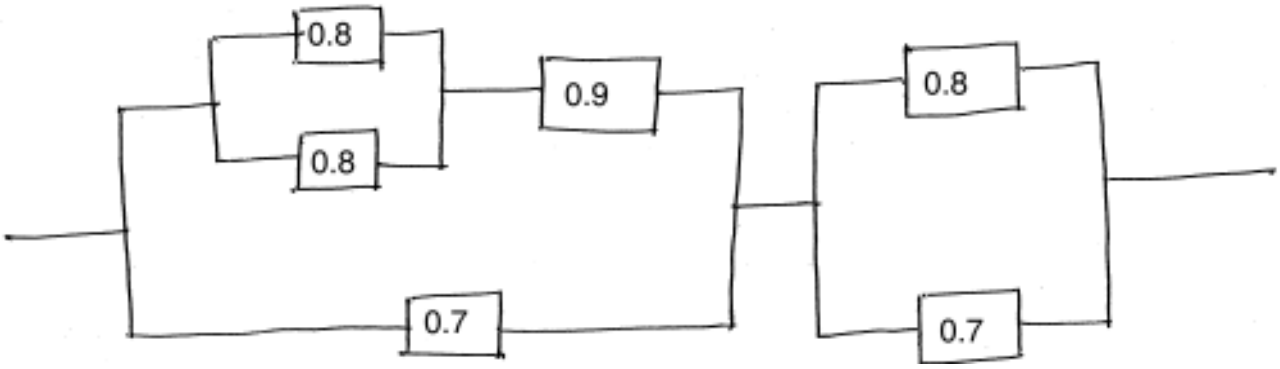
   b) Derive the expression : Z(t) R(t) = f(t). **6**

6. a) Write a short note on form and contiguity constraint. **6**

   b) Explain the methods of reducing thermal stresses. **5**

7. a) In a life test of 10 bulbs it is found that they fail at the following test hours. Determine MTTF of bulbs.
   Failure Hours : 802, 852, 901, 940, 993, 1060, 1105, 1137, 1182, 1202 **4**

   b) Calculate the reliability of the system as shown in fig. **7**



8. Write short notes on : **12**
   a) Thermal stresses in flat walls
   b) Rayleigh Distribution.

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SLR-EQ – 25

Seat No.	

M.E. (Mech : Design Engg.) (Semester – II) (New CBCS/CGPA) Examination, 2016
FINITE ELEMENT ANALYSIS (Paper – VII)

Day and Date : Friday, 9-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any three** questions from **each** Section.*
*2) Make suitable assumptions **if necessary** and state them **clearly**.*

SECTION – I

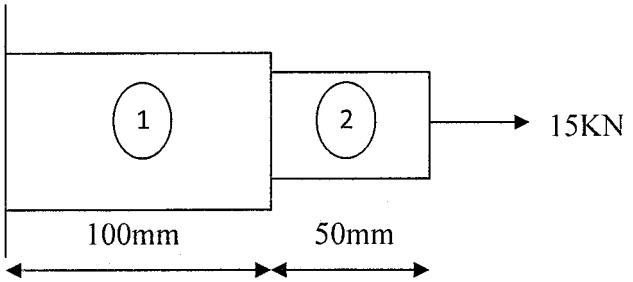
1. a) Explain steps involved in finite element method. **4**

   b) Develop weak form of weighted residual method and find the approximate solution for cantilever beam governing differential equation $AE\frac{d2y}{dx2} + ax = 0$; with boundary condition y(0) = 0, $AE\frac{dy}{dx}$ at x = 0; L = 0. **8**

2. a) Derive general equation for determining stiffness of an element with usual notations in the form of $[K]e = \int_{\upsilon} [B]^T [D] [B] d\upsilon$. **12**

3. a) Find the approximate solution of differential equation of cantilever rod subjected to uniform axial load using weighted residual method. **6**

   b) Solve the complete analysis. **6**



D1 = 50 mm ; D2 = 30 mm E = 200 GPa.

P.T.O.

4. Write short note on (attempt **any two**) : **12**

   a) CAE and major CAE software

   b) Rayleigh Ritz method.

   c) Discritization of finite element problem.

SECTION – II

5. a) Using Lagrangian Polynomial find shape function for two noded and three noded bar element. Plot the variation of shape function. **6**

   b) Write a short note on Hermite Polynomials. **4**

6. a) Explain in brief Isoparametric, Subparametric and Superparametric elements. **6**

   b) Explain sub-structuring and sub-modeling in brief. **6**

7. a) Explain modeling procedure of conductive thermal analysis using software based FEM along with its application. **10**

8. Write short note on (attempt **any two**) : **12**

   a) Simplex, complex and multiplex elements.

   b) Modal Analysis

   c) Geometric nonlinearity.

SLR-EQ – 26

Seat No.	

M.E. (Mechanical) (Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2016
Paper – VIII : EXPERIMENTAL STRESS ANALYSIS (New)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Answer **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data **if necessary** and mention **it clearly**.*
*4) **Use** of non programmable calculators is **allowed**.*

SECTION – I

1. a) Explain effect of stressed model in circular dark field polariscope arrangement. **8**
   b) Differentiate between natural and artificial doubly refraction. **4**

2. a) A2-D photo elastic model of a connecting rod was loaded in circular polariscope. The isochromatic fringe order at the point of interest was 4.0. A circular disc of the same material of 80 mm diameter was loaded in diametral compression to calculate material fringe value. At a load of 1400 N, the fringe order at centre of disc was observed to be 3.5.

   Calculate maximum in-plane shear stress at the point of interest if connecting rod has a thickness of 10 mm. **6**
   b) Discuss fringe sharpening. **6**

3. a) Explain shear difference method. **6**
   b) Derive stress optics law for two dimensional photo elasticity. **6**

4. Write short notes on : **11**
   a) Stress-freezing technique in 3D photo elasticity
   b) Brittle coating method.

P.T.O.

SECTION – II

5. a) The strain readings as measured by a three element rectangular rosette at a point in the stressed body are as follows : •a = 250 micro-strain, •b = –160 micro-strain and •c = –50 micro-strain. Determine the maximum principal strain direction, the principal stresses and the maximum shear stress. Take E = 210 GPa and μ = 0.3. **8**

   b) Explain bonding of strain gauges and moisture proofing. **4**

6. a) Define transverse sensitivity of a strain gauge. Derive the expression for transverse sensitivity of a strain gauge. **6**

   b) Explain various ways of initial balance of Whetstone's bridge. **6**

7. a) Explain Moire fringe method. What are the merit and demerit ? **6**

   b) Discuss use of strain gauge for measurement of load and pressure. **6**

8. Write short notes on : **11**

   a) Material used for photo elastic coating.

   b) Temperature compensation of strain gauges.

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SLR-EQ – 27

Seat No.	

M.E. Mechanical (Design Engineering) (CBCS/CGPA)
(Semester – II) Examination, 2016
Paper – IX : INDUSTRIAL PRODUCT DESIGN (New)

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: i) Attempt* ***any five*** *questions from the following .*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) Support the answers by ***neat*** *sketches* ***wherever*** *necessary.*

1. a) Explain the industrial product design approach based on idea generation and inventiveness. **7**
   b) Explain aspects of ergonomic design of radial drilling machine with suitable examples. **7**

2. a) Explain importance of modeling technique and prototype design in industrial product design with examples. **7**
   b) How line and form influence the aesthetics of consumer product ? Illustrate with examples. **7**

3. a) What is design for production ? Explain its impact on product cost. **7**
   b) What are legal and standard requirements ? Why it is necessary to incorporate the legal and standard requirements in the design of a product ? **7**

4. a) What is creativity ? Explain the role of creativity in the product design with example. **7**
   b) Explain maintainability considerations in the product design. **7**

5. a) Discuss role of color in industrial products. How will you select colors to the industrial products ? **7**
   b) What is psychology of seeing ? Discuss its effect on product design. **7**

6. a) Explain the concept of mechanics of seeing. Explain importance of rhythm in the product. **7**
   b) What is style and house style ? How they are different from each other ? **7**

7. a) Explain concept of unity with suitable examples. **7**
   b) What are the factors to be considered in the selection of material for the product ? Discuss the impact of these factors on product design. **7**

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SLR-EQ – 28

Seat No.	

M.E. Mechanical (Design Engineering) (Semester – II)
(New CBCS/CGPA) Examination, 2016
Paper – X – Elective – II : INDUSTRIAL TRIBOLOGY

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Question **1** and question **5** are **compulsory**. Solve **any two** questions **each** from Section **I** and Section **II** out of **remaining**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume necessary data, **if required**.*

SECTION – I

1. Derive Reynolds equation with usual notations. What are assumptions made while deriving this equation ? Explain how this can be used to obtain pressure distribution in short bearings ? **13**

2. a) Explain Rayleigh step bearing. **3**

   b) Following data refers to hydrostatic thrust bearings. **8**
   1) Shaft dia. = 500 mm
   2) Recess dia. = 300 mm
   3) Shaft speed = 750 mm
   4) Supply pressure = 6 N/mm^2
   5) Film thickness = 0.18 mm
   6) Viscosity of lubricant = 28 cP
   7) Specific gravity of lubricant = 0.86
   8) Specific heat of lubricant = 1.76 kJ/kg °C

   Calculate :
   1) Load carrying capacity.
   2) Flow requirement in 1/min
   3) Viscous power loss.
   4) Temp. rise.

P.T.O.

3. a) From two dimensional Reynolds equation derive an expression for pressure distribution in narrow width Tapered pad bearings. **8**

   b) What is Sommerfeld number ? State its significance in bearing design. **3**

4. Explain the following :
   1) Modified Adhesion theory of friction. **4**
   2) Tomlinson' theory of molecular attraction. **4**
   3) Stick slip motion. **3**

SECTION – II

5. a) Explain practical applications of hydrostatic squeeze film lubrication. **6**

   b) Differentiate between squeeze film lubrication and hydrodynamic lubrication. **7**

6. a) Compare gas lubricated bearings with oil lubricated bearings based on following parameters. **6**
      1) Load carrying capacity
      2) Film thickness
      3) Surface finish
      4) Bearing material
      5) Overall coefficient of friction
      6) Effect of temperature on viscosity of lubricant.

   b) Discuss Tribological aspects of metal rolling. **5**

7. Using Ertel Grubin theory derive relation. **11**

$$\frac{h_o}{R} = 1.19 \left[\frac{\mu_o U \alpha}{R}\right]^{\frac{8}{11}} \left[\frac{ELR}{W}\right]^{\frac{1}{11}}$$

8. Briefly discuss :
   1) Lubrication in wire drawing and extrusion. **4**
   2) Piston pin lubrication. **4**
   3) Desirable properties of bearing material **3**

SLR-EQ – 29

Seat No.	

M.E. (Mechanical Design Engineering) (Semester – II) Examination, 2016
(New – CBCS/CGPA)
ENGINEERING FRACTURE MECHANICS (Elective – II) (Paper – X)

Day and Date : Wednesday, 14-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt* ***any two*** *questions from* ***each*** *Section.*

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

3) ***Use*** *of Scientific calculator is* ***allowed****.*

4) ***Assume*** *suitable data if* ***necessary*** *and mention it* ***clearly****.*

SECTION – I

1. a) Explain Resistance curves for brittle and ductile materials. **5**

   b) Explain stress intensity factor with respect to fracture mechanics. **5**

   c) Explain with suitable figures opening mode, shearing mode and tearing mode. **8**

2. a) A 75 cm wide steel plate has central crack of length 2a = 10 cm. The plate is 5 mm thick. The plate is pulled to fracture and the fracture load is 1000 KN. Determine the stress intensity factor assuming a/W as small. Also determine the value of fracture resistance. Take Young's Modulus for material as 200 GPa. **10**

   b) Explain Griffith's energy balance approach related with fracture mechanics. **7**

3. Write short note on following (**any three**) : **17**

   i) Crack opening displacement

   ii) Irwin's Fracture Criterion

   iii) Interferometry and Holography

   iv) Energy release rate.

P.T.O.

SECTION – II

4. a) A large centre-cracked plate containing an initial crack of length $2a_0 = 10$ mm is subjected to constant amplitude cyclic tensile stress ranging between a minimum value of 120 MPa and maximum value of 180 MPa. Assuming fatigue crack growth rate is governed by equation $\frac{da}{dN} = 0.42 \times 10^{-11}(\Delta k)^3 (m/cycle)$:

   i) Calculate crack growth rate when crack length has the following values 2a = 10 mm, 30 mm, 50 mm.

   ii) Assuming further that relevant fracture toughness is 60 MPa $\sqrt{m}$, estimate number of cycles to failure.

   Determine the plastic zone length at fracture for mild steel length at fracture for mild steel with $K_{IC} = 70$ MPa $\sqrt{m}$ and $\sigma_{ys} = 450$ MPa for

   i) Plane stress

   ii) Finite thickness condition. **12**

   b) Explain different stages of fatigue crack initiation and propagation. **6**

5. a) Compare creep and stress rupture test. **6**

   b) What is difference between safe design and damage tolerance design methodology to predict crack growth life ? **6**

   c) What are limitations of S-N curve approach ? **5**

6. Write short note on following (**any three**) : **17**

   i) Fatigue life calculations methods

   ii) Effect of overhead during fatigue crack propagation

   iii) Sub-critical crack growth

   iv) Creep resistance materials.

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SLR-EQ – 30

Seat No.	

M.E. (Mechanical Design Engineering) (Semester – II) Examination, 2016
THEORY AND ANALYSIS OF COMPOSITE MATERIALS (Elective – II)
(New – CBCS/CGPA) (Paper – X)

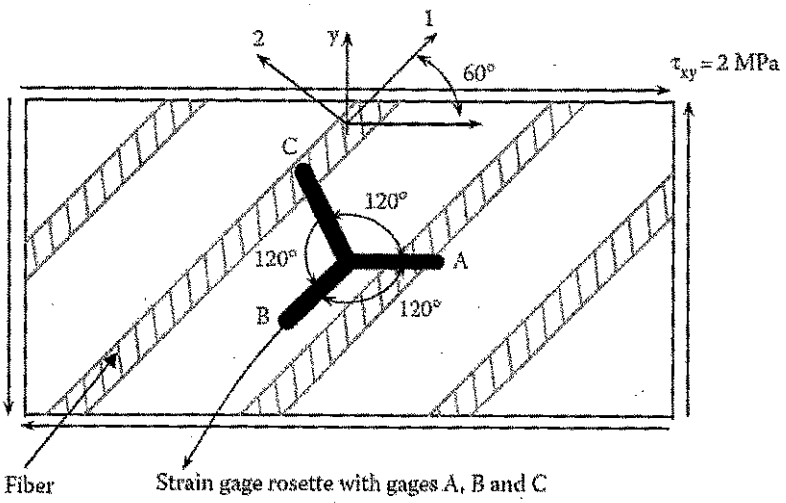
Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt* ***any two*** *questions.*
2) Figures to the right indicate ***full*** *marks.*
3) Use of Scientific calculator is ***allowed****.*
4) Assume suitable data ***if*** *necessary and mention it* ***clearly****.*

SECTION – I

1. A) Give the advantages and drawbacks of metal matrix composites over polymer matrix composites. **6**

   B) As shown in below Figure, a 60° angle graphite/epoxy lamina is subjected only to a shear stress τxy = 2 MPa in the global axes. What would be the value of the strains measured by the strain gage rosette – that is what would be the normal strains measured by strain gages A, B and C ? Use the properties of unidirectional graphite/epoxy lamina from Table [1]. **12**



Strain gage rosette on an angle lamina.

P.T.O.

2. A) Find the major and minor Poisson's ratio of a glass/epoxy lamina with a 70% fiber volume fraction. Poisson's ratio of the fiber is $V_f = 0.2$, Poisson's ratio of the matrix is $V_m = 0.3$. The longitudinal Young's modulus is $E_1 = 60.52$ GPa. The transverse Young's modulus is $E_2 = 10.37$ GPa. **10**

   B) Find the transverse Young's modulus of a glass/epoxy lamina with a fibre volume fraction of 70%. Young's modulus of the fibre is Ef = 85 GPa Young's modulus of the matrix is Em = 3.4 GPa. **7**

3. A) Explain rule of mixture. **6**

   B) Explain Tsa-Hill theory. **6**

   C) Explain metal matrix composites. **5**

SECTION – II

4. A) Explain layup and curing related with manufacture of laminated fibre reinforced composite materials. **12**

   B) Explain load deflection behaviour of metal plates with figures related to strength of laminates. **6**

5. A) Explain lower bound and upper bound on apparent Young's modulus related with elasticity approach to stiffness. **10**

   B) What are steps in the structural design processes. **7**

6. A) Find the maximum value of $S > 0$ if a stress $\sigma x = 2S$, $\sigma y = -3S$ and $\tau xy = 4S$ are applied to a 60° lamina of graphite/epoxy. Use Tsai – Wu failure theory. Use the properties of a unidirectional graphite/epoxy lamina from table [1]. **12**

   B) Explain types of defects related with manufacture of composites. **5**

TABLE NO. [1]

Typical Mechanical Properties of a Unidirectional Lamina (SI System of Units)

Property	Symbol	Units	Glass/ epoxy	Boron/ epoxy	Graphite epoxy
Fiber volume fraction	V_f		0.45	0.50	0.70
Longitudinal elastic modulus	E_1	GPa	38.6	204	181
Transverse elastic modulus	E_2	GPa	8.27	18.50	10.30
Major Poisson's ratio	ν_{12}		0.26	0.23	0.28
Shear modulus	G_{12}	GPa	4.14	5.59	7.17
Ultimate longitudinal tensile strength	$(\sigma_1^T)_{ult}$	MPa	1062	1260	1500
Ultimate longitudinal compressive strength	$(\sigma_1^C)_{ult}$	MPa	610	2500	1500
Ultimate transverse tensile strength	$(\sigma_2^T)_{ult}$	MPa	31	61	40
Ultimate transverse compressive strength	$(\sigma_2^C)_{ult}$	MPa	118	202	246
Ultimate in-plane shear strength	$(\tau_{12})_{ult}$	MPa	72	67	68
Longitudinal coefficient of thermal expansion	α_1	μm/m/°C	8.6	6.1	0.02
Transverse coefficient of thermal expansion	α_2	μm/m/°C	22.1	30.3	22.5
Longitudinal coefficient of moisture expansion	β_1	m/m/kg/kg	0.00	0.00	0.00
Transverse coefficient of moisture expansion	β_2	m/m/kg/kg	0.60	0.60	0.60

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Seat No.	

M.E. – Mechanical (Design Engineering) (Semester – II) Examination, 2016 (New-CBCS/CGPA)
Elective – II : ENGINEERING DESIGN OPTIMIZATION (Paper – X)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any five** questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data **if necessary** and state it clearly.*
*4) **Use** of non-programmable calculator is **allowed**.*

1. a) Explain classification of optimization problems based on the nature of design variables. **7**
   b) Give engineering applications of optimization. **7**

2. a) Write note on multivariable optimization techniques. **7**
   b) Write the Taylor's series expansion of a function f(x). **7**

3. a) Explain random walk method. **7**
   b) Find the dimensions of a box of largest volume that can be inscribed in a sphere of unit radius. **7**

4. a) What is multi-objective optimization ? What are different methods of the same ? **7**
   b) Explain weighted min-max method for multi-objective optimization. **7**

5. a) Write note on exhaustive search. **7**
   b) Explain standard form of linear programming. **7**

6. a) Explain selection of optimum configuration for design optimization of mechanical systems. **7**
   b) Explain geometry of linear programming. **7**

7. a) Explain sequential quadratic programming. **7**
   b) Write note on characteristics of mechanical systems. **7**

SLR-EQ – 32

Seat No.	

M.E. (Electronics) Semester – I (CBCS/CGPA) Examination, 2016
CMOS VLSI DESIGN (Paper – I)

Day and Date : Thursday, 15-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

N. B. : *1) Q. **1** and Q. **5** are **compulsory**.*
*2) Solve **any two** questions from Q. **2** to Q. **4** for Section – **I**.*
*3) Solve **any two** questions from Q. **6** to Q. **8** for Section – **II**.*
*4) Figures to the **right** indicate **full** marks.*

SECTION – I

1. a) Draw output characteristics of nMOS transistor and explain cut off region, non-saturation region and saturation region for nMOS transistor. **7**

   b) What is technology scaling for MOS transistor ? **4**

2. a) What is VTC of CMOS inverter ? How noise margin can be obtained from VTC of CMOS inverter ? **6**

   b) What is dynamic power dissipation of CMOS inverter ? **6**

3. a) What is CMOS logic ? **4**

   b) Design AND, OR, NAND and NOR gates using pass transistor logic. **8**

4. Write notes on **any three** of the following : **(4×3=12)**

   a) Effect of β_n / β_p on CMOS inverter.

   b) Dynamic CMOS NAND gate.

   c) Ratioed logic.

   d) Charge sharing for dynamic CMOS logic.

P.T.O.

SECTION – II

5. a) What is low voltage static latch ? What are problems for this latch and how they are solved ? **6**

   b) Explain dynamic edge triggered register. **5**

6. a) What is C^2MOS master slave positive edge triggered register ? Draw the circuit and explain. **6**

   b) What is clock skew and jitter ? **6**

7. a) Explain plesiochronous interconnect and asynchronous interconnect timing classifications of digital systems. **6**

   b) What is latch based clocking ? **6**

8. a) Explain designing of fast adders. **6**

   b) Draw circuit and explain CMOS SRAM cell. **6**

SLR-EQ – 33

Seat No.	

M.E. (Electronics Engg.) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – II : ADVANCED DIGITAL SIGNAL PROCESSING

Day and Date : Saturday, 17-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicates **full** marks.*
*3) **Assume** suitable data if **required**.*

SECTION – I

1. 1) Draw the block diagram of forward linear prediction. Derive the equation for coefficient of linear Predictor. **6**

   2) Explain the Levinson Durbin algorithm for computation of LPC's. **6**

2. 1) Derive the equation for energy density spectrum which is obtained from the Fourier transform of autocorrelation of the sequence {x(n)}. **6**

   2) Derive the equation of Power density spectrum estimation called as 'periodogram'. **6**

3. 1) Derive the equation for Type III and Type IV Symmetrical Linear Phase FIR filters. **6**

   2) Explain the design of Hilbert Transformer. **5**

SECTION – II

4. 1) Explain the process of Decimation by a factor 'D'. Draw the spectrum for each stage. **6**

   2) Explain with block diagram Phase Shifters. **6**

P.T.O.

5. 1) Explain digital IIR filter design in time domain using pole-approximation method. **6**

   2) Design a digital low pass Butterworth filter using bilinear transformation with pass band and stop band cut-off frequencies 800 rad/sec and 1800 rad/sec respectively. The pass band attenuation is – 3 db and stop band attenuation is – 10 db. **6**

6. 1) What is Haar Wavelet transform ? Discuss atleast two properties of Haar Wavelet Transform. **6**

   2) Explain characteristics of Wavelet expansion system. **5**

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SLR-EQ – 34

Seat No.	

M.E. (Electronics Engineering) (Part – I) (Semester – I) (CBCS – CGPA) Examination, 2016
Paper – III : ADVANCED NETWORK ENGINEERING

Day and Date : Monday, 19-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Figures to the **right** indicates **full** marks.*
*2) Assume suitable data if **necessary**.*

SECTION – I

1. Answer following questions : **(3×4=12)**
   1) How ICMP helps to improve IP's performance ? What is the difference between error reporting and error correction ? List various ICMP messages and their meanings.
   2) What is the need of fragmentation in IP communication ? Explain the significance of identification, fragmentation offset and flags associated with the fragmentation.
   3) Draw and explain IPv6 base header format. What is the need of extension header ?

2. Answer **any two** from following questions : **(2×6=12)**
   1) What are the features of TCP ? What is small packet and silly window syndrome problem related to TCP ? How these problems are overcome ?
   2) Draw a diagram a datagram that used IPsec encapsulating security payload. Explain ESP header and trailer format.
   3) What are the reasons of using cryptography system ? What are the types of cryptography systems ? Explain public key cryptography system.

3. Answer following questions :
   1) If N = 119, public key = 5 and private key is 77. Demonstrate RSA algorithm to send character 'C'. **5**
   2) What is the purpose of IPsec authentication header ? Draw IPsec authentication header format and explain. **6**

      OR

   2) What is three way handshake in TCP ? Explain tail drop and random early discard related to TCP. **6**

P.T.O.

SECTION – II

4. Answer following questions : **(3×4=12)**
   1) What are the applications of MPEG – 1, 2 and 4 ? What are the aspects of MPEG – 4 system ?
   2) Explain CIF and QCIF formats of video encoding.
   3) What is jitter and playback buffer ? Explain the role of RTCP in real time communication. List basic RTCP messages and their meanings.

5. Answer **any two** from following questions : **(2×6=12)**
   1) Draw and explain end-to-end architecture for MPEG – 4 transmission over internet.
   2) Draw the functional block diagram of MPEG audio encoder and explain each block. Specify basic MPEG algorithm for audio.
   3) Are sequence numbers are necessary in RTP ? Can time stamp be used as sequence number in RTP ? Draw RTP header format and explain.

6. Answer following questions :
   1) What are the QoS driven routing protocols ? What are different protocols used in internet routing ? **5**
   2) What is basic operation of DVMRP ? What are the functions of DVMRP protocol ? Discuss DVMRP in short. **6**

      OR

   3) What are the different layers of MPEG audio ? Explain MPEG – 1 audio handling in layer – 3. **6**

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SLR-EQ – 35

Seat No.	

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – IV : RANDOM SIGNALS AND PROCESSES

Day and Date : Wednesday, 21-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** suitable data **if** necessary.*

SECTION – I

1. Attempt **any two** of the following : **(2×6=12)**
   a) State Bernoulli theorem on independent trials. A fair coin is tossed 4 times. What is the probability of getting more heads than tails ?
   b) A box contains 5 red and 4 white balls. Two balls are drawn successively from the box without replacement and it is noted that the second one is white. What is the probability that the first is also white ?
   c) Two six-sided (balanced) dice are thrown. Find the probabilities of each of the following events :
      i) a 5 does not occur on either throw
      ii) the sum is 7
      iii) a 5 and a 3 occur in any order
      iv) the first throw is a 5 and the second throw is a 5 or a 4
      v) both throws are 5
      vi) either throw is a 6

2. Attempt **any three** of the following : **(4×3=12)**
   a) What is the probability density function ? Give the properties of probability density function.
   b) A fair coin is tossed three times and the random variable X equals the total number of heads. Find and sketch $F_x(x)$ and $f_x(x)$.

P.T.O.

c) Find the distribution function of X whose probability density function is given

by $f_x(x) = \begin{cases} 0 & \text{for } x \le 0 \\ x & \text{for } 0 < x \le 1 \\ 2-x & \text{for } 1 \le x < 2 \\ 0 & \text{for } x \ge 2 \end{cases}$

d) If X is uniformly distributed random variable with mean 1 and variance 4/3, find P(X > 0).

3. Attempt the following :

a) Derive the expression for the PDF of sum of the two independent random variables. **5**

b) Find the covariance of X and Y if X and Y have joint probability density function $f_{XY}(x,y) = \begin{cases} 5xy & 0 \le x \le 1, \quad 0 \le y \le 1 \\ 0 & \text{otherwise} \end{cases}$ **6**

OR

b) Two random variables X and Y have joint probability density function of the form

$$f_{XY}(x, y) = \begin{cases} \frac{3}{2}(x^2 + y^2) & 0 \le x \le 1, 0 \le y \le 1 \\ 0 & \text{elsewhere} \end{cases}$$

i) What is the probability that both x and y are larger than 5 ?

ii) Find the mean value of X.

iii) Find the correlation E(XY). **6**

SECTION – II

4. Attempt **any two** of the following : **(2×6=12)**

a) Define following terms for random processes

i) Stationarity ii) Ergodicity iii) Time average iv) Autocorrelation.

b) If $Y(t) = A(\cos \omega t + \theta)$ where A and ω are independent random variables and θ is uniformly distributed in $(-\pi, \pi)$, prove that $Rx(t1, t2) = (1/2)\, E(R^2) \cos \omega (t1-t2)$.

c) Find the mean, variance and the root mean square of the process whose autocorrelation function is given as follows :

$R_{xx}(\tau) = 3 + 4e^{-2|\tau|}$

5. Attempt **any two** of the following : **(2×6=12)**

a) Define power spectral density. State Einstein Wiener Khinchine theorem. State the properties.

b) Let X(t) be a random process having the following form $X(t) = A \cos(\omega 0t + \theta) + N(t)$

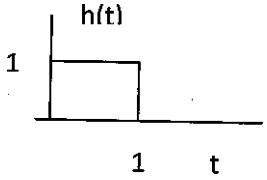
Where A and $\omega 0$ are constants, θ is a random variable and N(t) is independent white noise. Random variable θ is uniformly distributed random variable in $(0, 2\pi)$. Obtain the power spectral density Sx(f).

c) Find the autocorrelation function of the random process X(t) whose spectral density is given by $S(\omega) = \begin{cases} A & |\omega| \leq \lambda \\ 0 & |\omega| > \lambda \end{cases}$

6. Attempt following :

a) Define and explain the properties of linear systems. **5**

b) White noise is applied to the input of a linear system whose impulse response is shown below. Determine and sketch the autocorrelation function of the output. **6**



OR

b) Define Poisson process. Obtain the mean and variance of Poisson process. **6**

SLR-EQ – 36

Seat No.	

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : Elective – I : DESIGN OF WIRELESS SYSTEM

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***if necessary****.*

SECTION – I

1. a) Design a six pole lumped band pass filter with a passband of 475-525 MHz. $Z_{in} / Z_{out} = 50\,\Omega$. **7**

   b) Design a passive loop PLL Synthesizer with frequency range 2.4 – 2.5 GHz (Center frequency 2.45 GHz), V_{cc} = 5 V, f_{ref} = 10 MHz, f_{com} = 100 KHz, channel spacing = 100 KHz, filter of third order, loop bandwidth = 2 KHz, charge pump gain = 1 mA, phase margin 45°, T3/T1 ratio = 45%, PLL IC of National LMX2326, VCO of RFMD VCO790-2300T. **6**

2. Solve **any two** :

   a) Explain diplexer filters. **6**

   b) Discuss any two lumped filter circuit types in details. **6**

   c) What are digital modulation issues ? **6**

3. Solve **any two** :

   a) Design a discrete LC BJT oscillator for 400 MHz. Assume suitable parameters. **5**

   b) Design a discrete crystal BJT oscillator for 22 MHz. Assume suitable parameters. **5**

   c) Design a low cost variable bias VGA amplifier with reverse gain control. Assume suitable parameters. **5**

P.T.O.

SECTION – II

4. a) Explain how QOS in IEEE 802.11 WLAN system can be analyzed by suitable simulation. **7**

   b) Design shunt PIN SPST RF switch and small RF signal series PIN SPST switch. **6**

5. Solve **any two** :

   a) Design a passive RF diode single ended mixer for RF of 60 MHz and IF of 40 MHz. Assume suitable parameters. **6**

   b) Draw and explain a full duplex FDD radio. **6**

   c) Discuss basics of discrete event simulation. **6**

6. Solve **any two** :

   a) Draw and explain AGC circuit in receiver's IF chain. **5**

   b) Draw and explain in brief-a log amplifier, with integrator and buffer amplifier, used in a receiver's AGC circuit. **5**

   c) Draw and explain 50 Ω LC power splitter/combiner with 0°. Also design it for f_r = 915 MHz with $Z_{IN} = Z_{OUT} = 50\,\Omega$. **5**

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SLR-EQ – 37

Seat No.	

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : WIRELESS SENSOR NETWORKS (Elective – I)

Day and Date : Friday, 23-12-2016 Max.Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

2) Figures to the ***right*** *indicates* ***full*** *marks.*

3) Assume suitable data if ***necessary****.*

SECTION – I

1. a) What are different WSN architectures ? Explain with typical application scenario for each architecture. **7**

   b) Discuss categories of WSN routing protocols with example and features for each type. **6**

2. a) Explain directed diffusion. **6**

   b) Explain destination sequenced distance vector routing protocol. **6**

   OR

   c) Explain unicast location based routing. **6**

3. a) Discuss D MAC. **5**

   b) Explain funneling MAC. **5**

   OR

   c) Discuss Z MAC. **5**

P.T.O.

SECTION – II

4. a) With suitable diagram explain typical WSN node architecture. **7**

   b) Explain dynamic power management. **6**

5. a) What is necessity of time synchronization ? What are challenges ? **6**

   b) Explain LTS Protocol. **6**

   OR

   c) Explain triangulation technique. **6**

6. a) Explain GPS based localization. **5**

   b) Discuss 802.15.4. **5**

   OR

   c) Explain data transfer in beckon enabled networks. **5**

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SLR-EQ – 39

Seat No.	

M.E. (Electronics) (Semester – I) Examination, 2016
Paper – V (Elective – I)
(CBCS/CGPA)
IMAGE AND VIDEO PROCESSING

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

1. Solve **any four** questions. **(4×5=20)**

   1) What is Quantization ? Explain visual quantization.

   2) Explain details Hadamard Transform.

   3) Explain details Blind De-convolution.

   4) What is the use of wiener filter in image restoration ? Explain.

   5) Explain image degradation model/restoration process in detail.

   6) Write short note on Bayesian Method.

2. Solve the following questions.

   1) Explain and check whether the DFT matrix is unitary or not. **(1×8=8)**

   2) Perform and explain histogram equalization of the image. **(1×7=7)**

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

P.T.O.

SECTION – II

3. Solve **any four** questions. **(4×5=20)**

   1) Differentiate between lossless and lossy compression and explain transform coding system with a neat diagram.

   2) Write short note on

      i) H.261 ii) H.263

   3) Explain in details MPEG 4, MPEG 7.

   4) Discuss about region based image segmentation techniques. Compare threshold region based techniques.

   5) What is coding redundancy ? Explain brief details.

   6) Explain Edge detection method such as canny edge detection.

4. Solve the following questions.

   1) Consider an image stripo of size 50 × 100 show in fig. the image consists of five vertical strips, the gray levels of the strips from left to right are 128, 64, 32,16, and 8. The corresponding widths of the stripes are 35, 30, 20, 10 and 5 pixel respectively. If this strips image coded is by Huffman coding, determine its efficiency. **(1×8=8)**

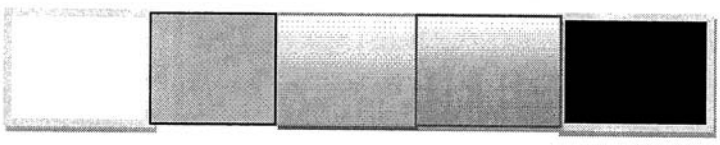

Fig. Image Strip

   2) Explain Color model in video processing. **(1×7=7)**

SLR-EQ – 41

Seat No.	

M.E. (Electronics Engineering) (Semester – II) (CBCS/CGPA) Examination, 2016
Paper – VI : RESEARCH METHODOLOGY (New)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicates **full** marks.*
*3) Assume suitable data if **necessary**.*

SECTION – I

1. a) What are different definitions of research ? Which definition do you feel is more relevant to engineering research ? Why ? **6**
   b) With suitable example in engineering research, explain static system modeling. **6**

2. a) With suitable engineering example discuss significance of research. **5**
   b) With suitable engineering example explain steps in identifying research problem. **5**

   OR

   c) For any engineering research problem example of your choice discuss 'Objectives'. **5**

3. a) With suitable example elaborate 'sub objective' and 'scope' in a typical engineering research synopsis. **7**
   b) Discuss Monte Carlo simulation. **6**

   OR

   c) With suitable examples explain applied Vs fundamental research. **6**

P.T.O.

SECTION – II

4. a) Explain any two statistical distributions. **6**

   b) Discuss significance of E-research with suitable example. **6**

5. a) Discuss in details various chapters/sections in a typical engineering research project report. **5**

   b) With suitable example explain strategy of experimentation. **5**

   OR

   c) Explain statistical output analysis. **5**

6. a) Explain significance of E books and E journals in modern research. **7**

   b) Write a note on virtual lab. **6**

   OR

   c) Discuss guidelines for design of experiments. **6**

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SLR-EQ – 42

Seat No.	

M.E. (Electronics Engg.) Semester – II (New – CBCS/CGPA) Examination, 2016
EMBEDDED SYSTEM DESIGN (Paper – VII)

Day and Date : Friday, 9-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions** : 1) **All** questions are **compulsory.

*2) Assume suitable data **wherever** necessary.*

SECTION – I

1. Describe the following with example **(any three)** : **(5×3=15)**
   a) Pre index with write back indexing method.
   b) Pre index indexing method.
   c) Post index indexing method.
   d) Types of addressing modes in ARM.
2. Explain in brief the evolution of ARM architecture. **10**
3. What is exception handling in ARM processor ? **10**

OR

3. Explain the characteristics of embedded computing applications.

SECTION – II

4. Explain software development process life cycle and its model. **10**
5. Explain in detail the various scheduling policies with example. **10**
6. Explain system design example application in CCD camera. **15**

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SLR-EQ – 43

Seat No.	

M.E. (Electronics Engineering) (Semester – II) (New – CBCS/CGPA) Examination, 2016
Paper – VIII : PERIPHERAL SYSTEM DESIGN AND INTERFACING

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Answer following questions : **(3×4=12)**
   1) Why termination in RS-485 is necessary ?

      A RS-485 connection of length 1000 meter carries data at rate of 50 Kbps; is it necessary to terminate the connection ? Assume propagation velocity of 200 m/μsec over the connection. If termination is required, what is the value of termination resistor to be used ?
   2) Explain different data transfer types in USB communication.
   3) What is DMA operation in PC ? What are the different DMA channels in PC ?

2. Answer **any two** from following questions : **(2×6=12)**
   1) What is 4 mA to 20 mA current loop for serial communication ? What are different 4 mA to 20 mA current loop components ? What is the selection criteria for these components ?
   2) List features of PCI bus. Explain PCI bus system and PCI arbitration briefly.
   3) Draw timing diagram showing handshake protocol related to GPIB. What are the advantages and drawbacks of GPIB ?

3. Answer following questions :
   1) Draw USB frame format and explain it in brief. What is enumeration process in USB ? **6**
   2) What are the limitations of 8 bit ISA ? Discuss features of EISA. **5**

      OR

   2) Discuss RS-232 serial interface briefly. **5**

P.T.O.

SECTION – II

4. Answer following questions. **(3×4=12)**
   1) Draw and explain functional block diagram of typical PC based DAQ system.
   2) How low and high frequency analog signals are sampled in DAQ ? What is multi-rate sampling ?
   3) Draw a neat sketch of PLC construction and describe it.

5. Answer **any two** from following questions. **(2×6=12)**
   1) What is an automatic controller ? Discuss various modes of control actions.
   2) Explain distributed computer control system and its features.
   3) What are the field bus classes ? Discuss field bus architecture in brief.

6. Answer following questions.
   1) Name the layers of MODBUS protocol. Draw the MODBUS message format for RTU mode and describe importance of each field. **6**
   2) What is profibus DP, slave and master ? Draw and explain in brief profibus telegram format. **5**

   OR

   2) Name different layers of DeviceNet protocol. Draw network structure of DeviceNet and explain. **5**

SLR-EQ – 44

Seat No.	

M.E. (Electronics Engg.) (Semester – II) (New-CBCS/CGPA) Examination, 2016
ADVANCED CONTROL SYSTEMS (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Figure to the **right** indicates **full** marks.*
*3) Assume suitable data **whenever** necessary.*

SECTION – I

1. Attempt **any two** : **(6×2=12)**

a) The state variable representation of SISO system is

$$\dot{X} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t) \text{ and } y(t) = [1\ 2]$$

Check the controllability, observability and stability of above system.

b) Explain sampling, quantization effect, zero order hold block.

c) Determine the stability of discreet time system described by Z domain characteristic equation $P(Z) = 2Z^4 + 7Z^3 + 10Z^2 + 4Z + 1 = 0$.

2. Attempt **any two** : **(6×2=12)**

a) A control system is represented by the differential equation $\frac{d^3y(t)}{dt^3} = u(t)$.

If y(t) is observed as output and u(t) as input. Describe the system in stare variable form.

b) State and explain rules for constructing root locus for discreet system.

c) Find transfer function in Z-domain for transfer function given below

$$F(S) = \frac{1}{s(s+5)^2}.$$

P.T.O.

3. Answer the following. **11**

   a) Determine eigen values for following matrix $A = \begin{bmatrix} -3 & 1 \\ 1 & -3 \end{bmatrix}$. **5**

   b) $\begin{bmatrix} \frac{dx1}{dt} \\ \frac{dx2}{dt} \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x1 \\ x2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ u; t > 0 and y = [1 0] $\begin{bmatrix} x1 \\ x2 \end{bmatrix}$. **6**

   Find transfer function of the system and comment on the stability of the system.

SECTION – II

4. Attempt **any two** : **(6×2=12)**

   a) The negative feedback control system has forward path transfer function G(s) = 10/S (S + 1). While feedback path has transfer function H(s) = 5. Determine sensitivity of closed loop transfer function with respective to H(s). ω = 1 rad/sec.

   b) What do you mean by state observer ? Explain full order state observer.

   c) Explain two degree of freedom control.

5. Attempt **any two** : **(6×2=12)**

   a) A system is explained by the following state space model.

   $\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -6 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} u(t)$. Design a state feedback controller such that the poles are moved to $-1 \pm j, -5$ and system is fully controllable.

   b) Explain Servo system and design of state and output regulation.

   c) Explain uncertainty and robustness.

6. Answer the following. **11**

   a) Write a note on basic MIMO control loop. **5**

   b) What do you mean by pole placement problem ? Explain with example. **6**

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SLR-EQ – 45

Seat No.	

M.E. (Electronics Engineering) (Semester – II) (New) Examination, 2016 (CBCS/CGPA)
MOBILE TECHNOLOGY (Elective – II) (Paper – X)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***if necessary****.*

SECTION – I

1. a) Describe GPRS network nodes. **7**

   b) Explain any two basic location update procedures. **7**

2. Answer **any two**. **12**

   a) Explain WAP network configuration.

   b) Describe GPRS attach and detach procedures.

   c) With suitable sketch explain SMS architecture. List important protocol layers used for SMS.

3. a) List the steps involved in international call setup procedure. **5**

   b) Explain security technique implemented in mobile station. **4**

   OR

   b) Explain WAP protocol stack. **4**

SECTION – II

4. a) Explain forward and reverse link for EVDO. **7**

   b) Describe various components of information security. **7**

P.T.O.

5. Answer **any two**. **12**

   a) Give detail information of structures of transport channel and physical channel in air interface.

   b) Briefly explain the establishment of UMTS speech call.

   c) Discuss the issues, for deciding on which variants to implement with packet network.

6. a) List and explain different applications of CDMA2000. **5**

   b) Discuss types of attacks observed in mobile computing. **4**

   OR

   b) Explain the architecture of UTRAN. **4**

SLR-EQ – 46

Seat No.	

M.E. (Electronics) (Semester – II) (New) (CBCS/CGPA) Examination, 2016
Paper – X : (Elective – II) : REAL TIME SYSTEMS

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicates* ***full*** *marks.*
3) ***Assume*** *suitable data,* ***if required****.*

SECTION – I

1. 1) Explain structure of Real Time System. **6**
   2) Discuss in detail task classes with example. **5**

2. 1) Describe desired language characteristic used for Real Time Systems. **6**
   2) Explain with examples data type used in various programming tools. **6**

3. 1) Explain with properties Run Time error handling during execution of software. **6**
   2) Explain with example task scheduling. **6**

SECTION – II

4. 1) Explain the difference between Real time databases and general purpose databases. **6**
   2) Explain Transaction priorities used in Real Time database. **6**

5. 1) Explain the performance of VTCSMA algorithm. **6**
   2) Explain in detail concept of data diversity. **6**

6. 1) Explain Markov chain for a system with transient and permanent failures. **6**
   2) Explain tolerant synchronization in hardware and software. **5**

SLR- EQ – 47

Seat No.	

M.E. (Electronics) (Semester – II) (New–CBCS/CGPA) Examination, 2016
Paper – X : Elective – II : VLSI IN SIGNAL PROCESSING

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Solve **any four** : **20**

a) Draw the block diagram and SFG for $y(n) = ax(n) + bx(n – 1) + cx(n – 3)$.

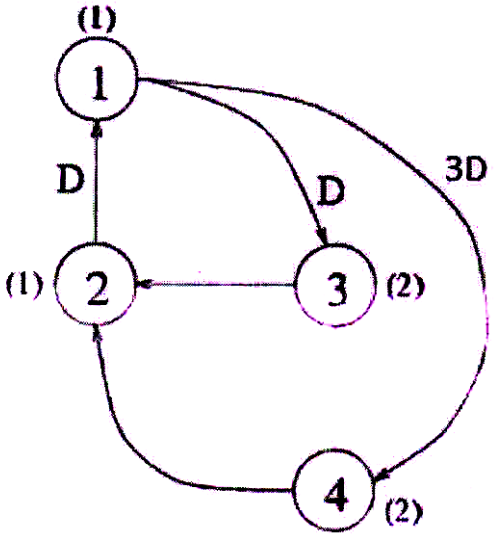
b) Explain the following :

i) Loop bound

ii) Iteration bound.

c) Define pipelining and parallel processing. Explain their advantages.

d) Perform the retiming for the following DFG shown in fig.

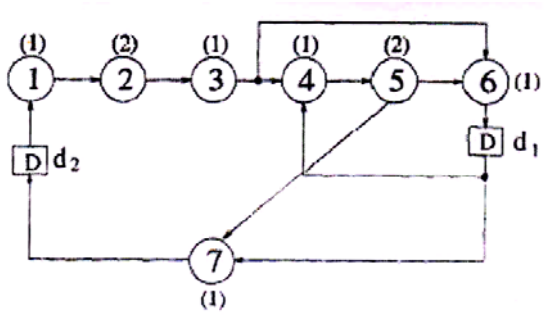


e) What is retiming of DFG ? Explain properties of retiming.

P.T.O.

2. Solve the following :

a) For DFG shown below find iteration bound using MCM algorithm.



8

b) In the SFG shown in fig. a) the computation time for each node is assumed to be 1u.t.

i) Calculate critical path computation time.

ii) The critical path has been reduced to 2 u.t. by inserting 3 extra delay element as shown in fig. b)

iii) Is this valid pipelining if not obtaining an appropriate pipelining ckt with critical path of 2 u.t.

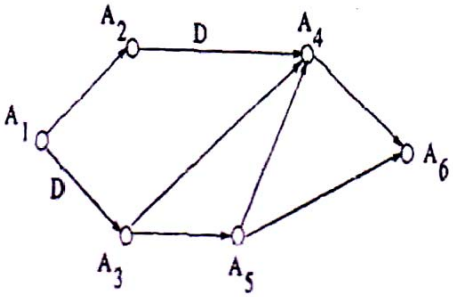


Fig. a

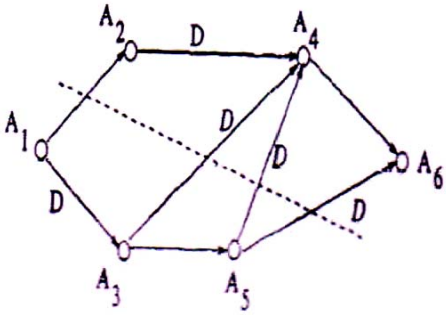
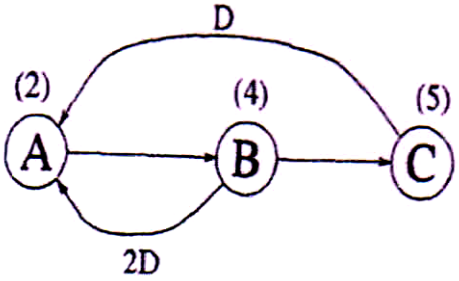


Fig. b

7

OR

b) Find the loop bound and iteration bound for the DFG shown below. Also examine the precedence constraints and justify the loop bound calculated above.



7

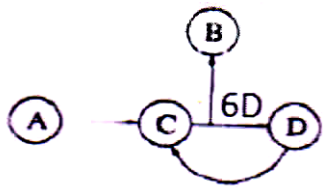
SECTION – II

3. Solve **any four** : **20**

a) Write a note on systolic design for matrix-matrix multiplication.

b) Mention the step to minimize register in folding architecture.

c) Unfold the DFG for program as shown in fig. with unfolding factor 2.



d) Explain applications of unfolding.

e) Explain parallel carry save array multipliers.

4. Solve the following :

a) Design B2 filter of FIR systolic array. **8**

b) Draw the constraint graph and use it do determine if the following system inequalities have a solution and find the solution if one exists using Floyd-Warshall algorithm.

$r_1 - r_2 \leq 0$
$r_3 - r_1 \leq 5$
$r_4 - r_1 \leq 4$
$r_4 - r_3 \leq -1$
$r_3 - r_2 \leq 2$ **7**

OR

b) Draw the circular life time chart for following with period N = 8 :

Variable name	Tin
a	0
b	1
c	2
d	3
e	4
f	5
g	6
h	7

SLR-EQ – 49(1)

Seat No.	

M.E. (Electronics Engineering) (Semester – III) (Old) Examination, 2016
Self Learning Subject – NETWORK AND INTERNET SECURITY
(Paper – I)

Day and Date : Saturday, 24-12-2016 Max.Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***if*** *necessary.*

SECTION – I

1. a) Discuss wireless network threats and security measures. **7**
   b) Explain biometric techniques for security and identification. **6**

2. Solve **any two** : **(6×2=12)**
   a) Discuss passive security attacks.
   b) Discuss remote user authentication principles.
   c) Discuss different IEEE 802.11 services.

3. Solve **any two** : **(5×2=10)**
   a) Discuss WAP infrastructure.
   b) Discuss cryptographic algorithm for WAP.
   c) Discuss motivation and requirements for Kerberos.

SECTION – II

4. a) Explain internet mail architecture. **7**
   b) Discuss applications of IPsec. **6**

5. Solve **any two** : **(6×2=12)**
   a) Discuss multiple threat malware.
   b) Discuss intrusion detection.
   c) Discuss packet filtering firewall.

6. Solve **any two** : **(5×2=10)**
   a) Discuss Pretty Good Privacy steps implemented and reasons for its growth.
   b) Discuss controls provided by firewall-service, direction, user and behavior.
   c) Discuss encapsulating security payload for IP security.

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SLR-EQ – 49(2)

Seat No.	

M.E. (Electronics Engineering) (Semester – III) (Old) Examination, 2016
Paper – I : Self-Learning Subject : ADVANCED SIGNAL AND IMAGE PROCESSING

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Solve **any four** of the following : **20**
   a) Explain Biometric system with the help of neat diagram.
   b) Explain the design cycle of Biometric system.
   c) Explain how fuzzy logic is useful in biomedicine.
   d) Explain the filters used to reduce the noise in medical images.
   e) Explain feature extraction process in medical image processing.

2. Solve the following :
   a) What are the various security and privacy related issues in Biometric system ? Explain. **8**
   b) Explain biomedical image processing with the help of neat diagram. **7**

   OR

   b) Explain how fuzzy logic is useful in industrial automation. **7**

SECTION – II

3. Solve **any four** of the following : **20**
   a) Explain with the help of equations, effect of scaling on power consumption.
   b) Explain how the power is estimated in sequential circuits.
   c) Explain the various power reduction techniques.
   d) Explain the Euclidean GCD algorithm for polynomials.
   e) Explain in detail force directed scheduling algorithm.

4. Solve the following :
   a) Explain Wallace tree multiplier with the help of neat diagram. **8**
   b) Explain simulation and non-simulation based approaches in low power VLSI design. **7**

   OR

   b) Explain the application of DSP processor in Multimedia signal processing. **7**

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SLR-EQ – 50

Seat No.	

M.E. (CSE) (Semester – I) (CBCS/CGPA) Examination, 2016
THEORY OF COMPUTATION (Paper – I)

Day and Date : Thursday, 15-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Answer **any four**. **24**

   a) Define and elaborate Sequence, Tuples, functions and relations with examples.

   b) Prove that in a graph G, the sum of degree of the nodes of G is an even number using proof by construction.

   c) What are the variants of turing machine ? Describe any one with its theorem.

   d) Illustrate A_{NFA} and A_{DFA} in decidability and prove that they are decidable languages.

   e) Prove that EQ_{DFA} is a decidable language using Symmetric difference.

2. Answer the following : **6**

   What is diagonalization method ? Prove the corollary “some languages are not turing recognizable.

3. Answer the following : **5**

   Design a TM for a computation of addition of two numbers with its formal definition

P.T.O.

SECTION – II

4. Answer **any four**. **24**

   a) If R_{TM} = {<M> | M is a TM and L (M) is a regular language} then prove that R_{TM} is undecidable.

   b) Define computation history and linear bounded automaton ? Prove that A_{LBA} is decidable.

   c) Explain recursion theorem with self reference example.

   d) Elaborate NP completeness with example.

   e) Elaborate growth rate of functions.

5. Answer the following : **6**

   Illustrate PCP problem and prove that PCP is undecidable.

6. Answer the following : **5**

   Prove that if $A <_m B$ and A is undecidable then B is undecidable and define mapping reducibility.

SLR-EQ – 51

Seat No.	

M.E. (Computer Science and Engg.) (Semester – I) Examination, 2016
(CBCS/CGPA)
Paper – II : ADVANCED OPERATING SYSTEMS

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

I. Answer **any two** : **10**

1) Why are distributed systems more difficult to design than the operating systems for centralized time-sharing systems ?

2) In the microkernel approach for designing a distributed operating system, what are the primary tasks that the kernel must perform ?

3) What are the common issues with which the designer of a heterogeneous distributed system must deal with ?

II. Answer **any two** : **10**

1) What is an idempotent operation ? Which of the following operations are idempotent ?
   a) Read_next_record(filename)
   b) Read_record(filename, rec-num)
   c) Add(int1, int2)
   d) Increment(var-name)

2) Explain different degrees of reliability with one application for each.

3) How do you justify that different applications require different degrees of reliability in multicast communication ?

III. 1) Explain different RPC servers **10**
   a) Instance-per-call servers
   b) Instance-per-session servers
   c) Persistent servers.

2) What are the two methods of locating a server in RPC ? Explain. **5**

P.T.O.

SECTION – II

IV. Answer **any two** : **10**

1) What are the commonly used approaches for structuring shared-memory space of a DSM system ?

2) With example, explain the concept of sequential consistency model.

3) Propose a suitable replacement algorithm for a DSM system whose shared memory space is structured as objects with the goal to minimize memory fragmentation.

V. Answer **any two** : **10**

1) What is processor thrashing ? Give two situations that can lead to processor thrashing.

2) Suggest some policies used for load estimation in load-balancing algorithms. Discuss their advantages and disadvantages.

3) A system consists of three processors p1, p2, p3 and a process having four tasks t1, t2, t3 and t4 is to be executed on this system. Suppose Eij is the cost of executing task ti on processor pj and Cij is the communication cost between task ti and tj when two tasks are assigned to different processors. Let E11 = 31, E12 = 4, E13 = 14, E21 = 1, E22 = 5, E23 = 6, E31 = 2, E32 = 4, E33 = 24, E41 = 3, E42 = 28, E43 = 10, C12 = 35, C13 = 3, C14 = 8, C23 = 6, C24 = 4, C34 = 23. Find an optimal assignment of the tasks to the processors and calculate the cost of an optimal assignment.

VI. 1) Explain address space transfer mechanisms used in process migration. **10**

2) Which one or more of the message-forwarding mechanisms are suitable for a process migration with the following goals ? **5**

a) Transparency is the main goal.

b) Reliability is the main goal.

c) Performance is the main goal.

d) Simple implementation is the main goal.

If more than one mechanisms are suitable for a particular case, which one will you prefer to use and why ?

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SLR-EQ – 52

Seat No.	

M.E. (Semester – I) (Computer Science and Engineering) (CBCS/CGPA) Examination, 2016
Paper – III : ANALYSIS OF ALGORITHMS

Day and Date : Monday, 19-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Question **1** and **5** are **compulsory**.*
*2) Attempt **any two** questions of **remaining** questions from **each** Section.*
*3) Figure to **right** indicates marks.*

SECTION – I

1. What is the need of algorithm analysis ? What is Time Complexity and Space Complexity ? **7**

2. A) Explain Recursive Algorithms and Recurrence Relation. Give an example of solving recurrence equation. **7**

   B) Differentiate between Divide and conquer, Greedy Method and Dynamic programming. **7**

3. A) Find out the optimal binary merge pattern for ten files whose length are :

   28, 32, 15, 5, 84, 53, 91, 35, 3, 11. **7**

   B) Explain the graph coloring problem with suitable example. **7**

4. A) Consider the travelling sales person instance defined by following cost matrix :

	1	2	3	4	5
1	∞	07	03	12	08
2	03	∞	06	14	09
3	05	08	∞	06	18
4	09	03	05	∞	11
5	18	14	09	08	∞

   Obtain the reduced cost matrix. **7**

   B) Explain with suitable example the general strategy for backtracking Algorithms. **7**

P.T.O.

SECTION – II

5. Explain non-deterministic Algorithm concept with the help of searching of an element in given set. **7**

6. A) Write a short note on lower bound PRAM. **7**

   B) State and explain Cook's Theorem. **7**

7. A) Explain Convex Hull problem. **7**

   B) Explain Prefix Computation. **7**

8. A) Explain odd-even merge algorithm with example with PRAM. **7**

   B) Write a short note on NP-hard travelling salesman problem. **7**

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SLR-EQ – 53

Seat No.	

M.E. (Computer Science and Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – IV : RESEARCH METHODOLOGY

Day and Date : Wednesday, 21-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks for that question.*
3) If required assume suitable data.

SECTION – I

1. Write answer to **any four** questions (**7** marks for **each**) : **(7×4=28)**

   A) What do you mean by research ? Explain its significance in modern times.

   B) Briefly describe all those points of techniques involved in defining a problem.

   C) In the context of research design explain the meaning of research hypothesis, experimental and non-experimental hypothesis-testing research.

   D) Explain and illustrate two group simple randomized research design.

   E) Clearly explain the difference between collection of data through questionnaires and schedules.

   F) What is the meaning of case study methods of data collection ? What are the major phases involved in it ? What are its advantages and limitation ?

2. Draw the flow chart and briefly describe the different steps involved in a research process. **7**

SECTION – II

3. Write answer to **any four** questions (**7** marks for **each**) : **(7×4=28)**

   A) Why tabulation is considered essential in a research study ? Narrate the characteristics of a good table.

P.T.O.

B) What do you mean by multivariate analysis ? Explain how it differs from bivariate analysis.

C) What are the different types of research papers ? What is the purpose and usefulness of each type of research paper ?

D) What is meant by Intellectual property ? How to protect it ?

E) What is the significance of report writing ? Which are the usual steps involved in writing report ?

F) What precautions need to be taken for writing research reports ?

4. Draw the flow chart and briefly describe the different steps involved in hypothesis testing. **7**

SLR-EQ – 54

Seat No.	

M.E. (Computer Science and Engineering) (Semester – I) Examination, 2016
(CBCS/CGPA)
Elective – I : DATA MINING (Paper – V)

Day and Date : Friday, 23-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any five** questions from **each** Section.*

*2) Assume suitable data **if** needed.*

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

SECTION – I

1. Explain various components involved in data warehouse architecture. **7**
2. Discuss the major distinguishing features between OLAP & OLTP. **7**
3. Write short note on Apriori Algorithm. **7**
4. Explain simple Decision Tree Based classification algorithm and list out its advantages and disadvantages. **7**
5. Explain Nearest Neighbour algorithm. **7**
6. Explain neural networks in detail with activation functions. **7**

SECTION – II

7. Explain Web structure mining. **7**
8. Explain Morkov model for temporal mining. **7**
9. Explain Harvest system and personalization of Web Content Mining. **7**
10. Explain trend dependencies. **7**
11. Explain STING (Statistical Information Grid Based Method). **7**
12. List out different applications of Data Mining. **7**

SLR-EQ – 55

Seat No.	

M.E. (Computer Science and Engineering) Semester – I Examination, 2016
(CBCS/CGPA Pattern)
Paper – V (Elective – I) : MOBILE COMPUTING

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time :11.00 a.m. to 2.00 p.m.

***Instruction : All** questions are **compulsory**.*

SECTION – I

1. Solve **any two** : **12**

   a) MSK system is used for signal transmission. Explain and draw waveforms to show that following data does not produce any phase shift :

   Data : 1 1 0 1 0 0 1 0

   b) Discuss main problem of signal propagation.

   c) Draw and explain FHSS transmitter and receiver.

2. Solve **any two** : **12**

   a) Explain GSM system architecture.

   b) Explain MTC and MOC in GSM.

   c) Explain PRMA implicit reservation scheme.

3. How MACA can avoid hidden terminals problem ? Explain with diagram. **6**

   OR

   Explain ISMA scheme for packet data transmission service.

4. Explain security in GSM. **5**

P.T.O.

SECTION – II

5. Solve **any two** : **12**
   a) Explain 802.11 b architecture with respect to networking of Bluetooth devices.
   b) Draw and explain Symbian OS architecture.
   c) Write a note on WML script.

6. Solve **any two** : **12**
   a) Explain agent solicitation and agent advertisement in agent discovery phase.
   b) Write a note on Plam OS.
   c) Explain infrastructure-based and ad-hoc wireless network.

7. Draw and explain wireless datagram protocol of WAP. **6**

   OR

   Explain DFWMAC-PCF with RTS/CTS extension.

8. Write a note on Transport layer security in WAP. **5**

SLR-EQ –58

Seat No.	

M.E. (CSE) (New)(Semester – II) Examination, 2016
Paper – VI : INTERNET ROUTING ALGORITHM (CBCS/CGPA)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) **All** questions are **compulsory**.*
*3) **Wherever** required draw diagrams and assume data.*

SECTION – I

I. Write answer to **any two** questions. **(2×5=10)**

A) Write a short note on OSI Model.

B) What is CIDR ? Consider IP Address 10.21.5.90 that is given to be part of a/17 address block. Determine IP prefix it belongs to in the CIDR notation.

C) What is a link state advertisement ? What are different types of LSAs defined in OSPF ?

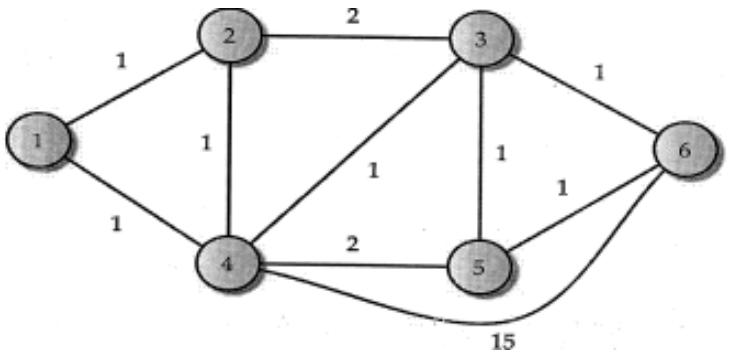
II. Write answer to **any two** questions. **(2×5=10)**

A) With diagram briefly explain high-level functional view of a router.

B) Using mathematical notations and equations write distance vector algorithm (computed at node i).

C) What are the primary operational considerations in regard to the RIP protocol ?

III. A) For the following network topology compute the shortest path between node 1 to 6 node using hop-iteratedcentralized Bellman-Ford algorithm. **10**



B) What are the different BGP timers ? **5**

P.T.O.

SECTION – II

IV. Write answer to **any two** questions. **(2×5=10)**

A) List the router bottlenecks and its cause.

B) Explain the concept of Link-State routing protocol.

C) What are the possible factors that can cause instability in Internet routing ?

V. Write answer to **any two** questions. **(2×5=10)**

A) Identify issues faced in a distance vector protocol that are addressed by a path vector protocol.

B) Write a short note on allocation of IP prefixes and AS number.

C) Explain Naive's solution for Packet classification.

VI. A) Draw the diagram of packet flow in router. Also explain ingress and egress packet processing. **10**

B) Which are the basic forwarding functions implemented in a router ? **5**

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SLR-EQ – 59

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II)
(New – CBCS/CGPA) Examination, 2016
ADVANCED DATABASE CONCEPTS (Paper – VII)

Day and Date : Friday, 9-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Question **1** and **5** are **compulsory**.*
*2) Attempt **any two** questions from Question **2** to **4** from Section – **I**.*
*3) Attempt **any two** questions from Question **6** to **8** from Section – **II**.*
*4) Figures to the **right** indicate marks to a question.*
*5) Assume suitable data **wherever** necessary.*

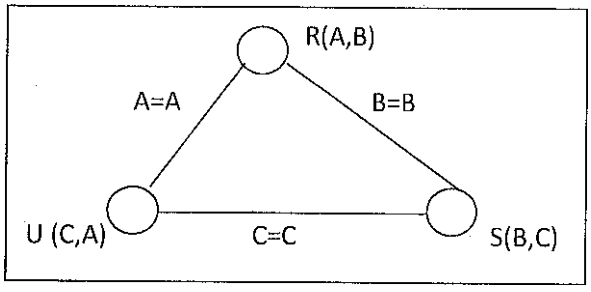
SECTION – I

1. 1) Suppose you have histogram where values are between 1 and 100 and partitioned into 10 ranges 1-10, 11-20, ..., 91-100 with frequencies 15, 5, 20, 10, 10, 5, 5, 20, 5 and 5 respectively. Give a load balanced partitioning function to divide the values in 5 partitions. **5**

   2) Explain fragment and replicate join. When it is advantageous to use ? **5**

   3) Compare top down and bottom up approach to design of data distribution. **5**

2. Construct a reducer for R using semi-join programs having join graph in the figure. **10**



with R = <0, 1>, <3, 4>, <6, 7>, <7, 1>
S = <1, 2>, <4, 5>, <6, 6>, <7, 7>
U = <2, 3>, <5, 0>, <6, 6>, <7, 7>

P.T.O.

3. 1) Explain how distributed deadlock is detected. **5**
   2) Explain Basic Timestamp Mechanism w.r.t. concurrency control. **5**

4. 1) Explain methods available for joining locally two relations. Also explain evaluation cost for each method. **5**
   2) Describe a good way to parallelize the following operations. **5**
      1) Aggregation by count method.
      2) Aggregation by average method.

SECTION – II

5. Emp = (ename, ChildrenSet multiset (Children), Skillset multiset (Skills))
   Children = (name, birthday)
   Skills = (type, ExamSet setoff (Exams))
   Exams = (year, city)
   Define the above schema in SQL with appropriate structured types for each attribute. **15**

6. 1) What are complex data types ? How they are defined in SQL ? **5**
   2) Explain Nesting and unnesting of relations with example. **5**

7. 1) How multimedia data is indexed ? Discuss any one indexing structure. **5**
   2) How multimedia data is stored and retrieved ? **5**

8. Write a short note on : **10**
   1) Grid Files
   2) Time in database.

SLR-EQ – 60

Seat No.	

M.E. (Computer Sci. and Engg.) (Semester – II) (New – CBCS/CGPA) Examination, 2016
PARALLEL COMPUTER ARCHITECTURE (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****.*
2) ***All*** *questions from Section –* ***I*** *and* ***II*** *are* ***compulsory****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume data if ***necessary****.*

SECTION – I

1. Attempt **any three** of the following : **(5×3=15)**
   a) Why are control dependences barriers for extracting more parallelism and performance ?
   b) What is speculative branch processing ? Explain with example.
   c) Why shelving is known as indirect issue ? Explain in detail.
   d) What is branch prediction ? Give impact of branches.
2. Draw design space of shelving. Discuss operand fetch policy in detail. **10**
3. Describe in detail logical layout of FX Pipelines (RISC and CISC pipelines). **10**

SECTION – II

4. Attempt **any three** of the following : **(5×3=15)**
   a) How Instruction Set Architecture (ISA) checks the results of operations ?
   b) Explain Grohoski's estimate of branch statistics.
   c) What are the basic approaches to branch handling ?
   d) Explain features of IBM Power 4.
5. Explain the interpretation of the concept of branch penalty. Discuss the concept of Zero-cycle branching in detail. **10**
6. A) Draw and explain core part of the microarchitecture of the PentiumPro. **10**

   OR

   B) Discuss the interpretation of the concept of sequential consistency of instruction execution. **10**

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SLR-EQ – 61

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II)
(New – CBCS/CGPA) Examination, 2016
GRID COMPUTING (Elective – II) (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) Assume suitable data ***if*** *necessary.*

3) ***Wherever*** *required draw appropriate and* ***neat*** *diagrams.*

4) Figures to the ***right*** *indicate* ***full*** *marks for that question.*

SECTION – I

1. Write answer to **any four** questions (**5** marks for **each**). **(4×5=20)**

   A) Compare an electrical power grid with computing grid.

   B) Summarize and write critique on some alternative grid perspectives.

   C) Write a short note on service-oriented view of the Semantic Grid.

   D) In a nutshell describe Worldwide LHC Computing Grid (WLCG).

   E) Briefly describe abstractions and services that can be used as building blocks to implement a variety of higher-level Grid Services.

2. Write answer to **any one** questions. **10**

   A) Write a note on Open Grid Services Architecture (OGSA).

   B) Write a note on the emergence of virtual organizations.

3. List the key research issues that remain for exploiting knowledge services in the Semantic Grid. **5**

P.T.O.

SECTION – II

4. Write answer to **any four** questions (**5** marks for **each**). **(4×5=20)**

   A) Write a short note on VOTable.

   B) Outline the data processing by pipeline of applications in Encyclopedia of Life (EOL) project.

   C) What is Strasbourg Ontology ?

   D) What is MONTAGE architecture ?

   E) Write a short note on applications of GARUDA Grid.

5. Write answer to **any one** questions. **10**

   A) Explain the schematic three-layered architecture adopted at San Diego Supercomputer Center (SDSC) in developing next generation Grid portals.

   B) What is a GARUDA Grid computing system ? Describe its architecture with core components.

6. Explain chemical markup language. **5**

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SLR-EQ – 62

Seat No.	

M.E. (Computer Sci. and Engg.) (Semester – II) (New – CBCS/CGPA) Examination, 2016
Elective – II : REAL TIME OPERATING SYSTEM (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Q. **1** from Section – **I** and Q. **5** from Section – **II** are **compulsory**.*
*2) Attempt **any two** questions from Q. **2** to Q. **4** for Section – **I** and **any two** questions from Q. **6** to Q. **8** for Section – **II**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

1. Define RTOS. Discuss Real Time design issues and give any one example of RTOS. **7**

2. A) Describe following Language Features :
   i) Parameter Passing
   ii) Dynamic Allocation
   iii) Typing. **7**

   B) Describe Flow charts and Structure charts with diagram and examples. **7**

3. A) Describe Kernel Hierarchy. Explain pooled loop system with example. **7**

   B) Describe Full-Featured Real-Time OS. **7**

4. A) Explain Time-Relative buffering and Ring buffers with example and diagrams. **7**

   B) Describe following terms :
   i) Overlays
   ii) MFT
   iii) MVT
   iv) Demand paging. **7**

P.T.O.

SECTION – II

5. Describe Interrupt Latency in details. **7**

6. A) Describe in detail the method to reduce memory loading. **7**

   B) Describe Probability Functions and Discrete Functions of Queuing models. **7**

7. A) Explain Process block model, McCabe's Metric and Halstead's Metric for approximating system reliability. **7**

   B) Describe Backoff method and patching used in Hardware-Software Integration. **7**

8. A) Explain Real-time Databases in detail. **7**

   B) Describe Real-time Unix by drawing its architecture diagram. **7**

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SLR-EQ – 63

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II) (New – CBCS/CGPA) Examination, 2016
NATURAL LANGUAGE PROCESSING (Paper – IX) (Elective – II)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Q. No.* ***1*** *and* ***5*** *are* ***compulsory****.*
2) Solve ***any two*** *questions from* ***each*** *Section.*

SECTION – I

1. Answer briefly : **15**
   a) Illustrate the phases involved in the analysis of sentence.
   b) Compare between free word order languages and context free languages.
   c) Why we need to perform morphological analysis ? Illustrate.
   d) Describe elements of semantic model in the Paninian framework.
   e) Explain the use of lakshan charts in core parser.

2. a) Translate the following in an Indian language and analyze the same using LWG and morphological analysis. **5**
      I) Girls are garlanding the teacher.
      II) People were listening to the news.
   b) What are the rules involved in the analysis of sentences following Paninian theory. Illustrate with examples. **5**

3. a) How do speed up morphological analysis by compilation ? **5**
   b) Illustrate the use of Kriya Rupa Charts. **5**

4. a) List different kinds of modifier – modified structure and explain any three in detail. **5**
   b) Describe the tasks performed by core parser and explain how parse can be obtained from constraint graph using integer programming. **5**

P.T.O.

SECTION – II

5. Answer briefly : **15**

   a) Give the domains where MT is not possible. Give the languages bridges in Hindi.

   b) What is LFG ? Give overview of LFG.

   c) Give similarities between TAG and PG.

   d) Explain X-bar theory and Theta theory from GB.

   e) PG perform better than TAG for Indian languages; Justify.

6. a) Describe Anusaraka system in detail. **5**

   b) Discuss LFG formalism and well-formedness condition in detail. **5**

7. a) Give similarities and Differences between TAG and PG. **5**

   b) State and illustrate the levels in GB. **5**

8. a) Give the characteristics of Indian languages. Which representation is most suitable for them. **5**

   b) Illustrate Lexicalized Tree Substitution Grammar. **5**

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SLR-EQ – 64

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II) (New-CBCS/CGPA) Examination, 2016
Elective – II : INFRASTRUCTURE MANAGEMENT (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions**: 1) Q. **(1)** and **(2)** are **compulsory.
*2) Answer **any three** questions from Q. **3** to Q. **7**.*
*3) **All** questions carry **equal** marks.*

Objective Type Questions

1. Choose the correct alternatives : **14**

1) Which of these items is a major component of today's IT infrastructure ?
   a) computer software
   b) data management technology
   c) networking
   d) technology services
   e) all of the above

2) What software organizes, manages and processes business dates concerned with inventory, customers and vendors ?
   a) application software
   b) customer-oriented software
   c) data management software
   d) storage area network
   e) grid computing software

P.T.O.

3) What type of computer (s) is specially designed and/or used for tasks that require extremely rapid and complex calculations ?
   a) PC
   b) supercomputer
   c) midrange computer
   d) mainframe
   e) personal digital assistant

4) A multitier, load-balancing scheme for web-based applications in which the web site content, logic and processing are performed by smaller and less expensive servers located nearby the user is known as
   a) transactions, such as payroll time cards, which are accumulated and stored in a group or batch until the time when it is efficient or necessary to process them
   b) industry-wide effort to develop systems that can configure themselves, optimize and tune themselves, heal and protects themselves
   c) the process of presenting a set of computing resources so that they can all be accessed in ways that are not restricted by physical configuration or geographic location
   d) a way to reduce power requirements and hardware sprawl
   e) the process of edge computing

5) The storage and input and output devices are called peripheral devices because
   a) they are outside the main computer system unit
   b) they are not as important as other computer devices
   c) their main purpose is to fix computer errors
   d) none of the above
   e) all of the above

6) What is the most widely used secondary storage medium ?
   a) magnetic tape
   b) magnetic sensor
   c) network
   d) optical disc
   e) magnetic disk

7) Which device is NOT considered an input device ?
   a) printer
   b) sensor
   c) touch screen
   d) keyboard
   e) computer mouse

8) Which one of these operating systems are used powerful PCs, workstations and network servers is called
   a) Windows XP
   b) Mac OS X
   c) Linux
   d) UNIX
   e) Windows Vista

9) Which of the following is NOT a category of Fourth-Generation Languages ?
   a) Query language
   b) Application generator
   c) Graphics language
   d) Report generator
   e) COBOL

10) _____ are small software programs that can be added to Web pages or placed on the desktop to provide additional functionality
   a) Mashups
   b) Widgets
   c) Clouds
   d) Ajax
   e) Java

11) When firms outsource software outside their national borders, the practice is called
   a) Out sourcing
   b) Localization
   c) Web supporting
   d) Off-shore outsourcing
   e) Web hosting

12) What software application allows individuals or companies to create their own customized application and share information with others ?
   a) Mash-ups
   b) Widgets
   c) Cloud computing
   d) Web service
   e) None of the above

13) What is the software tool that provide immediate online answers to requests for information that are not predefined ?
   a) Fourth-generation language
   b) Query languages
   c) HTML
   d) Tcp/ip
   e) Visual programming language

14) Which of the following is not an input device ?
   a) Keyboard
   b) Sensors
   c) Printers
   d) Character recognition
   e) Digital scanner

2. Attempt **any three** : **14**
   a) What are the infrastructure Management activities ?
   b) List the basic elements of IT infrastructure.
   c) What is ITIL ?
   d) Compare between Service level and financial management.

3. a) List the steps in evolution of infrastructure. Elaborate. **10**
   b) What is capacity management ? How is it carried out ? **4**

4. a) How is problem management carried out ? **10**
   b) How is extraction from storage done using management ? **4**

5. a) What are types security management techniques ? **10**
   b) What is a Urban Governance ? How is it developed ? **4**

6. a) List the applications of Service supports. Illustrate one. **8**
   b) What is Firewall ? **6**

7. a) How are issues in infrastructure management tackled ? **8**
   b) List and explain the security management techniques. **6**

SLR-EQ – 65

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II) (New) Examination, 2016

Paper – X : Elective – III : WEB TECHNOLOGY (CBCS/CGPA)

Day and Date : Wednesday, 14-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Attempt **any five** questions from **each** Section.*

*2) Figures to **right** indicate **full** marks.*

*3) **Assume** suitable data **if necessary**.*

SECTION – I

1. Design a home web page of your dream smart city using HTML and CSS. **7**
2. Explain session tracking and cookies in ASP. **7**
3. What are the drawbacks of HTML ? How they are addressed in XML ? **7**
4. Explain the basic process of event-driven computation in creating Java Script. **7**
5. Write short notes on DOM and event model. **7**
6. Explain client side and server side scripting. **7**

SECTION – II

7. Write a JSP that handles empty form values. **7**
8. What is session and how client state is maintained using session ? Explain session tracking and management. **7**
9. Explain Web 2.0 and Web 3.0 implement strategies. **7**
10. Explain Mashups and Widgets. **7**
11. Explain the components of JSP. **7**
12. Explain types of Vulnerabilities in Web Security with suitable example. **7**

SLR-EQ – 66

Seat No.	

M.E. (CSE) (Semester – II) (New – CBCS/CGPA) Examination, 2016
(Paper – X) (Elective – III) : BUSINESS INTELLIGENT SYSTEM

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time: 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Write answer to **any four** questions : **(4×5=20)**
   1) List and describe the components of BI.
   2) What are some of the major response activities that organizations take ?
   3) Define and explain BPM.
   4) What is KPI and what are its distinguishing characteristics ?
   5) What are some of popular application areas of text mining ?

2. Write answer to **any one** question : **10**
   1) What does six sigma refers to ?
   2) What are some of benefits and challenges of NLP ?

3. What are the major differences between a scorecard and a dashboard ? **5**

SECTION – II

4. Write answer to **any four** questions : **(4×5=20)**
   1) What are the major types of BI implementation influencing factors ?
   2) What are some of the critical success factors in BI projects ?
   3) What is on-demand BI ?
   4) What are the limitations of on demand systems ?
   5) Describe the global nature of social networks.

5. Write answer to **any one** question : **10**
   1) What is RFID ?
   2) Define reality mining.

6. Describe mobile social networking. **5**

SLR-EQ – 67

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II) (New – CBCS/CGPA) Examination, 2016
OBJECT ORIENTED SOFTWARE ENGINEERING AND DESIGN PATTERNS (Paper – X) (Elective – III)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Question **1** and **5** are **compulsory**.*

*2) Answer **any two** questions in **each** Section.*

*3) Make suitable assumptions if necessary and state them **clearly**.*

SECTION – I

1. Answer briefly : **15**

   a) Explain the life cycle of Domain object.

   b) Write a short note on requirement workflow.

   c) Explain Software Architecture and its Relationships to other Disciplines.

2. a) What are Activity Diagrams ? **5**

   b) Write a short note on building blocks of model driven design. **5**

3. a) Explain deployment diagrams in detail. **5**

   b) Draw the use case diagram for Bank ATM system. **5**

4. Write a short note on architectural styles (**any two**) : **10**

   a) Piles and filters.

   b) Layered system.

   c) Client Server architecture.

P.T.O.

SECTION – II

5. Answer briefly : **15**
   a) Write a short note on IS2000 : The Advanced Imaging Solution.
   b) Explain Customer Relationship Management (CRM) Archetype Pattern.
   c) What is global analysis ?

6. a) Compare product and quantity archetype patterns. **5**
   b) Explain communication patterns with an example. **5**

7. a) What are component and connector view types ? Explain their styles. **5**
   b) How is behavior documented in software architecture design ? **5**

8. Explain Module Architecture and Code Architecture view in detail. **10**

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SLR-EQ – 68

Seat No.	

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2016
WIRELESS AD-HOC NETWORK (Elective – III) (New) (Paper – X)

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions** : 1) Question **1** and **5** are **compulsory.
*2) Answer **any two** questions from remaining of **each** Section.*
*3) Figures to **right** indicates marks.*

SECTION – I

1. A) List characteristics of the wireless channel. Explain what is fading. **5**

   B) Explain in details IEEE 802 11 DCF and RTS-CTS mechanism. **6**

2. A) Why CSMA/CD is not generally used in wireless LAN ? Explain Hidden and exposed terminal problems in details. **6**

   B) Differentiate between cellular network and wireless ad-hoc network. **6**

3. A) Explain Optimization incorporated in Basic DSR. What are its advantages ? **6**

   B) Give the classification of routing protocol and also list the characteristics of ideal routing protocol in WAN. **6**

4. A) Discuss technical challenges in Packet Radio Network and explain the Architecture of PRNETs. **6**

   B) Explain with neat diagram Zone Routing Protocol (ZRP). **6**

SECTION – II

5. A) List the issues in designing a Multicast Routing Protocol. Explain operation of Multicast Routing Protocol. **6**

   B) Explain the issues and challenges in security provisioning. **5**

P.T.O.

6. A) List and explain major reasons behind throughput degradation in TCP when used in Ad-hoc WANs. **6**

   B) Explain with diagram the routing layer and it module in Multicast Routing Reference model. **6**

7. A) Explain with diagram tree initialization, maintenance and route optimization phases in BEMRP. **6**

   B) Compare tree based and mesh based multicast routing protocols. **6**

8. A) Explain key management for Cryptography algorithms in ad-hoc wireless networks. **6**

   B) Explain classification of Transport layer solutions. **6**

SLR-EQ – 69 (C)

Seat No.	

M.E. (CSE) (Semester – III) (Old) Examination, 2016
Self Learning : COMPUTER NETWORK ADMINISTRATION
(Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Q.**1** from Section – **I** and Q.**5** from Section – **II** are **compulsory**.*
*2) Attempt **any two** questions from Q.**2** to Q.**4** for Section – **I** and **any two** questions from Q.**6** to Q.**8** for Section – **II**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

1. Describe current status and future of network management. **7**

2. A) Draw a diagram for Data and Telecommunication network and explain. **7**
   B) Write a note on – Challenges of information technology manager. **7**

3. A) Explain ASN.1 in detail. **7**
   B) Describe Analogy of Telephone network management. **7**

4. A) Describe different organization models of SNMP 1 network management. **7**
   B) Describe elements of system group in MIB. **7**

SECTION – II

5. Explain different SNMP operations. **7**

6. A) Describe MIB leniographic ordering. **7**
   B) List and explain SNMP access policies. **7**

7. A) Explain ATM Remote monitoring with help of ATM RMON MIB. **7**
   B) Explain RMON 1 groups and functions. **7**

8. A) Write a note on – System and application management. **7**
   B) List and explain Enterprise Management solutions. **7**

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SLR-EQ – 69(a)

Seat No.	

M.E. (CSE) (Semester – III) (Old) Examination, 2016
SELF LEARNING – Bigdata (Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time: 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Answer **any four** : **24**

   a) Illustrate Bigdata management architecture with neat diagram.

   b) Analyze the role of relational databases in Bigdata and explain.

   c) Elaborate Server, Network and Application virtualization.

   d) Provide map-reduce function for matrix multiplication.

   e) What type of database is supported by HBase ? Elaborate its characteristics.

2. Answer the following : **6**

   What is Bigdata Technology Stack ? Elaborate its Layer 0 in detail.

3. Answer the following : **5**

   With the block diagram explain HDFS.

SECTION – II

4. Answer **any four** : **24**

   a) What are map-reduce functions ? Elaborate matrix-vector multiplication using map-reduce.

   b) Explain the company needs for data in motion.

   c) How Bigdata is ethically neutral ? Elaborate.

   d) What are the four elements of Bigdata ethics ? Explain in detail.

   e) How fraud is prevented with Bigdata analytics ? Illustrate with example.

5. Answer the following : **6**

   Elaborate the union, intersection, difference, grouping and aggregation operations by map-reduce.

6. Answer the following : **5**

   What is streaming data ? Explain it in healthcare industry and energy.

SLR-EQ – 70

Seat No.	

M.E. (Electronics and Telecommunication Engineering) (Semester – I) (CBCS) Examination, 2016
RESEARCH METHODOLOGY (Paper – I)

Day and Date : Thursday, 15-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Note** : **All** questions are **compulsory.

SECTION – I

1. Solve **any two** : **(5×2=10)**

   a) List motivation in research.

   b) Explain system modeling with the help of example.

   c) Define dependent variable, independent variable, confounded relationship, research hypothesis, control group.

2. Solve **any one** : **(7×1=7)**

   a) Illustrate the principles involved in the simulation of a discrete system using telephone system with example.

   b) Explain completely randomized design with block diagrams.

3. Solve **any three** : **(6×3=18)**

   a) Mention criteria for good research.

   b) What is literature review ? What is its importance ?

   c) What is technique involved in defining a problem ? State example.

   d) Explain static mathematical models with example.

P.T.O.

SECTION – II

4. Solve **any two** : **(2×5=10)**

   1) Differentiate between Research Design and Experimental Design.

   2) Explain in detail ethical issues in research.

   3) What are the statistical techniques which are commonly used in educational research ?

5. Attempt **any one** : **(1×7=7)**

   1) Give in detail considerations for statistical analysis.

   2) What do you understand by research report or thesis ? Indicate its need and importance in the research work.

6. Write a short note on **any three** : **(3×6=18)**

   1) Virtual lab.

   2) Patents.

   3) Writing abstract.

   4) Evaluation of report.

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SLR-EQ – 71

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – I) (CBCS) Examination, 2016
Paper – II : ANTENNA THEORY AND DESIGN

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***if required****.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**
   a) List and define the antenna parameters.
   b) Explain about various microstrip antenna configuration.
   c) Explain the need of antenna arrays and elaborate different configuration of antenna arrays.

2. Solve **any one** question : **(7×1=7)**
   a) Explain transmission line model for the analysis of microstrip antenna.
   b) Design a rectangular microstrip antenna using a substrate (RT/duroid 5880) with dielectric constant of 2.2, $h = 0.1588$ cm (0.0625 inches) so as to resonate at 10 GHz.

3. Attempt **any three** questions : **(6×3=18)**
   a) Explain broadside and end fire array radiation pattern.
   b) Explain Aperture Coupled Microstrip Feed with diagram and give its advantages and disadvantages.
   c) Elaborate the advantages of microstrip antenna and comment on its use in mobile communication.
   d) Explain the radiation mechanism of a microstrip antenna.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**
   a) Explain various definitions of Bandwidth.
   b) What are the various categories of substrate. Give examples of each categories.
   c) Explain Mutual Coupling in Microstrip Antenna Arrays.

5. Solve **any one** question : **(7×1=7)**
   a) Explain linear array design with microstrip patches using series feed arrays.
   b) State different techniques for bandwidth enhancement of antenna. Explain selection of suitable feeding technique.

6. Attempt **any three** questions : **(6×3=18)**
   a) What parameters of substrate affect the impedance bandwidth of microstrip antenna and explain how it affects the impedance bandwidth.
   b) Explain the choice of substrate for antenna design considering parameters such as dielectric constant, loss tangent, dimension stability, chemical resistance, temperature range, relative cost.
   c) Explain series and parallel feeding for microstrip antenna arrays.
   d) Explain transmission line modeling for aperture coupled microstrip antenna.

SLR-EQ – 72

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – I) Examination, 2016
(CBCS)
Paper – III : PROBABILITY AND STOCHASTIC PROCESSES

Day and Date : Monday, 19-12-2016 Max.Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

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

3) Draw neat diagram ***wherever*** *required.*

SECTION – I

1. Attempt **any two** : **(6×2=12)**

   a) State and prove the Baye's theorem.

   b) List and brief properties of Probability Density Function of Random Variables.

   c) Discuss the properties of covariance in brief.

2. Attempt **any one** : **(7×1=7)**

   a) The continuous random variable X has the pdf $f_x(x) = \begin{cases} k(2x - x^2) & 0 < x < 2 \\ 0 & \text{otherwise} \end{cases}$

   where k is constant

   i) Find the value of k

   ii) Determine P(X > 1)

   iii) Find the cdf of X.

   b) If random variable X is having E(X) = 3, Var (X) = 2 and Y = 3X – 11. Show that X and Y are orthogonal.

P.T.O.

3. Attempt **any two** : **(8×2=16)**

   a) Explain maximum likelihood estimation of nonrandom parameters.

   b) Let $Y = aX + b$

      i) Find the covariance of X and Y.

      ii) Find the correlation coefficient of X and Y.

   c) Prove the central limit theorem.

SECTION – II

4. Attempt **any two** : **(6×2=12)**

   a) Show that the correlation coefficient lies between –1 and +1.

   b) Explain different classification states of Markov Chain.

   c) State the properties of power spectral density.

5. Attempt **any one** : **(7×1=7)**

   a) People arrive at a cinema ticket booth in Poisson distributed arrival rate of 25 per hour. Service rate is exponentially distributed with an average time of 2 minute. Calculate the mean number in the waiting line, expected waiting time, the mean number in the system and expected time in the system

   b) Explain Chapman-Kolmogrov equation for discrete Markov chain.

6. Attempt **any two** : **(8×2=16)**

   a) Two jointly wide sense stationary random process have sample functions of the form $X(t) = A \cos (w_0 t + \theta)$ and $Y(t) = B \cos (w_0 t + \theta + \phi)$ where θ is a random variable uniformly distributed between 0 and 2Π and A, B and Φ are constants.

      i) Find the cross-correlation function $R_{XY}(\tau)$.

      ii) For what values of Φ are X(t) and Y(t) orthogonal ?

   b) Discuss estimation of autocorrelation function using frequency domain technique.

   c) For M/M/N/∞ queuing system with mean arrival rate λ is randomly distributed according to Poissons distribution. The service time distribution is approximated by an exponential distribution and mean rate of services is μ. Calculate :

      i) The average number of customers in the system.

      ii) Average waiting time per customer in the system.

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SLR-EQ – 73

Seat No.	

M.E. (E and TC) (Semester – I) (CBCS) Examination, 2016
ADVANCED NETWORK SYSTEMS (Paper – IV)

Day and Date : Wednesday, 21-12-2016 Total Marks : 70
Time :11.00 a.m. to 2.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

1. Attempt **any two** : **(5×2=10)**
   a) What is ARP ? Explain.
   b) Draw resource record format of DNS and explain each field in detail.
   c) Explain FTP process model.

2. Attempt **any one** : **(7×1=7)**
   a) Explain on ICMP messages :
      i) Echo request reply
      ii) Source quench message.
   b) Explain types of firewalls in detail.

3. Attempt **any three** : **(6×3=18)**
   a) Resolver in DNS
   b) Internet security
   c) DHCP
   d) Mobile IP.

SECTION – II

4. Solve **any two** : **(5×2=10)**
   a) Explain the service stratum functions of ITU NGN.
   b) Explain Private Network-to-Network interface signaling in ATM.
   c) What are different IP forwarding architectures ? Explain.

P.T.O.

5. Solve **any one** : **(7×1=7)**

   a) Explain the QoS network performance parameters defined in ATM standards.

   b) How is a Virtual Channel Connection established in Multiprotocol over ATM (MPOA) ?

6. Solve **any three** : **(6×3=18)**

   a) What are the functionalities of User Equipment in NGN ?

   b) Explain different ATM service categories.

   c) Explain wildcard filter reservation style in RSVP.

   d) Explain the high level system architecture of Gigabit Ethernet.

SLR-EQ – 74

Seat No.	

M.E. (E & TC) (Semester – I) (CBCS) Examination, 2016
Paper – V : OPTICAL NETWORKS (Elective – I)

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate maximum marks.*
3) Assume suitable data if required.

SECTION – I

1. Solve **any two** : **(5×2=10)**

   a) Explain optical Add-drop Multiplexer.

   b) What is synchronous clock hierarchy ? What is its role in high speed transport networks ?

   c) Write short note on the evolution of optical systems. Illustrate the signaling multiplexing hierarchies.

2. Solve **any one** : **(7×1=7)**

   a) Describe the functional components in SONET. How the link failures are detected in SONET/SDH ?

   b) Explain the following with reference to optical networks architecture :
      i) The Digital Wrapper.
      ii) Control Planes.
      iii) In/Out of band signals.

3. Solve **any three** : **(6×3=18)**

   a) Describe major characteristics of three generation of transport network. Discuss key nodes in a high capacity optical network.

   b) Write a short note on OTN Layered model.

   c) Discuss basic formats of
      i) An STS-N SONET frame.
      ii) An STM-N SDH frame.

   d) Briefly explain the following :
      i) Dense Wave Division Multiplexing.
      ii) Erbium Doped Fiber.

P.T.O.

SECTION – II

4. Solve **any two** : **(5×2=10)**
   a) How MPLS supports to virtual private network ?
   b) Explain the concept of IP Subnets.
   c) What are the major functions of optical routers ?

5. Solve **any one** : **(7×1=7)**
   a) Explain the process of interworking of IP, MPLS and Optical control planes.
   b) Explain MPLS traffic engineering.

6. Solve **any three** : **(6×3=18)**
   a) What is correlation in MPLS and Optical wavelength ?
   b) What are evolutions in switching/routing systems ?
   c) What are similarities in MPLS and Optical traffic engineering ?
   d) Explain support of non-optical nodes in Optical Internets.

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SLR-EQ – 75

Seat No.	

M.E. (E&TC Engineering) (Semester – I) Examination, 2016
(CBCS)
Paper – V : SPEECH AND VIDEO PROCESSING (Elective – I)

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Note : *i)* ***All*** *questions* ***compulsory****.*
ii) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*
iv) Use of electronic pocket calculator is ***allowed****.*

SECTION – I

1. Attempt **two** questions :
   a) Explain in detail Pitch prediction. **7**
   b) Explain Linear Predictive Coding for Speech Synthesis. **8**

   OR

   b) Explain the significance of speech filtering.

2. Attempt **two** questions :
   a) Explain in detail speech recognition systems. **7**
   b) Explain simulation of speech signal. **8**

   OR

   b) Explain in detail Pitch estimation.

3. Attempt **one** question :
   a) Explain the significance of Speech analysis. **5**

   OR

   b) Write short note on Speech production.

P.T.O.

SECTION – II

4. Attempt **two** questions :
   a) Explain in detail 3D Motion Models. **7**
   b) Explain the principle of Pixel based motion estimation. **8**

   OR

   b) Write short note on Linear Predictive Coding (LPC).

5. Attempt **two** questions :
   a) Explain in detail Geometric Image Formation. **7**
   b) Explain in detail region based motion estimation. **8**

   OR

   b) Write short note on applications of video coding.

6. Attempt **one** question :
   a) Explain the Sampling process. **5**

   OR

   b) Compare Analog and Digital video.

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SLR-EQ – 76

Seat No.	

M.E. (E&TC) (Semester – I) (CBCS) Examination, 2016
(Paper – V) (Elective – I)
ADVANCED VLSI DESIGN

Day and Date : Friday, 23-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *I) Q.* ***1*** *is* ***compulsory****.*

II) Attempt ***any two*** *questions from Q.* ***2*** *to Q.* ***4****.*

III) Attempt ***any two*** *questions from Q.* ***5*** *to Q.* ***7****.*

1. a) Explain vector quantization which is used in data compression. **5**

   b) Explain the use of parallel processing for reducing power consumption. **5**

   c) Explain algorithm of computing input co-variance matrix K and output co-variance matrix W. **4**

2. a) Explain convolution algorithm for two discrete sequences. **8**

   b) Explain fine grain pipelining. **6**

3. a) For a unscaled second order filter, state variable matrices are

$$A = \begin{bmatrix} 0 & 1 \\ \frac{1}{16} & 0 \end{bmatrix}, D = \begin{bmatrix} 0 \\ 1 \end{bmatrix}, C = \begin{bmatrix} \frac{1}{16} \\ -\frac{1}{2} \end{bmatrix}, D = [0]$$

   Find state co-variance matrix for scaled and unscaled filter. **8**

   b) Explain round off noise computation in filter. **6**

4. a) Construct a 2×2 convolution algorithm using Cook-Toom algorithm with $\beta = 0, \pm 1$. **8**

   b) Explain Baugh Wooley multiplier for 4×4 bit multiplication. **6**

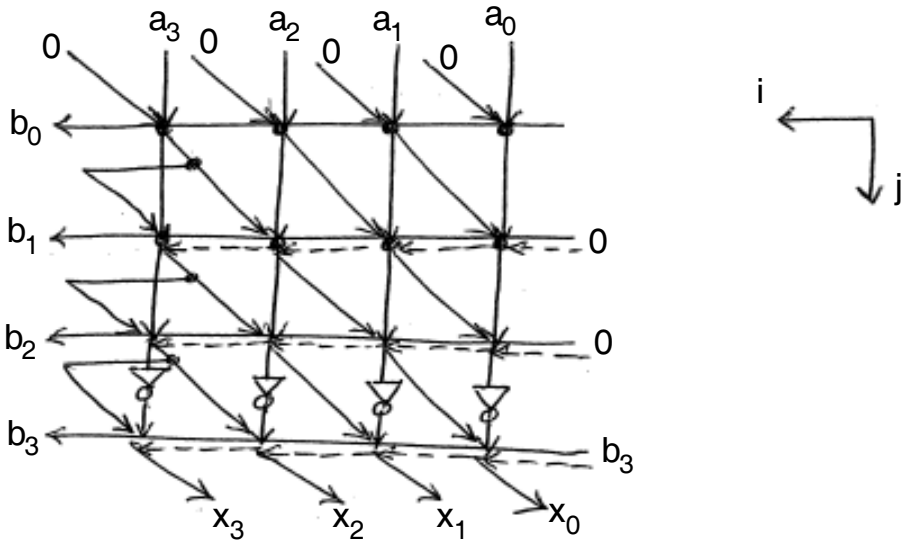
P.T.O.

5. a) For given systolic array representation of carry ripple array multiplication following vectors are defined

   $d = (0\ 1)^T$ $p^T = (1\ 0)$ $S^T = (0\ 1)$

   i) Give the edge mapping

   ii) Draw bit serial carry ripple multiplier. **8**



   b) Explain algorithm for computing CSD format of W-bit number. Convert the number 1.01110011 into its CSD format. **6**

6. a) Give the DCVSL implementation of logic function f = AB + C(A + B). **8**

   b) What is signal transition graph ? Explain different terminologies associated with it. **6**

7. a) Give the FPGA implementation of carry completion adder module. **8**

   b) Draw state transition diagram for a static CMOS NOR gate. **6**

SLR-EQ – 77

Seat No.	

M.E. (Electronics and Telecommunication. Engg.) (Semester – II) (New-CBCS) Examination, 2016
RF AND MICROWAVE CIRCUIT DESIGN (Paper – VI)

Day and Date : Thursday, 8-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Assume** suitable data **if required**.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**

   a) Explain two port network parameters.

   b) Design a resistive tee network using of ABCD parameters.

   c) Define S-parameters. Explain S parameters from SPICE analysis.

2. Solve **any one** question. **(7×1=7)**

   a) Define and Derive expressions for two port power gains.

   b) Explain stability of amplifier and derive the expressions for input and output stability circles and also sketch stability circles using Smith chart.

3. Attempt **any three** questions : **(6×3=18)**

   a) Explain frequency conversion using mixer.

   b) Define noise figure of mixer. Derive the relation between noise figure for DSB and SSB input signals.

   c) Explain single ended diode mixer with neat circuit diagram.

   d) A single ended FET mixer is to be designed for a wireless local area network receiver operating at 2.4 GHz. The parameters of the FET are Rd = 300 Ω, Ri = 10 Ω, Cgs = 0.3pF, and g1 = 10mS. Calculate the maximum possible conversion gain.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**

   a) Explain two port oscillator design.

   b) Explain characteristics of hyperabrupt-junction diode.

   c) Explain K-β diagram and wave velocities.

5. Solve **any one** question. **(7×1=7)**

   a) Explain how transistor model is used for producing the negative resistance in the design of two port oscillator.

   b) Explain the process of filter design by insertion loss method.

6. Attempt **any three** questions : **(6×3=18)**

   a) Write a note on Richard's transformation for filter implementation.

   b) Explain the characteristics of ideal substrate material and ideal conductor material used for the manufacturing of monolithic microwave integrated circuits.

   c) Explain diffusion and ion implantation MMIC fabrication techniques.

   d) Explain Kuroda's identity.

SLR-EQ – 78

Seat No.	

M.E. (Electronics and Telecommunication Engg.)
(Semester – II) Examination, 2016
(New CBCS)
ADVANCED SIGNAL PROCESSING (Paper – VII)

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Draw neat diagram ***wherever*** *required.*

SECTION – I

1. Attempt **any two** : **(2×6=12)**
   a) Explain in detail adaptive system with suitable example.
   b) Describe in brief least mean square minimization.
   c) Explain in detail least absolute deviation.

2. Attempt **any one** : **(1×7=7)**
   a) Describe in brief principle of adaptive filter.
   b) Describe in brief least-mean-square algorithm.

3. Attempt **any two** : **(2×8=16)**
   a) Explain in detail Steepest-Descent Algorithm (SDA).
   b) Explain in detail Levinson-Durbin algorithm with suitable example.
   c) Compare the Steepest-Descent Algorithm Verses Least-Mean-Square Algorithm.

SECTION – II

4. Attempt **any two** : **(2×6=12)**
   a) Explain in detail equalization of data in communication channels.
   b) Describe in brief constant modulus algorithm.
   c) Explain in detail adaptive blind equalizer.

P.T.O.

5. Attempt **any one** : **(1×7=7)**
   a) Explain in detail noise cancellation in adaptive filter with suitable example.
   b) Explain in detail single stage and multistage realization.
6. Attempt **any two** : **(2×8=16)**
   a) Describe in brief Echo cancellation with suitable example.
   b) Explain in detail application of subband coding.
   c) Find the sub band decomposition and reconstruction with Haar filter for given sequence. x(n) = {1, 2, 2, 1}.

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SLR-EQ – 79

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – II) Examination, 2016
(New – CBCS)
WIRELESS COMMUNICATION (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*

SECTION – I

1. Solve **any four** : **(4×4=16)**

   1) Explain the parameters of mobile multipath channels.

   2) Describe the Rayleigh and Ricean fading distributions.

   3) Write a note on Doppler fading.

   4) Discuss the basic concept of cellular phone in brief.

   5) What do you mean by multipath diversity ?

2. A) Solve **any two** : **(2×6=12)**

      1) Explain Jakes model in detail.

      2) List and explain the multipath access techniques for wireless communication.

      3) Explain the PN sequences.

   B) What is small scale fading ? Enlist the factors influencing small scale fading. **7**

P.T.O.

SECTION – II

3. Solve **any four** : **(4×4=16)**

   1) Explain MRT diversity of MIMO.

   2) What are the benefits of cyclic prefix in OFDM ?

   3) What is UWB ? Write features of UWB.

   4) Compare and contrast GSM and WCDMA.

   5) What is OFDM ? Mention its merits and demerits.

4. A) Solve **any two** : **(2×6=12)**

      1) Discuss UWB data modulation.

      2) Explain SVD and Eigen modes of the MIMO Channel.

      3) Compare wireless and fixed telephone networks.

   B) With neat diagram explain the system model for MIMO systems. **7**

SLR-EQ – 80

Seat No.	

M.E. (E and TC) (Semester – II) Examination, 2016
(New – CBCS)
CRYPTOGRAPHY AND NETWORK SECURITY (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

1. Attempt **any two** : **(5×2=10)**
   a) Compare block versus stream cipher.
   b) Discuss on steganography.
   c) Explain various security attack types.

2. Attempt **any one** : **(7×1=7)**
   a) Assuming necessary parameters implement RSA algorithm.
   b) Explain linear and differential cryptanalysis.

3. Attempt **any three** : **(6×3=18)**
   a) Draw and explain public key cryptography system for secrecy and authentication.
   b) Explain in detail AES (Advanced Encryption Standard).
   c) Explain with examples transposition cipher.
   d) Explain public key distribution techniques.

SECTION – II

4. Attempt **any two** : **(5×2=10)**
   a) Explain hash function.
   b) Explain Secure Socket Layer.
   c) What is firewall ? Explain role of firewall in security of system.

P.T.O.

5. Attempt **any one** : **(7×1=7)**

   a) What is Kerberos ?

   b) Explain IPSec. in detail.

6. Attempt **any three** : **(6×3=18)**

   a) Explain Elgamal Digital Signature Technique.

   b) Describe X.509 Certificates.

   c) Write a note on digital signature standards.

   d) Explain PKIX Management Functions.

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SLR-EQ – 81

Seat No.	

M.E. (Electronics and Telecommunication) (Semester – II) (New-CBCS) Examination, 2016
WIRELESS SENSOR NETWORK AND OPTIMIZATION (Elective – II) (Paper – X)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***N.B.** : **All** questions are **compulsory**.*

SECTION – I

1. Solve **any three**. **(8×3=24)**
   a) State four category 2 Wireless Sensor Network applications and explain any one.
   b) Draw typical sensor node and explain it.
   c) What is difference between Cellular network and Ad-hoc Wireless sensor network.
   d) Explain network topologies for Wireless Sensor Network.

2. a) What is WANET ? **3**
   b) Explain hidden node and exposed node problem in WSN. **8**

   OR

   b) What are the constraints and challenges in ad-hoc wireless sensor network. **8**

SECTION – II

3. Solve **any three**. **(8×3=24)**
   a) Enlist the issues in designing a MAC protocol for ad-hoc wireless networks.
   b) Explain Busy Tone Multiple Access (BTMA) protocol.
   c) Enlist characteristics of an ideal routing protocol for ad-hoc wireless networks.
   d) Explain processor power management schemes.

4. a) State classification of energy management schemes. **3**
   b) With neat sketches, explain Dynamic source routing protocol. **8**

   OR

   b) Explain Collision Avoidance Time Allocation (CATA) protocol. **8**

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SLR-EQ – 82

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – II) (CBCS) Examination, 2016
WAVELET TRANSFORM AND APPLICATIONS (New)
Paper – X (Elective – II)

Day and Date : Wednesday, 14-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions**: 1) **All** questions are **compulsory**.*

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

*3) Assume suitable data **if required**.*

SECTION – I

1. Attempt **any one** of the following questions : **(7×1=7)**
   a) Discuss about Wavelet basis functions.
   b) Explain construction of MRA with equations of The dilation equation and the wavelet equations.

2. Attempt **any two** of the following questions : **(5×2=10)**
   a) Explain continuous wavelet transform and discrete wavelet transform using equations.
   b) Explain the Criteria for wavelet selection.
   c) Explain Wavelet decomposition and reconstruction of functions in $L^2(R)$.

3. Write a short note on (**any three**) : **(6×3=18)**
   a) Continuous Wavelet Transform.
   b) Biorthogonality and biorthogonal basis for construction of wavelets.
   c) Admissibility condition.
   d) Decimation and Interpolation.

P.T.O.

SECTION – II

4. Attempt **any one** of the following questions : **(7×1=7)**

   a) Explain video compression using multi resolution technique.

   b) Adapted wavelet techniques for encoding MRI diagnosis.

5. Attempt **any two** of the following questions : **(5×2=10)**

   a) Explain image compression using DWT.

   b) Discuss about image differences using wavelet decomposition.

   c) Write about Wireless Digital Communication System based on DWT.

6. Write a short note on (**any three**) : **(6×3=18)**

   a) Wavelet Denoising.

   b) Object Isolation.

   c) Transform coding.

   d) Audio compression using DWT.

SLR-EQ – 83

Seat No.	

M.E. (Electronics and Telecomm.) Engg. (Semester – II) Examination, 2016
(New CBCS)
Paper – X : Elective – II : ADVANCED EMBEDDED SYSTEMS

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

1. Attempt **any two** : **(6×2)**
   1) Give the overview of MP11 CPU.
   2) Explain ARM 11 Architecture in detail.
   3) Explain the ARM state register set of Mp11.

2. Attempt **any two** : **(6×2)**
   1) Explain hardware architecture of an embedded system.
   2) Explain the program status registers.
   3) Give the details of exceptions in Mp11.

3. Attempt **any two** : **(6×2)**
   1) Explain Register organization in ARM.
   2) Explain the instruction bit pattern of MRC and MCR instructions of CP15 registers.
   3) Explain c0, Main ID Register.

P.T.O.

SECTION – II

4. Attempt **any two** : **(6×2)**

   1) Explain the task state.

   2) Explain the inter task communication and synchronization.

   3) Explain the features of RTOS.

5. Attempt **any two** : **(6×2)**

   1) Explain the concept of memory management in an embedded system.

   2) Explain schedule of embedded system.

   3) Explain features of RT-Linux.

6. Write a short note on **any two** : **(5×2)**

   1) Raspberry Pi Architecture

   2) GPIO of Raspberry Pi

   3) Keyboard interfacing with Raspberry Pi.

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SLR-EQ – 84

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – II) (CGPA) Examination, 2016

Paper – VI : RF AND MICROWAVE CIRCUIT DESIGN (OLD)

Day and Date : Thursday, 8-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

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

3) ***Assume*** *suitable data* ***if required****.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**

   a) Define standing wave ratio and derive the expression for SWR in terms of reflection coefficient.

   b) ZL = $(75 + j50)\,\Omega$ connected to a transmission line with characteristic impedance of $50\,\Omega$. Find the corresponding reflection coefficient and transmission coefficient.

   c) Explain the physical characteristic of HEMT.

2. Solve **any one** question : **(7×1=7)**

   a) Explain (i) Diffusion and ion implantation (ii) Epitaxial Growth MMIC fabrication techniques.

   b) A GaAS MESFET with a gold gate fabricated to be 1.0 μm in length and 200 μm in width and d = 0.5 μm in depth the following electric characteristics are known $\varepsilon_r = 13.1$, $N_D = 10^{16}$ cm^{-3} and $\mu_n = 8500$ $cm^2/V.s$. Find the cut-off frequency at room temperature.

3. Attempt **any three** questions : **(6×3=18)**

   a) Derive the equation of transmission lines with the help of uniformly distributed circuit theory in case of lossy and lossless line.

   b) Derive the expressions for various gain factors G_T, G_{avs}, G_{avn}. For microwave RF Amplifier.

   c) Explain Class A RF transistor amplifier design.

   d) Explain the characteristics of the smith chart.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**
   a) Explain about design of high frequency microwave oscillator.
   b) Discuss Richard's transformation and Unit element matrix.
   c) Explain the operation of BJT as active RF element.

5. Solve **any one** question : **(7×1=7)**
   a) Explain about different topologies of single stub matching network.
   b) Prove Kurdas fourth identity with ABCD parameters and also calculate the value of N.

6. Attempt **any three** questions : **(6×3=18)**
   a) Explain the parameters which play a key role while analyzing filters.
   b) Write a note on linear and non-linear mixer operation.
   c) Derive expression for conversion between S parameters and Z parameters.
   d) Write short notes on constant VSWR circles in case of microwave amplifiers.

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SLR-EQ – 85

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – II) (CGPA) Examination, 2016
Paper – VII : WIRELESS COMMUNICATION (Old)

Day and Date : Saturday, 10-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Q. **1** is **compulsory**.*
*2) Solve **any four** questions from Q. **2** to Q. **6**.*
*3) Figures to **right** indicate **full** marks.*
*4) **Assume** suitable data if **necessary**.*

1. Attempt the following :
   a) What is fading ? Explain the factors influencing small scale fading. **5**
   b) Explain the Rayleigh fading distribution. **5**
   c) Compute BER of a wireless communication system at SNR 20dB. **4**

2. a) Explain the ground reflection (Two Ray) model. **7**
   b) Explain co-channel interference and adjacent channel interference and their effect on cellular mobile communication. **7**

3. a) Explain the basic underlying physical laws for scattering as applicable an EM wave in cellular communication. **7**
   b) Given that the probability density function (pdf) of a Rayleigh distributed envelope is given by $p(r) = \frac{r}{\sigma^2} \exp\left(\frac{-r^2}{2\sigma^2}\right)$ where σ^2 is the variance,
   Show that the cumulative distribution function is given as
   $p\,(r < R) = 1 - \exp\left(\frac{-R^2}{2\sigma^2}\right)$. Find the percentage of time that a signal is 10 dB or more below the rms value for a Rayleigh fading signal. **7**

P.T.O.

4. a) Explain SDMA packet radio. **7**

   b) Discuss traffic routing mechanism in wireless networks. **7**

5. a) Compare wireless and fixed telephone networks. **7**

   b) Explain Personal Access Communication System (PACS). **7**

6. a) Explain common channel signaling scheme. What are advantages of common channel signaling over conventional signaling. **7**

   b) Write a note on IEEE 802.11 standards. **7**

SLR-EQ – 86

Seat No.	

M.E. (E&TC) (Semester – II) (CGPA) Examination, 2016
Paper – VIII : ADAPTIVE SIGNAL PROCESSING (Old)

Day and Date : Friday, 9-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: I)* ***All*** *questions are* ***compulsory****.*
II) Assume suitable data if ***necessary****.*

1. Attempt **any two** : **15**

   a) Derive performance function and draw performance surface for adaptive linear combiner.

   b) State and explain different properties of complex Gaussian process.

   c) Consider AR process u(n) of order two described by difference equation

   $u(n) = u(n-1) - 0.5\,u(n-2) + v(n)$ where v(n) is white noise with zero mean and 0.5 variance. Write :

   1) Yule – Walker equation

   2) Find r(1) and r(2).

2. Attempt **any two** : **10**

   a) Find eigen values and eigen vectors for $R = \begin{bmatrix} 0.5 & 0.25 \\ 0.25 & 0.5 \end{bmatrix}$.

   b) Find circular convolution of x(n) = {1, 2, 3, 4} and y(n) = {1, 2, 2, 1}.

   c) Explain WOLD decomposition theorem.

3. Attempt **any two** : **10**

   a) Write a note on performance penalty.

   b) Explain characteristics of adaptive signal processing.

   c) Explain in detail steepest descent gradient search algorithm.

P.T.O.

4. Attempt **any two** : **15**
   a) Explain adaptive noise canceller.
   b) Explain different stochastic models.
   c) State orthogonality principle and derive expression for Weiner – Hopf equation.

5. Attempt **any two** : **10**
   a) Explain fast block LMS algorithm.
   b) Define matrix inversion lemma. How it is useful in RLS algorithm.
   c) Explain adaptive laguerre lattice filter.

6. Attempt **any two** : **10**
   a) Explain any two application of adaptive signal processing.
   b) Explain IIR filters used for system identification using equation error method.
   c) Explain square root adaptive filter.

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SLR-EQ – 88

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – II)
Examination, 2016
(Old-CGPA)
Paper – IX (Elective-II) : CRYPTOGRAPHY AND NETWORK SECURITY

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *mark.*
3) Draw neat diagram ***wherever*** *required.*

SECTION – I

1. Attempt **any two** : **(5×2=10)**

   a) What is transposition cipher ? Give an example.

   b) Explain advanced encryption standard.

   c) Explain symmetric key distribution.

2. Attempt **any one** : **(7×1=7)**

   a) Explain strength of DES and what is triple DES ?

   b) Explain D-H key exchange algorithm and its implementation.

3. Attempt **any three** : **(6×3=18)**

   a) Explain linear and differential cryptanalysis.

   b) Explain Shannon's theory of confusion and diffusion.

   c) Explain encryption and decryption of public key crypto system.

   d) Discuss the implementation of RSA algorithm.

P.T.O.

SECTION – II

4. Attempt **any two** : **(5×2=10)**

   a) Explain SSL architecture.

   b) What types of attacks are addressed by message authentication ?

   c) Explain three classes of intruders.

5. Attempt **any one** : **(7×1=7)**

   a) Explain three strong authentication procedures of X.509 with diagram.

   b) Write a note on security of MAC.

6. Attempt **any three** : **(6×3=18)**

   a) Discuss PGP services in detail.

   b) Discuss Firewall security.

   c) Explain secure hash algorithm.

   d) Discuss on web-security consideration.

SLR-EQ – 90

Seat No.	

M.E. (Electronics and Telecommunication) (Semester – II) Examination, 2016
(Old – CGPA)
Paper – X : MOBILE COMPUTING (Elective – III)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***N.B** : **All** questions are **compulsory**.*

SECTION – I

1. Solve **any three** : **(8×3=24)**
   a) State benefits, disadvantages and applications of Wireless LAN.
   b) Compare dynamic source routing with on-demand Distance Vector routing.
   c) Explain route maintenance-link failure in on-demand Distance Vector routing.
   d) What is I-TCP protocol ? Explain snooping.

2. a) Compare GSM and CDMA. **3**
   b) Explain location management in PCN. **8**

   OR

   b) Explain frequency allocation in GSM. How bandwidth is shared for multiple users ? **8**

SECTION – II

3. Solve **any three** : **(8×3=24)**
   a) What are different challenges in providing the QOS in wireless network ? Explain each.
   b) Describe the Symbian OS architecture. Explain memory management in Symbian.
   c) Explain attacks with respect to information security.
   d) Write short note on i) Digital signature ii) Design choices of providing QOS support.

4. a) What is RPC ? **3**
   b) Perform encryption and decryption using RSA algorithm for p = 7 and q = 17. Assume that plaintext block is 8 bits long and the value is 65. **8**

   OR

   b) Explain MVC in Symbian OS. **8**

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SLR-EQ – 92

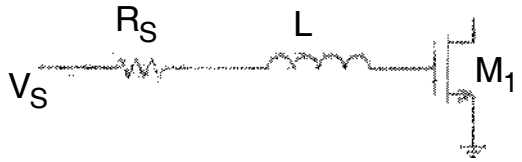
Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – II) Examination, 2016
(Old CGPA)
Paper – X : Elective – III : COMMUNICATION SYSTEM DESIGN

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Q. 1 is **compulsory**.*
*2) Solve **any four** questions from Q. **2** to Q. **6**.*
*3) Figures to the **right** indicate **full** marks.*
*4) Assume suitable data **if** necessary.*

1. a) Explain the block diagram of QPSK transmitter. **5**
   b) Derive an expression for harmonic distortion for single tone input. **5**
   c) Explain the concept of impedance matching for the following LNA. **4**



2. a) Write a note on third order intercept point. **7**
   b) Derive an expression for Friss' equation. Hence prove that the minimum separation between users is inversely proportional to the maximum interference power level. **7**

3. a) Draw the circuit diagram of a wideband LNA. How is the RF signal prevented from being injected into the current bias chains ? **7**
   b) Derive an expression for the noise figure of a narrowband LNA. **7**

4. a) Explain the Mixer modelled as a variable gain amplifier. **7**
   b) Give the qualitative description of Gilbert Mixer. **7**

P.T.O.

5. a) Prove that the doubling of the oversampling rate in a second order Sigma Delta modulator reduces the rms quantization noise by 15 dB. **7**

   b) Derive an expression for the noise transfer function and the signal transfer function of a first order Sigma Delta modulator. With help of the frequency spectra prove that the Sigma Delta modulator maximizes the S/N ratio. **7**

6. a) For a switched capacitor, prove that the equivalent resistance is dependent on the switching frequency. **7**

   b) Define the term Dynamic Range of an ADC. Derive an expression for Dynamic Range of a second order ADC. **7**

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SLR-EQ – 94 (a)

Seat No.	

M.E. (Electronics and Telecommunication Engineering)
(Semester – III) Examination, 2016
(Self-Learning Subject)
MODELING AND SIMULATION OF COMMUNICATION SYSTEM
(Paper – I) (Old)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**
   a) Explain multi-disciplinary aspects of simulation.
   b) What is performance estimation ?
   c) Explain methodology problem solving for simulation.

2. Solve **any one** question : **(7×1=7)**
   a) Explain classification of system properties for performance evaluation technique.
   b) Explain basic concepts of modeling in detail.

3. Attempt **any three** questions : **(6×3=18)**
   a) Explain the role of simulation in communication engineering system.
   b) Write a note on errors in system and device modeling.
   c) Explain the process of quantization.
   d) Explain validation processes for Random process Models and System model.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**
   a) Explain Seed numbers and vectors.
   b) Explain Histogram method.
   c) Explain frequency domain representation of periodic continuous signals.

5. Solve **any one** question : **(7×1=7)**
   a) Explain techniques for generating Uncorrelated Gaussian Random Numbers.
   b) Explain tools for generating pseudo-random number that are uniformly distributed between 0 and 1.

6. Attempt **any three** questions : **(6×3=18)**
   a) Explain Monte Carlo simulation model for communication system.
   b) Explain properties of Fourier transform.
   c) Write note on Gibbs phenomenon and Hilbert transform.
   d) Explain block diagram representation of systems.

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SLR-EQ – 95

Seat No.	

M.E. (Mech.) CAD/CAM (Semester – I) (CBCS/CGPA) Examination, 2016
ADVANCED MACHINE DESIGN (Paper – I)

Day and Date : Thursday 15-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Question **1** and Question **5** are **compulsory**.*

*2) Solve **any two** question **each** from Section **I** and **II** out of remaining.*

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

*4) Assume necessary data **if** required.*

SECTION – I

1. For the given stress matrix, determine the principal strain and direction of the maximum unit strain (ε max.)

$$[\varepsilon_{ij}] = P\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & -4 \\ 0 & -4 & 3 \end{bmatrix}$$ where $P = 10^{-4}$. **13**

2. The displacement field in micro unit for a body is given by

   $u = (x^2 + y)\, j + (3 + z)\, j + (x^{2+}2y)k$

   Determine the principal strain at (3, 1, –2) and direction of minimum principal stress. **11**

3. a) Write a notes on : **6**
      1) State of stress at a pt.
      2) State of strain at point

   b) Explain the Mohr's circle for three dimensional state of stress. **5**

4. a) Explain plane strain in polar co-ordinator. **5**

   b) Compute Lame's coefficient λ and u for steel having $E = 207\times10^6$ KPa $u = 0.3$. **6**

P.T.O.

SECTION – II

5. a) A steel shaft of 10 cm diameter is shrunk inside a bronze cylinder of 25 cm outer diameter. The shrink allowance is 1 part per 1000 (I.e 0.005 cm diff. between the raddi). Find the circumstantial stresses in the bronze cylinder at the inside and outside raddi and stress in the shaft.

   $E_{steel} = 2.18 \times 10^6$ kgf /cm^2 (214×10^6 KPa)

   $E_{bronze} = 1.09 \times 10^6$ kgf/cm^2 (107×10^6 KPa)

   u = 0.3 for both metal. **7**

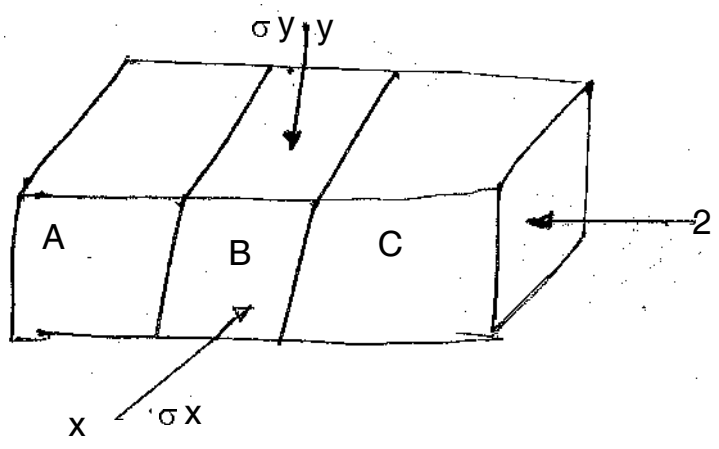
   b) Explain the concept of thin walled and thick walled cylinder. **6**

6. a) What is endurance limit ? Explain the significance of modify Goodman diagram in the analysis. **6**

   b) Explain stress concentration used in m/c component. **5**

7. Determine the diameter of a cold rolled steel shaft, 0.6 m long used to transmit 50 hp at 600 rpm. The shaft is simply supported at its ends in bearings. The shaft experience bending owing to its own weight also, use factor of safety 2. The tensile yield limit is 280×10^3 KPa and shear yield limit us 140×103 KPa. Use maximum shear stress theory. **11**

8. A soft block B is inserted between two hard blocks A & C. Friction of block B with respected to other two block is negligible. If block B is subjected to stresses σ_x and σ_y as shown in fig. 1, then determine stress σ_z and also strain $\in_{xx}, \in_{yy}$. **11**



SLR-EQ – 96

Seat No.	

M.E. (Mechanical – CAD/CAM) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – II : COMPUTER AIDED MANUFACTURING

Day and Date : Saturday, 17-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Q. No. **4** and Q. No. **8** are **compulsory**. Solve **any two** from remaining questions from **each** Section.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume suitable data **if required** and state **clearly**.*

SECTION – I

1. a) Explain the construction and role of a spindle in CNC machines. **5**
   b) Explain with the help of sketch principle of operation of CNC system. **5**
2. a) Explain thermal aspects of metal cutting. **5**
   b) Explain role of cutting fluid. **5**
3. a) Explain routine and canned cycle with example. **5**
   b) Explain cutter compensation and tool length compensation. **5**
4. Write short note on : **(5×3=15)**
   a) Effect of heat treatment on machining operations.
   b) Cutting tool material.
   c) ISO nomenclature of tools.

SECTION – II

5. a) Explain abrasive water jet machining process and state its advantages. **5**
   b) Explain working principle of wire cut EDM. **5**
6. a) Explain Laser machining process. **5**
   b) Explain process planning with suitable example. **5**
7. a) Explain CMM. **5**
   b) How CNC differs from conventional machine ? **5**
8. Write short note on : **(5×3=15)**
   a) CNC controller.
   b) Tool path generation.
   c) Importance of various types of fits.

SLR-EQ – 97

Seat No.	

M.E. Mechanical (CAD/CAM) (Semester – I) (CBCS/CGPA) Examination, 2016
FINITE ELEMENT ANALYSIS (Paper – III)

Day and Date : Monday, 19-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any three** questions from **each** Section.*
*2) Make suitable assumptions **if** necessary and state them clearly.*
*3) Figures to **right** indicate **full** marks.*
*4) **Use** of non programmable calculator is **allowed**.*

SECTION – I

1. a) Explain in brief consistence and lumped mass formulation. **6**

   b) Explain principle of minimum potential energy approach. **6**

2. a) Explain general procedure for finite element analysis. **5**

   b) Explain weighted residual approach applied to finite element analysis. **6**

3. a) Explain CST and LST elements. **5**

   b) Explain Hermite shape function of beam elements. **6**

4. Write short note on : **12**
   a) Principle of virtual work.
   b) Formulation of Isoparametric elements.

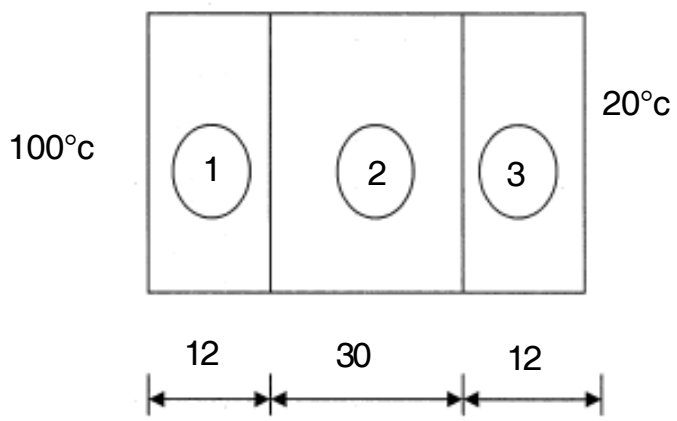
SECTION – II

5. a) Explain model validity and model accuracy using approximation of geometry and material property. **5**

   b) Explain refinement in finite element solution. **6**

P.T.O.

6. Using finite element method find temperature distribution and heat flow through composite wall as shown in figure. **12**



$K1 = 80*10^{-3}$ W/mm°c; $K2 = 0.8*10^{-3}$ W/mm°c; A = 1 mm^2

$K3 = 80*10^{-3}$ W/mm°c. All dimensions are in mm.

7. a) Explain plane stress, plain strain and axis symmetric elements. **5**

   b) Discuss in brief dynamic analysis in finite element method. **6**

8. Write short note on. **12**

   a) Software used in FEM.

   b) Transient Response Analysis.

SLR-EQ – 98

Seat No.	

M.E. (Mechanical) (CAD-CAM) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – IV : DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY

Day and Date : Wednesday, 21-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Make ***suitable*** *assumptions if* ***required****.*

SECTION – I

1. a) What is research ? Explain in detail the steps involved in research with flow chart. **9**

   b) What is different types of error in research ? Explain with suitable examples. **8**

2. a) What is literature review in research ? Explain its importance and methods. **9**

   b) What are types of data ? Explain sources of data collection. **8**

3. Write short notes on (**any three**) : **(3×6=18)**

   1) Types of research.

   2) Selection of samples.

   3) Creative problem solving method.

   4) Research design.

P.T.O.

SECTION – II

4. a) Explain concept of robust design with suitable example. **9**

   b) Explain Taguchi method in detail. **8**

5. a) What is two factor factorial design ? Explain with suitable examples. **9**

   b) Explain writing research paper for publication. **8**

6. Write short notes on (**any three**) : **(3×6=18)**

   1) Principles of thesis writing.

   2) Parametric and non-parametric tests.

   3) Analysis of variance.

   4) Concept of design of experiments.

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SLR-EQ – 104

Seat No.	

M.E. (Mech. – CAD/CAM) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : Elective – I : ADVANCED MATERIALS AND PROCESSING

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attend **any three** questions from **each** Section.*
*2) **Draw** neat sketches **wherever** necessary.*

SECTION – I

1. A) What are the important techniques used for manufacturing of fibers and foams ? **6**

   B) Explain the different types of composite materials with their use. **5**

2. A) Explain any one case study in detail with respect to selection of material in automobile application. **6**

   B) Explain in detail properties of nano materials and bio materials. **6**

3. A) What is heat treatment ? Explain the objectives of normalizing heat treatment. **6**

   B) Give classification of materials and compare ferrous and non ferrous alloys. **5**

4. Answer the following questions **(any three)** : **12**

   a) What are the applications of Thermosets and thermoplasts ?

   b) Write a note on semi conductors and super conductors.

   c) Compare between smart materials and shape memory alloys.

   d) What are the advantages of composite over other materials ? Enlist few applications.

   e) Write a note on polymers.

P.T.O.

SECTION – II

5. A) Explain the principle of operation of magnetic abrasive machining operation. **6**

   B) What is significance of MRR ? Explain the principle of theory of material removal rate. **5**

6. A) What is the principle of non conventional machining ? Explain advantages and disadvantages and applications of ultrasonic machining. **6**

   B) What are the advantages, limitations and applications of EDM process ? **5**

7. A) What are the merits and demerits of nontraditional manufacturing techniques over conventional processes ? **6**

   B) Discuss any one case study with respect to micro machining of automobile components. **6**

8. Write short notes on **any three** : **12**

   a) Types of prototypes.

   b) Electochemical machining.

   c) Physical vapour deposition technique.

   d) Stereolithography.

   e) Advanced rolling mills.

SLR-EQ – 105

Seat No.	

M.E. Mechanical (CAD/CAM) (Semester – II) Examination, 2016
(New-CBCS/CGPA)
Paper – VI : MANUFACTURING SYSTEM DESIGN

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume additional suitable data, if necessary and mention it **clearly**.*

SECTION – I

1. a) Explain the concept of product life cycle and system for planning new product. **10**

   b) What is rational decision making process and discuss the types of decision making ? **7**

2. a) Discuss the characteristics and basic attributes of a system. How will you define a system on the basis of its attributes ? **10**

   b) Discuss the basic system design approaches for large scale system design and total system approach. **7**

3. Write short notes on (**any three**). **(3×6=18)**

   1) Cost reduction at product design stage.

   2) Techniques for system optimization.

   3) Process planning, process and operation design.

   4) Multiproduct small batch production.

P.T.O.

SECTION – II

4. a) Discuss the automatic data collection systems with their applicability. **10**

   b) Discuss the various types of simulation models. What is the role of the probability in simulation experimentation ? **7**

5. a) Discuss the stages in the analysis of situation in the design approach for manufacturing system design. **9**

   b) What is the flexibilities possible with a flexible manufacturing system ? Discuss its components briefly. **8**

6. Write short notes on (**any three**). **(3×6=18)**

   1) Lean manufacturing versus agile manufacturing

   2) Group technology and cell layouts

   3) Simulation validity

   4) On line and off line data collection techniques.

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SLR-EQ – 106

Seat No.	

M.E. Mechanical (CAD/CAM) (Semester – II) Examination, 2016
(New – CBCS/CGPA)
PRODUCT LIFECYCLE MANAGEMENT (Paper – VII)

Day and Date : Friday, 9-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Question No.* ***1*** *is* ***compulsory****. Solve* ***any two*** *questions out of* ***remaining three*** *from Section –* ***I****.*

2) Solve ***any three*** *questions from Section –* ***II****.*

3) Make suitable assumptions ***if necessary****.*

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

SECTION – I

1. Considers press tool assembly having seven parts and elaborate following points.
   a) Concept generation
   b) Product engineering
   c) Product manufacturing
   d) Cost estimation

   Make suitable assumption such as demand processing time and cost element. **13**

2. a) Explain with a graph various stages of product – Life cycle. **6**

   b) Interpret the term change management for PLM. **5**

3. a) Explain in brief about characteristics and importance of PLC in the manufacturing industry. **6**

   b) Explain with one example product policy of an organization. **5**

4. a) What are the sources that help to identify a new product ? **6**

   b) Explain the functional and operational aspects of product design. **5**

P.T.O.

SECTION – II

5. a) Explain features of an intelligent and integrated manufacturing system. **6**

   b) Explain in brief about taguchi method with one example. **5**

6. a) Discuss in brief the method of deploying design for manufacturing (DFM). **6**

   b) What is FMECA ? Discuss its application with suitable example. **5**

7. a) Explain in detail the collaborative product development. **6**

   b) Explain the quality and reliability aspects of new product design. **5**

8. a) Define product modeling. Discuss the various types of product models. **7**

   b) What is product architecture ? Explain with suitable example. **6**

SLR-EQ – 107

Seat No.	

M.E. Mechanical (CAD/CAM) (Semester – II) (New – CBCS/CGPA) Examination, 2016
INDUSTRIAL AUTOMATION AND ROBOTICS (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Answer **any three** questions from **each** Section.*
2) Answers to both the Sections are to be written in a single answer book.
*3) Figures to the **right** indicate **full** marks.*
*4) Assume suitable data **if necessary** and mention it **clearly**.*
*5) Draw **neat** sketches/figures **wherever** necessary.*

SECTION – I

1. a) Discuss the basic elements of an automated system. Also briefly explain the levels of automation. **6**

   b) What are the reasons for automation ? Explain fixed, flexible and programmable automation. **6**

2. a) Explain in-line, segmented in-line, rotary configurations of automated production lines in detail. **6**

   b) What is a parts delivery system at the assembly work-head ? With the help of neat sketches explain vibratory bowl feeders, selectors, orientors used in automated assembly. **6**

3. a) Explain different types of assembly system configurations. **6**

   b) Drive the expression for line efficiency of two stage transfer line with storage buffer. **6**

4. Write short notes on **any two**. **11**
   a) Continuous and descrete control system.
   b) Vibratory feeding devices.
   c) Basic components of an industrial robot.

P.T.O.

SECTION – II

5. a) Discuss the dynamic properties of robots. **8**
   i) Stability
   ii) Control resolution
   iii) Accuracy
   iv) Spatial resolution
   v) Repeatability
   vi) Compliance.

   b) Explain the types of motion and path controls for robots. **4**

6. a) What is robotic compliance ? Explain active and passive compliance. **6**

   b) Explain motion interpolation and its types in robots **6**

7. a) What are the power transmission systems in robots ? **5**

   b) Explain various types of grippers. **7**

8. Write short notes **any two**. **11**
   a) Tactile sensor.
   b) Proximity sensors and their applications.
   c) Robotic actuators.

SLR-EQ – 108

Seat No.	

M.E. (Mechanical – CAD/CAM) (Semester – II) (New – CBCS/CGPA) Examination, 2016
OPTIMIZATION TECHNIQUES (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instruction *:* ***All*** *questions are* ***compulsory****.*

SECTION – I

1. Solve **any two** : **11**
   a) Multi-variable optimization techniques.
   b) Necessary and sufficient conditions.
   c) Lagrange Multipliers Method.

2. Solve **any two** : **(6×2=12)**
   a) Unrestricted Search Method
   b) Golden-section Method
   c) Quasi-Newton Method.

3. Solve **any two** : **(6×2=12)**
   a) Evolutionary Search Method
   b) Pattern Search Method
   c) Steepest Descent Method.

SECTION – II

4. Write note on Nine Principles of OPT and Five focusing steps of TOC. **11**
5. Write note on Exterior Penalty Method and Interior Penalty Method. **12**
6. Solve **any two** : **(6×2=12)**
   a) Neural Networks
   b) Genetic Algorithm
   c) Simulated Annealing.

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SLR-EQ – 113

Seat No.	

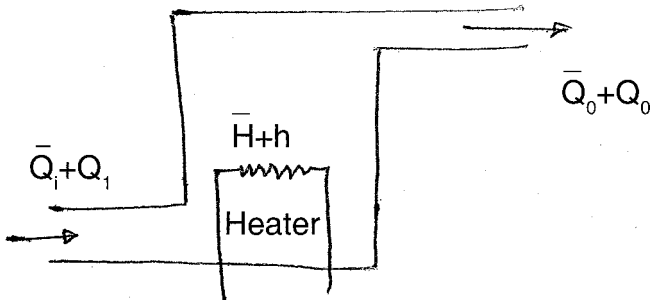
M.E. (Mech. – CAD/CAM) (Semester – II) (New – CBCS/CGPA) Examination, 2016
Elective – II : AUTOMATIC CONTROL ENGG. (Paper – X)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1) Answer **any five full** questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Make suitable assumptions, **if required** and state them **clearly**.*
*4) Use of Non-programmable calculator is **allowed**.*

1. a) Compare open loop and closed loop control system with appropriate examples. **4**

   b) Considering small deviations from steady-state operation, draw block diagram of the air heating system shown in fig. Assume that heat loss to the surrounding and heat capacitance of the metal ports of the heater are negligible. **10**



2. a) Describe PJD control action in detail. **6**

   b) Explain hydraulic servo-motor and draw the block diagram for the same. **8**

3. a) For a unity feedback control system, discuss steady state errors for the step input. **6**

   b) Explain disturbance in the forward path. **8**

P.T.O.

4. Write short notes on **(any three)** : **14**
   a) Laplace transform properties
   b) Thermal system
   c) Relative stability
   d) Optimal control system.

5. a) For bode plot, define the following terms : **6**
      a) Gain margin
      b) Phase margin
      c) Gain cross over frequency
      d) Phase cross over frequency.
   b) Sketch the bode plot for the system having **8**

$$G(s)\times H(s) = \frac{40s^2}{(s+2)(s+5)}$$, determine GM, PM and W_{gc}, W_{pc}.

6. a) The characteristics equation for the control system for an induction motor is

   $(s+2)\ (s+4)\ (s+a) + k = 0$

   To achieve good dynamic behavior, it is derived that the damping ratio $\xi = 0.5$ and natural frequency $W_n = 4$, Determine a and k. **8**

   b) Explain the following terms related to root locus plots :
      i) Asymptotes
      ii) Centroid. **6**

7. a) Explain phase lead compensator and derive the expression for the transfer function of a phase lead compensator. **7**
   b) Explain any four theorems of z-transforms. **7**

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SLR-EQ – 114

Seat No.	

M.E. Mechanical (CAD/CAM) (Semester – II) (Elective – II) Examination, 2016
(New – CBCS/CGPA)
Paper – X : CAD/CAM/CAE PRACTICES IN METAL FORMING

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Assume** additional suitable data, if necessary and mention it **clearly**.*

SECTION – I

1. a) Define stress, strain and strain rate. Explain the strain hardening. **9**
   b) Enumerate the different methods of analysis. Explain the Hills General Method. **8**

2. a) Write the classification of metal forming processes and describe the metal forming processes. **10**
   b) Explain the hot extrusion of rods and shapes in metal forming. **7**

3. Write short notes on (**any three**) : **(3×6=18)**
   1) Solid formulation and hollow formation.
   2) Impression and closed die forging.
   3) Yield criteria.
   4) Castability of non-ferrous metals.

SECTION – II

4. a) What is boundary condition ? Explain the significance of boundary condition in FEM. **9**
   b) "Die design is important in Axi-symmetric isothermal forging". Discuss. **8**

5. a) Explain the scope of FEA in metal casting. **9**
   b) Describe the multi pass bar drawing and extrusion. **8**

6. Write short notes on (**any three**) : **(3×6=18)**
   1) Closed die forging with flash.
   2) In-plane deformation process.
   3) Square-cup drawing process.
   4) Time investment and geometry updating.

SLR-EQ – 116

Seat No.	

M.E. (Mech. Engg.) (Semester – I) (CBCS/CGPA) Examination, 2016
COMPUTATIONAL TECHNIQUES IN DESIGN ENGINEERING (Paper – I)

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt* ***any two*** *questions from* ***each*** *Section.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***if necessary****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

1. a) Apply Bessel's formula to obtain y_{25}, given $y_{20} = 2854$, $y_{24} = 3162$, $y_{28} = 3544$, $y_{32} = 3992$. **8**

   b) Compute the distance covered in 20 minutes if the velocity v(km/min.) of a moped which starts from rest, is given at fixed intervals of time t (min.) as follows. **6**

t :	2	4	6	8	10	12	14	16	18	20
v :	10	18	25	29	32	20	11	5	2	0

   c) Explain errors in numerical calculations. **4**

2. a) Using Jacobi's method, find all eigen values and eigen vectors of the matrix. **8**

$$A = \begin{bmatrix} 1 & 1 & 0.5 \\ 1 & 1 & 0.25 \\ 0.5 & 0.25 & 2 \end{bmatrix}$$

   b) Fit a curve of the form $y = ae^{bx}$ to the following data : **9**

x :	0	1	2	3
y :	1.05	2.10	3.85	8.30

P.T.O.

3. a) Solve the equations, $27x + 6y - z = 85$, $x + y + 54z = 110$, $6x + 15y + 2z = 72$ by Gauss-Jacobi and Gauss Seidal method. **10**

   b) Derive trapezoidal formula for numerical integration. **7**

SECTION – II

4. a) Find the value of y for $x = 0.1$ by Picard's method given that

   $\frac{dy}{dx} = \frac{y - x}{y + x}$, $y(0) = 1$. **8**

   b) If $\frac{dy}{dx} = 2e^x y$, $y(0) = 2$, find y(4) using Adams y(1), y(2) and y(3) using Euler's modified formula. **10**

5. a) Explain history of finite element method. **6**

   b) Explain importance of mathematical modeling. **6**

   c) Explain 5 point standard formula and 5 point diagonal formula with figures. **5**

6. a) Solve $U_{xx} + U_{yy} = 0$ over square mesh of side 4 units, satisfying the following boundary conditions : **10**

   i) $u(0, y) = 0$, for $0 \le y \le 4$

   ii) $u(4, y) = 12 + y$, for $0 \le y \le 4$

   iii) $u(x, 0) = 3x$, for $0 \le x \le 4$

   iv) $u(x, 4) = x^2$, for $0 \le x \le 4$.

   b) Using Crank-Nicholson's scheme, solve the parabolic equation, $U_{xx} = 16U_t$, $0 < x < 1$, $t > 0$ given $u(x, 0) = 0$, $u(0, t) = 0$, $u(1, t) = 100t$. **7**

SLR-EQ – 117

Seat No.	

M.E. Mechanical Engineering (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – II : INDUSTRIAL INSTRUMENTATION

Day and Date : Saturday, 17-12-2016 Max. Marks : 70
Time: 11.00. a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Draw **neat** sketches **wherever** necessary.*

SECTION – I

1. a) Define calibration and explain different types of calibration. **6**

   b) Define the following : **6**
   i) Time Lag ii) Dead Zone iii) Fidelity.

2. a) Derive an expression for output response of second order system to a step input. **6**

   b) Explain different signal conditioning operations. **5**

3. a) Explain variable inductance transducer for linear and rotary motion. **6**

   b) Explain pneumatic and optical amplifying element. **5**

4. Write short notes on **any three** : **(3×4=12)**
   i) Pneumatic Load Cell.
   ii) Belt Dynamometer.
   iii) Potentiometric type A-D converter.
   iv) Electrodynamic transducer.

P.T.O.

SECTION – II

5. a) Explain high pressure measurement. **6**

   b) Explain variable area flow meter. **6**

6. a) Explain sound intensity level and addition of sound pressure levels. **6**

   b) Explain frequency analysis by transient testing. **5**

7. a) Explain time compression analyzer. **6**

   b) Explain wear behavior monitoring. **5**

8. Write short notes on **(any three)** : **(4×3=12)**

   i) Random Force Testing.

   ii) Capacitor type microphone.

   iii) Seeback effect and Peltier effect.

   iv) Pirani Gauge.

SLR-EQ – 118

Seat No.	

M.E. (Mechanical) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – III : SOLID MECHANICS

Day and Date : Monday, 19-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Assume** necessary suitable data, **if required**.*

SECTION – I

1. a) What are the assumptions made in theory of elasticity ? **4**

   b) Derive the equation of equilibrium in Cartesian co-ordinates for a plane stress problem. **8**

2. Investigate what problem is solved by the stress function ϕ applied to the region included by y = $\pm$c and x = 0 to x = 1. **11**

   $$\phi = \frac{3F}{4C}\left(xy - \frac{xy^3}{3C^2}\right) + \frac{P}{2}y^2 .$$

3. Derive the equation of compatibility in terms of stress components for a plane stress problem in polar co-ordinates. **11**

4. Write a note on **any two** of the following : **12**

   i) Relation between E, μ and G.

   ii) Airy's stress function.

   iii) Saint Venant's principle.

P.T.O.

SECTION – II

5. a) Define shear centre and explain the principles used in finding the shear centre. **4**

   b) Find the shear centre for the cross section having uniform thickness 5 mm as shown in Fig. 1. **7**

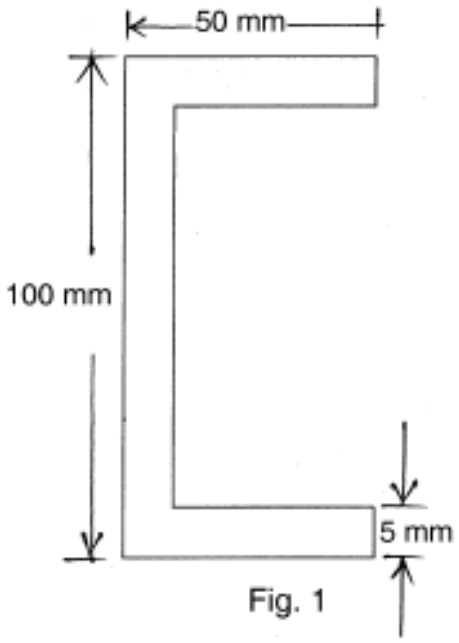

Fig. 1

6. a) Explain torsion of hallow shafts. **4**

   b) Find the membrane stresses in partially filled storage tank. **7**

7. a) State and explain basic assumptions made in theory of contact stresses. **4**

   b) Derive expression for area of contact and pressure distribution in case of contact between two spheres. **8**

8. Write a note on **any two** of the following : **12**

   i) Shell of Uniform strength

   ii) Membrane stresses

   iii) Contact stresses in ball bearing.

SLR-EQ – 119

Seat No.	

M.E. (Mechanical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – IV : DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY

Day and Date : Wednesday, 21-12-2016 Max. Marks : 70
Time: 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data **wherever** necessary and state it **clearly**.*

SECTION – I

1. a) Define research. Explain the objectives of research. **5**

   b) Explain steps involved in research using flowchart. **6**

2. a) Explain the data collection methods with examples. **6**

   b) How experimental design is done ? Give examples. **5**

3. a) Explain the relationship between modeling and simulation. **6**

   b) What are blocking and nuisance factors for Experimental Modeling. **6**

4. Write a short note on following (**any 3**) : **(3×4=12)**

   a) Controllable and uncontrollable variables

   b) Check list for good report

   c) Problems encountered by researchers in India

   d) Literature review

   e) Fuzzy theory.

P.T.O.

SECTION – II

5. a) Give the importance of softwares for research work. **6**

   b) Explain need of writing abstract in report. **6**

6. a) Write a note on layout of research report. **6**

   b) What is collective creativity ? Explain. **5**

7. a) Explain Convergent Vs Divergent thinking. **6**

   b) Explain Data processing and analysis. **6**

8. Write a short note on the followings (**any 3**) : **(3×4=12)**

   a) Style of writing report

   b) Use of computational tools

   c) Testing adequacy of model

   d) Normal distribution

   e) Importance and parameters of review paper.

SLR-EQ – 122

Seat No.	

M.E. (Mechanical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : RELIABILITY ENGINEERING (Elective – I)

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Note** : 1) **All** questions are **compulsory**.*
*2) Assume **suitable** data if necessary.*
*3) Figure to **right** indicates marks.*

SECTION – I

1. A) What are the three mathematical approaches for obtaining an item's mean time to failure ? **5**

   B) A jet engine consists of five modules each of which was found to have a Weibull failure distribution with a shape parameter of 1.5. Their scale parameters (characteristics life) are (in operating cycles) 3600, 7200, 5850, 4780 and 9300. Find the MTTF and median time to failure of the engine. **6**

2. A) A company supplies a box of 50 condensers of which five defective units get mixed up due to an error. If four items are drawn with replacement, what is the probability of
   1) Getting exactly 2 defective condensers ?
   2) Getting atleast 2 defective condensers ?
   3) Getting at the most 2 defective condensers ? **6**

   B) In order to determine the tensile strength of the material of a supply of connecting rods, samples of tensile specimens were prepared and tests conducted. The results showed a normal distribution with a mean tensile strength of 310 Mpa and a standard deviation of 34.5 Mpa. If the consignment involved 300 connecting rods, estimate
   1) How many connecting rods can be expected to have a strength less than 275 Mpa, and
   2) How many connecting rods can be expected to have a strength between 275 Mpa and 410 Mpa ? Use data if needed for $(z = -1.01) = 0.1562$ and $(z = +2.9) = 0.9981$. **6**

P.T.O.

3. Write short note (**any three**) : **(4×3=12)**
   1) Compare FMEA with FTA.
   2) Lognormal distribution used in reliability.
   3) Cause and effect diagram.
   4) Boolean Algebra Laws and Probability Properties.

SECTION – II

4. A) Describe the steps associated with the RCM process. **5**
   B) Explain Fault Tree Analysis (FTA) with suitable example. **6**

5. A) Assume that a system is composed of five independent and identical subsystems in series. The constant failure rate of each subsystem is 0.0025 failures per hour. Calculate (1) Reliability of the system for a 50-hour mission (2) The system Mean Time to Failure (MTTF). **6**
   B) Discuss reliability allocation and its benefits. **6**

6. Write short note (**any three**) : **(4×3=12)**
   1) Advantages of the delta-star method.
   2) Assumptions associated with the Markov method.
   3) Loss function concept.
   4) Reliability life testing.

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SLR-EQ – 123

Seat No.	

M.E. (Mechanical-Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : Elective – I : FINITE ELEMENT METHOD

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*
*2) Make suitable assumptions **if necessary** and state them **clearly**.*

SECTION – I

1. a) Explain steps involved in finite element Method. **6**

   b) Compare finite element method and exact solution. **6**

2. a) Explain weighted residual approach applied to finite element analysis. **6**

   b) Explain in brief consistence and lumped mass formulation. **5**

3. a) Using potential energy method to derive the element stiffness matrix and element equation for a truss element. **6**

   b) Explain static analysis for one dimensional bar element under time dependent loads. **5**

4. Write short note on : **12**

   a) Principal of virtual work

   b) Formulation of Iso-parametric elements.

SECTION – II

5. a) Using Lagrangian Polynomial find shape function for two noded and three noded bar element. Plot the variation of shape function. **6**

   b) Explain finite element analysis of composite material with suitable example. **6**

P.T.O.

6. a) Explain refinement in finite element solution. **6**

   b) Describe properties of 1-D, 2-D and 3-D elements. **5**

7. a) Discuss in brief dynamic analysis with the help of spring dash pot element in finite element method. **6**

   b) Explain plane stress, plain strain and axis symmetric elements. **5**

8. Write short note on : **12**

   a) Software used in FEM

   b) Frequency Analysis.

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SLR-EQ – 124

Seat No.	

M.E. (Mechanical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
SYNTHESIS AND ANALYSIS OF MECHANISMS AND MACHINES
(Elective – I) (Paper – V)

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from* ***each*** *Section.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***if necessary*** *and mention it* ***clearly****.*
4) Use non programmable calculators is ***allowed****.*

SECTION – I

1. a) Explain Kutzbach and Grubler criteria. **4**

   b) A bar mechanism is to be designed to generate the function $y = x^{1.8}$ for an interval in x from 1 to 5. The input link is to start from 315° and is to range of 90°, the output link is to start from 20° and is to have a range of 70°. Use three point Chebyshev spacing by algebraic method. **8**

2. a) Explain cam and follower synthesis by three accuracy point. **6**

   b) Explain Algebraic method of synthesis using complex number. **6**

3. a) Explain pole triangle. **6**

   b) Explain the procedure to find circle point and circle point curves. **6**

4. Write notes on the following : **11**

   a) Task of kinematic synthesis.

   b) Roberts-Chebyshev theorem.

P.T.O.

SECTION – II

5. a) Explain the symmetrical coupler curve. **6**

   b) Discuss the concept of Denavit-Harternberg parameters and their use in the study of spatial mechanism. **6**

6. a) Explain crank follower synthesis of five accuracy point. **6**

   b) Derive Euler-Savary equation for a four-bar linkage. **6**

7. a) Explain cubic of stationary curvature. **6**

   b) Explain Bobillier construction. **6**

8. Write notes on the following : **11**

   a) Computer Added design of mechanism used in synthesis.

   b) Denavit-Harternberg Parameter.

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SLR-EQ – 125

Seat No.	

M.E. Mechanical Engineering (Semester – II) Examination, 2016
(New CBCS/CGPA)
DESIGN ENGINEERING (Paper – VI)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Solve **any three** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume necessary data **if required** and state it **clearly**.*

SECTION – I

1. a) Derive an expression for a response of a single degree of freedom cam and follower system subjected to a ramp input. **6**

   b) Compare the kinematics of SHM and Cycloidal motion cam with the help of SVAJ diagrams. **6**

2. Synthesize a double dwell 4-5-6-7 polynomial cam for the following data. Plot SVAJ diagram and comment on it. **11**

   Dwell at zero displacement for 90°

   Rise of 30 mm for 90°

   Dwell at 30 mm for 90°

   Fall of 30 mm in 90°

   Angular velocity of cam is 10π rad/sec.

3. a) Explain with neat sketches the resultant stresses of combined thermal and working stresses for pressure vessel. **6**

   b) What is thermal stresses ? Derive an expression for thermal stresses in long and hollow cylinder. **5**

P.T.O.

4. Write short notes on : **12**

   a) Form design

   b) Design of speed reducers

   c) Cumulative fatigue.

SECTION – II

5. a) Derive the expression : $Z(t)\, R(t) = f(t)$. **6**

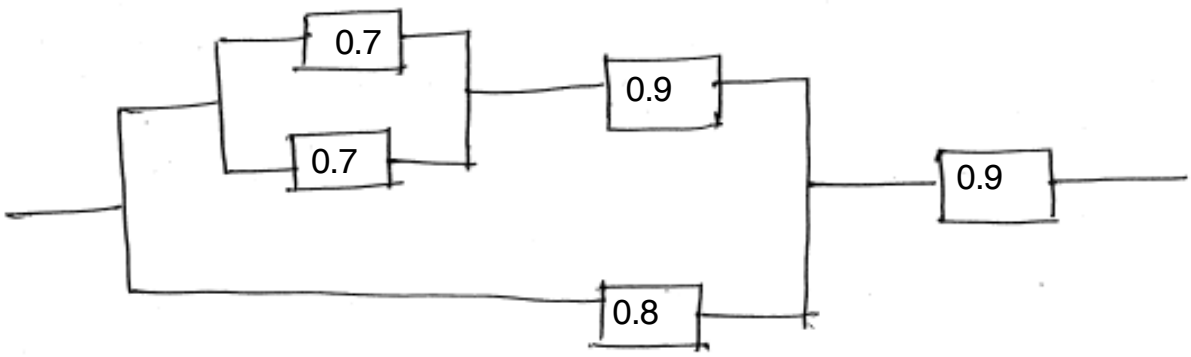
   b) A hard plastic box designed to house a multimeter is tested for its impact strength by dropping it from a fixed height and observing for any damage. A total of 500 boxes were tested and the results are tabulated as follows : **6**

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

   Determine : i) Failure density, ii) Hazard rate, iii) Reliability.

6. a) Explain the significance of bath tub curve in reliability analysis. **4**

   b) Calculate the reliabilities of the system as shown in the fig. **7**



7. a) Derive the expression for deflection slope and moment for infinitely long beam on elastic foundation subjected to single concentrated load. **6**

   b) Describe the discontinuity stresses in cylindrical pressure vessels with ellipsoidal head. **5**

8. Write short notes on : **12**

   a) Exponential creep law

   b) Spring back and shape factor in plastic bending

   c) Rayleigh distribution.

SLR-EQ – 126

Seat No.	

M.E. (Mechanical Engg.) (Semester – II) (CBCS/CGPA) Examination, 2016
Paper – VII : THEORY AND ANALYSIS OF COMPOSITE MATERIALS (New)

Day and Date : Friday, 9-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Solve **any two** questions from **each** Section.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume suitable data if **necessary** and mention it **clearly**.*

SECTION – I

1. a) Explain classification and characteristics of composite materials. **9**
   b) List out the applications of composite materials with suitable examples. **8**

2. a) Explain stress-strain relations for anisotropic materials. **9**
   b) What is stiffness ? Explain comparison of approaches to stiffness. **8**

3. Write short notes on (**any three**) : **(3×6=18)**
   1) Basic terminology of fiber-reinforced composite material.
   2) Strengths of an orthotropic lamina.
   3) Elasticity approach to stiffness.
   4) Maximum stress theory.

SECTION – II

4. a) Explain classical lamination theory. **9**
   b) Discuss mechanics of materials approach to strength. **8**

5. a) What is bending ? Explain governing equations for bending. **9**
   b) Explain basic principles of fracture mechanics. **8**

6. Write short note on (**any three**) : **(3×6=18)**
   1) Inter-laminar stresses.
   2) Buckling of laminated plates.
   3) Effect of discontinuity in laminates.
   4) Design of composite structures.

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SLR-EQ – 127

Seat No.	

M.E. Mechanical Engg. (Semester – II) (New CBCS/CGPA)
Examination, 2016
MECHATRONICS SYSTEM DESIGN (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Note** : 1) Answer **any five full** questions.*
*2) Draw meaningful sketches **wherever** necessary in **pencil** only.*
*3) Figures to **right** indicate **full** marks.*
*4) Make suitable assumptions, if required and state them **clearly**.*

1. a) Describe briefly hydraulic actuation systems. **7**
   b) Explain the basic internal structure of a PLC. **7**

2. a) With appropriate example, explain sequencing in PLC. **7**
   b) Compare Microprocessor with Microcontroller. **7**

3. a) Explain the basic elements of a closed loop control system with suitable example. **7**
   b) Explain :
      i) Proximity switches
      ii) Optical encoders. **7**

4. a) Describe the elements of data acquisition and control system. **7**
   b) Describe overframing. **7**

5. a) Describe the factors to be considered while selecting a sensor for a particular application. **7**
   b) Write a short note on Digital Signal Processing. **7**

P.T.O.

6. Write short notes on the following : **14**
   i) Micro-sensors in Mechatronics
   ii) Fuzzy logic applications in Mechatronics
   iii) Mechatronic monitoring system for a machine tool.

7. Write notes on the following : **14**
   i) Modes of control
   ii) Internal relays in PLC
   iii) Mechatronic system design steps.

8. Describe, in details, any one diagnostic application of PLC. **14**

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SLR-EQ – 128

Seat No.	

M.E. (Mechanical Engineering) (Semester – II) Examination, 2016
(New – CBCS/CGPA)
INDUSTRIAL PRODUCT DESIGN (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: i) Attempt* ***any five*** *questions from the following.*
ii) Figures to the ***right*** *indicate* ***full*** *marks.*
iii) Support the answers by ***neat*** *sketches* ***wherever*** *necessary.*

1. a) Explain the concept of Industrial Design. **7**
   b) Explain maintainability considerations in product design. **7**

2. a) Discuss the ergonomic aspect of design of machine tools. **7**
   b) Explain the process of setting specifications of a product. **7**

3. a) Discuss effect of color with reference to ergonomics of consumer products. **7**
   b) Explain standard and legal requirements of a consumer product. **7**

4. a) Explain the concept of unity and order with variety. **7**
   b) Explain influence of line and form with reference to aesthetics of a product. **7**

5. a) Explain value analysis and cost reduction. **7**
   b) Write a note on 'Design for production'. **7**

6. a) Explain use of modeling technique in product design. **7**
   b) Write a note on quality considerations in product design. **7**

7. a) Write a note on 'Drawing office procedure'. **7**
   b) Write a note on expressions of symmetry. **7**

SLR-EQ – 130

Seat No.	

M.E. (Mechanical Engg.) (Semester – II) (New) (CBCS/CGPA) Examination, 2016
Paper – X : MATERIAL HANDLING EQUIPMENT DESIGN (Elective – II)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer* ***any three*** *questions from Section* ***I*** *and* ***any three*** *questions from Section* ***II****.*
2) Make suitable assumptions if required and state them ***clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Draw ***neat*** *sketches, block diagram, flow charts etc.* ***wherever*** *necessary.*

SECTION – I

1. a) Discuss the objectives of material handling system. Explain its classification. **6**
   b) Explain the concept of stability and structural analysis of material handling equipment. **5**

2. Discuss types, design considerations of various types of cranes used in material handling. **12**

3. Discuss the construction, working and below mentioned parameters for
   a) Vibrating conveyor
   b) Screw conveyor

   Parameters to be covered size, speed, power requirement, capacity, advantages and limitations. **12**

4. a) Describe scope and importance of material handling in Foundry shop. **6**
   b) Explain relationship of packaging with material handling. **5**

P.T.O.

SECTION – II

5. Give detailed design steps for following elements of EOT crane (any four). Assume suitable capacity, height, travel on cross beam and other required data.
   a) Hook design.
   b) Wire rope design.
   c) Pulley design.
   d) Cross beam.
   e) Rope drum **12**

6. a) Explain system concept in material handling. **6**
   b) Discuss failure analysis of material handling system. **5**

7. a) Explain steps for solving material handling problem. **6**
   b) How material handling contributes to productivity ? Explain. **5**

8. Write note on (**any 3**) : **12**
   a) Roller conveyors.
   b) Systematic layout planning.
   c) Material handling and safety.
   d) Fork lift truck.

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SLR-EQ – 132

Seat No.	

M.E. (Mechanical Engg.) (Semester – II) (New) (CBCS/CGPA) Examination, 2016
Elective – II : ROBOTICS (Paper – X)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer* ***any five full*** *questions.*
2) Draw meaningful sketches ***wherever*** *necessary in pencil* ***only****.*
3) Figures to ***right*** *indicate* ***full*** *marks.*
4) Make suitable assumptions, ***if*** *required and state them* ***clearly****.*

1. a) What is homogenous transformation of coordinates ? Write homogenous transformation matrices for translation followed by rotation. **7**

   b) Discuss the various inputs to an inverse kinematics algorithm. Explain the functioning of an inverse kinematic algorithm. **7**

2. a) Discuss the relative merits and demerits of different textual robot languages. Explain the different program instructions. **7**

   b) Enumerate the non-manufacturing areas where robots are expected to be used. Discuss robot application for welding and machine loading. **7**

3. a) With the aid of a sketch describe the specifications of degrees of freedom required on a robot wrist to be used in painting applications. **7**

   b) Explain and justify, in which type of production, robots are preferred for loading and unloading function. **7**

4. a) Explain the working of hydraulic actuator system. Discuss the advantages and disadvantages of different types of actuators. **7**

   b) Explain the working of magnetic grippers used for robots. **7**

P.T.O.

5. a) Define a robot. Discuss the various types of joints used in robots. **7**

   b) Sketch and explain the typical configuration and degrees of freedom of wrist assembly. Discuss the various generations of robots. **7**

6. a) What are the basic components of a robotic system ? Explain the functions of each of the components with a neat sketch. **7**

   b) Discuss various mechanical design considerations of robots. **7**

7. a) Describe robot vision. Describe a vision sensor used to take the image of an object. **7**

   b) Explain, in details, the working of proximity and range sensors. **7**

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SLR-EQ – 134

Seat No.	

M.E. (Mechanical – Manufacturing Process Engg.) (Semester – I)
(CBCS/CGPA) Examination, 2016
Paper – I : ADVANCED MANUFACTURING TECHNIQUES – I

Day and Date : Thursday, 15-12-2016 Max.Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Solve **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume additional suitable data, **if** necessary and mention it **clearly**.*

SECTION – I

1. a) What are the applications and special features of AFM ? Explain with neat sketch. **10**
   b) Discuss the WJM in detail. **7**
2. a) List the various NDT processes and explain ultrasonic NDT test in detail. **10**
   b) Explain the atomic emission spectrometer. **7**
3. Write short notes on **(any three)** : **(3×6=18)**
   1) Submerged Arc Welding.
   2) ECG.
   3) Chemical Machining.
   4) HAZ in welding.

SECTION – II

4. a) Explain sterolithography in detail. **10**
   b) Explain product development cycle. **7**
5. a) Explain plasma spraying. **9**
   b) Discuss the Electroless Technology. **8**
6. Write short notes on (**any three**) : **(3×6=18)**
   1) CVD.
   2) Precision blanking.
   3) Press Brake Deep Drawing.
   4) Epoxy coating.

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SLR-EQ – 135

Seat No.	

M.E. Mech. Manufacturing Process Engg. (Semester – I)
(CGPA Pattern / CBCS) Examination, 2016
Paper – II : ELECTRO PHYSICAL PROCESSES

Day and Date : Saturday, 17-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Answer **any five full** questions.*
*2) Draw meaningful sketches **wherever** necessary in **pencil** only.*
*3) Figures to **right** indicate **full** marks.*
*4) Make suitable assumptions, **if** required and state them **clearly**.*

1. a) Describe electrochemical discharge machining with a neat sketch stating its principle. **9**

   b) Discuss the functions and characteristics of an electrolyte used in ECM process. **5**

2. a) Write a note on : Future trends of Spark Machining. **7**

   b) Describe electrode feed control used in EDM. **7**

3. a) Compare Modern Machining Processes as per their process capabilities. **7**

   b) Explain various applications of Modern Machining Processes. **7**

4. Write short notes on (**any three**) : **14**

   a) Stray cutting in EDM

   b) Application of LASER in micromachining

   c) Wire EDM

   d) Process capabilities of EBM.

5. a) Describe various applications, advantages and limitations of AJM. **8**

   b) Describe design of nozzle in AJM. **6**

P.T.O.

6. a) In EDM, discuss the effect of :

   i) Charging resistance ;

   ii) Gap setting ;

   iii) Capacitance on MRR. Employing R-C realization circuit. **7**

   b) Explain the process capabilities and limitations of LBM. **7**

7. Derive the MRR relation in USM as suggested by Cook. **14**

SLR-EQ – 136

Seat No.	

M.E. Mechanical (Manufacturing Process) (Semester – I) (CGPA/CBCS) Examination, 2016

Paper – III : COMPUTER AIDED MANUFACTURING

Day and Date : Monday, 19-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt* ***any five*** *questions.*
2) Assume suitable data ***wherever*** *necessary and state it* ***clearly****.*
3) Draw appropriate sketches ***wherever*** *required.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

1. a) What is Process Capability Index ? Explain with suitable example. **7**
   b) Briefly explain Concurrent Engineering approach. **7**

2. a) Explain parts classification and coding system. **7**
   b) Explain the role of AS/RS and AGV for automated manufacturing system. **7**

3. a) Explain how GT cells is different from Process Layout. **7**
   b) Explain FMS types and FMS flexibilities. **7**

4. a) What is canned cycle ? Explain any two drilling canned cycles with their syntax. **7**
   b) Compare NC and CNC machines. **7**

5. a) What is the importance of Group Technology in CAPP ? Explain. **7**
   b) Explain objectives of Cellular Manufacturing and what is composite part concept. **7**

6. a) Explain e-manufacturing. **7**
   b) What is Production Flow Analysis ? Explain. **7**

7. a) Compare elaborately MRP and ERP. **7**
   b) Describe Shop Floor Control. **7**

SLR-EQ – 137

Seat No.	

M.E. Mechanical (Mfg. Process Engg.) (Semester – I) Examination, 2016
(CBCS/CGPA)
RELIABILITY AND TEROTECHNOLOGY (Paper – IV)

Day and Date : Wednesday, 21-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Note** : 1) Answer **any five full** questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of nonprogrammable calculator is **allowed**.*
*4) Make suitable assumptions **whenever** necessary and state it clearly.*

1. a) How the operational availability is different from inherent availability ? **6**

   b) If an inherent availability of system is 0.95 when MTBF is 150 hours, what will be the maximum value of MTTR ? Assuming logistic time for administrative support as 40% of total down time and operational availability. **8**

2. a) Explain in detail Ferro-graphic technique for monitoring the schedule of predictive preventive maintenance. **6**

   b) Following table shows the results of life tests carried out on 400 components simultaneously. Evaluate hazard rate, failure density function and reliability of these functions. **8**

Operating Time (Years)	0	1	2	3	4	5
Number of Surviving Components	400	350	320	240	170	80

3. a) Explain the meaning and significance of Terotechnology referring its various objectives and techniques involved. **6**

   b) A system consisting of four sub-systems has a reliability level of 0.95 for 10 hours mission time of continuous operation. Sub-systems 1 and 3 are essential for successful operation of the system and their importance factor is 1.00. Sub-system 2 has to work for 9 hours operation of the system and its importance factor is 0.95. Sub-system 4 has to work for 8 hours operation of

the system and its importance factor is 0.90. Allocate the reliability by AGREE method by using the following table. **8**

Sr. No. Components (i)	No. of Component Modules (ni)
1	15
2	25
3	100
4	70

4. a) What are the basic aims of Total Predictive Maintenance (TPM) and how does its practice differ from that of terotechnology ? **6**

   b) The following short sample test refers to an accelerated lie testing of a system. **8**

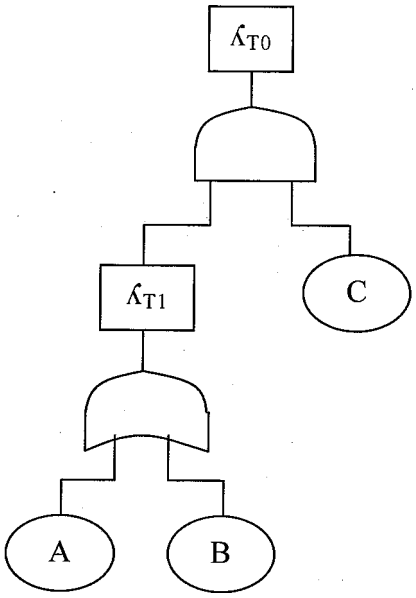
Failure No.	1	2	3	4	5	6
Operating Hours	25	8	12	18	15	20

   Plot the variation of Reliability against time by :

   i) Mean and ii) Median Ranking method.

5. a) Discuss the method of allocations of reliabilities of various components of a system using ARNIC method. State the assumptions used. **6**

   b) A logical gate diagram for FMEA study has been shown in fig. 2. The basic failure modes of A, B and C have failure rates 0.002, 0.003 and 0.004 per hour respectively. Find out the failure rate of T_0. Assume mission time of 100 hrs. **8**



6. Write short notes on the following (**any two**) : **(2×7=14)**
   a) Different types of probability distribution curves
   b) Different types of maintenance
   c) Fault-Tree analysis.

SLR-EQ – 139

Seat No.	

M.E. Mechanical (Mfg. Process Engg.) (Semester – I) Examination, 2016
DESIGN FOR MANUFACTURING (CBCS/CGPA)
(Paper – V) (Elective – I)

Day and Date : Friday, 23-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Note** : 1) Answer **any five full** questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) Make suitable assumptions **whenever** necessary and state it **clearly**.*

1. Discuss design for sheet metal working in brief. **14**

2. What is product life cycle ? Explain expanded product life cycle. **14**

3. How the product development is carried out ? Explain it by taking a suitable example. **14**

4. Explain in detail guidelines for DFA. **14**

5. What is Failure Mode Effect Analysis ? Discuss it by taking a appropriate example. **14**

6. How the material is selected for product development ? Discuss concurrent and sequential engineering. **14**

7. Discuss AHP and its importance. **14**

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SLR-EQ – 140

Seat No.	

M.E. (Mechanical – Manufacturing Process) (Semester – I) Examination, 2016
(CBCS/CGPA Pattern)
Paper – V : MANAGEMENT OF TECHNOLOGY (Elective – I)

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt **any five** questions.*
*2) **Assume** suitable data **wherever** necessary and state it **clearly**.*
*3) **Draw** appropriate sketches **wherever** required.*
*4) Figures to the **right** indicate **full** marks.*

1. Give detailed classification of technologies. **14**
2. What is technology ? Give details in terms of definition, meaning, requirement and characteristics. **14**
3. Describe technology forecasting with suitable examples. **14**
4. What are the various phases of Hype Cycle ? How they are relevant in MoT ? **14**
5. Write a note on technological environment changes. **14**
6. Explain, in details, the levels of technology transfer. **14**

SLR-EQ – 142

Seat No.	

M.E. (Mechanical – Manufacturing Process Engg.) (Semester – II) Examination, 2016
(CBCS/CGPA)
Paper – VI : ADVANCED MANUFACTURING TECHNIQUE – II (New)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Solve **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Assume** additional suitable data, if necessary and mention **it clearly**.*

SECTION – I

1. a) What are the applications and special features of Full Mould Casting ? Explain with neat sketch. **10**

   b) Discuss the Lapping in detail. **7**

2. a) Explain in detail Deburring Process. **10**

   b) Explain the Solidification process in casting. **7**

3. Write short notes on **(any three)** : **(3×6=18)**

   1) Burnishing

   2) Investment mould casting

   3) Die Continuous Casting

   4) Superfinishing.

P.T.O.

SECTION – II

4. a) Explain HERF in detail. **10**

   b) Explain Blow Moulding. **7**

5. a) Explain isostatic moulding. **9**

   b) Discuss Transfer moulding. **8**

6. Write short notes on **(any three)** : **(3×6=18)**

   1) Methods of powder production

   2) Explosive Forming

   3) Honing

   4) Solid Phase Welding.

SLR-EQ – 143

Seat No.	

M.E. Mechanical (Manufacturing Process) (Sem. – II)
(New – CBCS/CGPA) Examination, 2016
ROBOTICS AND ROBOT APPLICATIONS (Paper – VII)

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer* ***any five*** *full questions.*
2) Draw meaningful sketches ***wherever*** *necessary in pencil only.*
3) Figures to ***right*** *indicate* ***full*** *marks.*
4) Make suitable assumptions, if required and state them ***clearly****.*

1. a) Describe hydraulic drives used in robots. **7**
   b) Explain working of magnetic grippers. **7**

2. a) Explain the important design considerations for a gripper. **7**
   b) Describe the working of gear operated grippers used in industrial robots. **7**

3. Describe elaborately various force control methods in robot manipulators. **14**

4. Explain, in details, a mechanical gripper. Describe two ways of constraining the part in a gripper. **14**

5. a) Explain which work characteristics promote application of robots. Explain robot application for assembly and inspection. **7**
   b) Discuss common software elements of a robot. Explain motion programming of a robot. **7**

6. a) Describe the advantages and limitations of robot programming languages. **7**
   b) Describe various degrees of freedom associated with the following robots :
      i) GANTRY Robot ii) SCARA Robot. **7**

7. a) Describe various features of precision of movement. **7**
   b) Explain spatial resolution. **7**

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SLR-EQ – 144

Seat No.	

M.E. Mechanical (Mfg Process Engg.) (Semester – II) Examination, 2016
(New-CBCS/CGPA)
Paper – VIII : MANUFACTURING PROCESS MODELLING

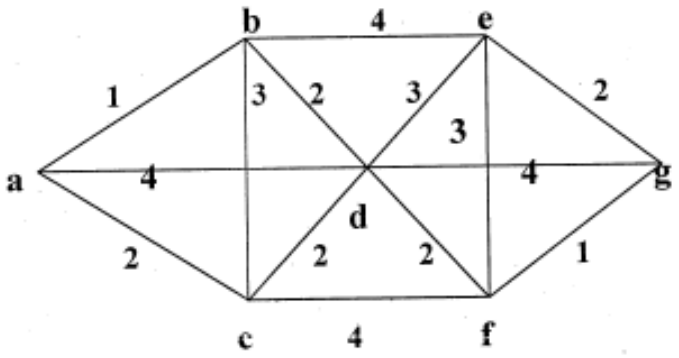
Day and Date : Saturday 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : i) Answer **any five full** questions.*
*ii) Figures to the **right** indicate **full** marks*
*iii) Use of nonprogrammable calculator is **allowed**.*
*iv) Make suitable assumptions whenever **necessary** and state it **clearly**.*

1. a) Write a note on automated manufacturing system. **8**

   b) Explain with graph high volume production plant configuration. **6**

2. a) Solve the chenese postman problem for the graph shown below from the vertex "a". **8**



   b) Define the following terms. **6**
      i) Isomorphism
      ii) Spanning Tree.

P.T.O.

3. a) Compare fixed time setup simulation vs. next event or event to event simulation. **8**

   b) What are the advantages and disadvantages of simulation methods ? **6**

4. a) Explain the multiple correlation analysis. **6**

   b) From the given data. **8**

X	1	5	3	2	1	1	7	3
Y	6	1	0	0	1	2	1	5

   i) fit a regression line of Y on X and hence predict Y if X = 10

   ii) fit a regression line of X on Y and hence predict Y if X = 2.5.

5. a) Differentiate between competitive learning and steepest learning. **6**

   b) In the following table S is the weight of sodium chloride which will dissolve in 100 gm of water at T°C. Fit an equation of the form S = mT + b, by least square method. Use this relation to estimate S when T = 50°C.

T = 0	20	40	60	80
S = 54	65	75	85	96

8

6. a) Explain with flow diagram for a simulation of single server queue. **8**

   b) Applications of neural network. **6**

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SLR-EQ – 145

Seat No.	

M.E. (Mech. Manufacturing Process Engg.) (Semester – II)
(New CBCS/CGPA) Examination, 2016
MACHINE TOOL ENGINEERING (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any five full** questions.*
2) Assume suitable data whenever necessary and state if necessary.

1. a) Describe the factors which affect the quality and performance of a machine tool. **7**
   b) Explain in brief the important consideration in machine tool design. **7**

2. a) What factors contribute to total cost in machining operations ? **7**
   b) Discuss the trends development of new metal cutting processes. **7**

3. a) Explain in brief about tribological behaviour of various material and their uses in recent machine tool design. **7**
   b) Name the different types of guideways and explain in brief the principle requirements of guideways. **7**

4. a) Describe the adverse effects of vibration and chatter in machining. **7**
   b) Explain stepped and stepless drive. **7**

5. a) List the various tests to which the machine tools are subjected. Give their sequences and explain any one in detail. **7**
   b) Explain in brief the design features of spindle. **7**

6. a) Explain in brief about forced and self excited vibration. **7**
   b) Explain in brief about requirements, function and classification of control systems in machine tools. **7**

7. Write short note on **(any two)** : **14**
   a) P.I.V. drive
   b) Pre-optive gear box
   c) Structure diagram and ray diagram.

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SLR-EQ – 146

Seat No.	

M.E. Mechanical (Manufacturing Process) (Semester – II)
Examination, 2016
(New – CBCS/CGPA)
Paper – X : TOTAL QUALITY CONTROL (Elective – II)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Note** : 1) Attempt **any five full** questions.*
*2) Figures to the **right** indicate **full** marks.*
*3) Make suitable assumptions, if required and state them **clearly**.*

1. Discuss TQM in detail. Explain TQM by taking a suitable case study. **14**

2. a) How do you define quality ? What is the concept of quality control ? **7**
   b) Write a note on seven new QC tools. **7**

3. Explain quality function deployment in detail. **14**

4. a) Discuss quality circle. **7**
   b) Explain Deming Prize criteria. **7**

5. a) Explain economic model of quality cost. **7**
   b) Explain guidelines to establish and cut down quality cost. **7**

6. a) Explain quality system standards. **7**
   b) Discuss Malcom Baldrige award criteria. **7**

SLR-EQ – 149

Seat No.	

M.E. – Mechanical (Mfg. Process) (Semester – II)
(New-CBCS/CGPA) Examination, 2016
COMPUTATIONAL TECHNIQUES
Elective – II (Paper – X)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1) Attempt **any two** questions from **each** Section.*
*2) Figures to **right** indicate **full** marks.*
*3) **Assume** suitable data if **necessary** and mention it **clearly**.*
*4) **Use** of non-programmable calculator is **allowed**.*

SECTION – I

1. a) i) Explain Runge-Kutta method in detail. **6**

   ii) Explain multiple regression with suitable example. **5**

   b) The data listed in table gives measurements of heat flux q at the surface of a solar collector. Estimate the total heat absorbed by a 2×10^5 cm^2 collector panel during 14 hr. period. The panel has an absorption efficiency $(\varepsilon) = 42\%$

   The total heat absorbed is given by $(H) = \varepsilon\int_0^1 q\,Adt$ where A = area, q = heat flux, t = time. Use Simpson's $^1/_3{}^{rd}$ rule.

t (hr)	**:**	0	1	2	3	4	6	8	11	1 4
q (cal/cm^2.hr)	**:**	0.05	1.72	5.23	6.38	7.86	8.05	8.03	5.82	0.24

7

2. a) Using the method of least squares, fit the curve, $y = ax^2 + \frac{b}{x}$ to the following data : **7**

x	**:**	1	2	3	4
y	**:**	–1.51	0.99	8.88	7.66

   b) Solve $10x - 7y + 3z + 5u = 6$, $-6x + 8y - z - 4u = 5$, $3x + y + 4z + 11u = 2$, $5x - 9y - 2z + 4u = 7$ by Gauss Elimination method. **10**

P.T.O.

3. a) Explain absolute error, relative error, round off error and truncated error with suitable example of each error. **10**

   b) Write short note on following : **7**

      i) Secant method

      ii) Bisection method.

SECTION – II

4. A) Assume that three position vectors P_1 (0, 0) P_2 (1, 2) and P_3 (3, 2) are known. Determine the cubic spline curve through these points using relaxed end conditions. Use the chord length approximation as $t_2 = \sqrt{5},\ t_3 = 2$. **10**

   B) Explain properties of B spline curves. **8**

5. A) Given B_0 [1 1], B_1 [2 3], B_2 [4 3], and B_3 [3 1] the vertices of a Bezier polygon, determine seven points on the Bezier curve. **10**

   B) Explain parametric representation of circle. **7**

6. A) Explain surface of revolution with figures. **7**

   B) Explain linear coon's surface. **5**

   C) Explain concatenated transformation. **5**

SLR-EQ – 150

Seat No.	

M.E. (Mech. – Thermal Engineering) (Semester – I) Examination, 2016 (CBCS/CGPA)
Paper – I : ADVANCED FLUID MECHANICS AND CFD

Day and Date : Thursday, 15-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt* ***any two*** *questions from* ***each*** *Section.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***if necessary****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

1. a) For the velocity profile in laminar boundary layer as, $\frac{u}{U} = \frac{3}{2}\left(\frac{y}{\delta}\right) - \left(\frac{1}{2}\right)\left(\frac{y}{\delta}\right)^3$

find the thickness of the boundary layer and the shear stress 1.5 m from the leading edge of a plate. The plate is 2 m long and 1.4 m wide and is placed in water which is moving with a velocity of 200 mm per second. Find the total drag force on the plate if μ for water = 0.01 poise. **9**

b) Prove that the maximum velocity in a circular pipe for viscous flow is equal to two times the average velocity of the flow. **9**

2. a) Air is flowing over a flat plate 500 mm long and 600 mm wide with a velocity of 4 m/s. The kinematic viscosity of air is given as 0.15×10^{-4} m^2/s. Find :

i) The boundary layer thickness at the end of the plate
ii) Shear stress at 200 mm from the leading edge
iii) Drag force on one side of the plate.

Take the velocity profile over the plate as $\frac{u}{U} = \text{Sin}\left(\frac{\pi}{2}, \frac{y}{\delta}\right)$ and density of air 1.24 kg/m^3. **9**

b) Explain methods of preventing the separation of boundary layer. **9**

P.T.O.

3. Write note on the following :
   a) Prandtl's mixing length theory **6**
   b) Wall turbulence and Free turbulence shear flow **6**
   c) Von Karman velocity distribution. **5**

SECTION – II

4. a) Explain the impact of CFD in various application areas. **8**
   b) A gas is flowing through a horizontal pipe at a temperature of 4°C. The diameter of a pipe is 8 cm and at a section 1-1 in this pipe, the pressure is 30.3 N/cm^2 (gauge) the diameter of the pipe change from 8 cm to 4 cm at the Section 2-2 where pressure is 20.3 N/cm^2 (gauge). Find the velocities of the gas at these sections assuming an isothermal process.
   Take R = 287.14 N-m/KgK and atmospheric pressure = 10 N/cm^2. **9**

5. a) Explain the Lax-Wendorff techniques with its advantages and disadvantages. **9**
   b) State the physical principle of continuity equation and derive the continuity equation using model of the finite control volume fixed in space. **9**

6. a) Explain substantial derivative of moving fluid element. **6**
   b) Write short note on characteristics of Parabolic equations. **6**
   c) Write short note on Numerical dissipation and dispersion. **6**

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SLR-EQ – 151

Seat No.	

M.E. (Mechanical) Thermal Engineering (Semester – I)
(CBCS/CGPA) Examination, 2016
MEASUREMENT IN THERMAL SYSTEMS (Paper – II)

Day and Date : Saturday, 17-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*
2) Use of non-programmable calculator is ***allowed****.*
3) ***Assume*** *suitable data* ***wherever*** *necessary.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. a) A load cell transducer is used for measurement of weight. The output of the secondary transducer of the load cell for application of different weights for increasing and decreasing values is given below :

Output			Output		
Load	**Increasing**	**Decreasing**	**Load**	**Increasing**	**Decreasing**
0	0.08	0.06	40	6.53	8.06
5	0.45	0.88	45	7.64	9.35
10	1.02	2.04	50	8.70	10.52
15	1.71	3.10	55	9.85	11.80
20	2.55	4.18	60	11.01	12.94
25	3.43	5.13	65	12.40	13.86
30	4.48	6.04	70	13.32	14.82
35	5.50	7.02	75	14.35	15.71

P.T.O.

Load	Output	
	Increasing	Decreasing
80	15.40	16.84
85	16.48	17.92
90	17.66	18.70
95	18.90	19.51
100	19.93	20.02

a) Determine the best fit line using method of least squares
b) Calculate the linearity. **10**

b) Define precision index, confidence interval, a resistor is measured by the voltmeter-ammeter method. The voltmeter reading is 123.4 V on the 250 V scale and the ammeter reading is 283.5 mA scale. Both meters are guaranteed to be accurate within $\pm$ 1% of full scale reading. Calculate
a) Indicated value of resistance
b) The limits within which the result can be guaranteed. **8**

2. a) Explain construction and working of RTD and how RTD's are different from thermistors ? **10**

b) Explain with neat sketch laws of thermocouples and how thermocouples are mounted to measure temperature of immersed surface in liquid ? **7**

3. a) With one example, enumerate the procedure of fitting power law curve amongst data of thermal systems. **8**

b) How thermal conductivity of solids and liquids is determined experimentally ? **9**

SECTION – II

4. a) A vertical venturimeter has its inlet and throat diameters 200 mm and 100 mm respectively. A differential mercury manometer connected to the inlet and throat points gives a reading of 250 mm. Determine the rate of flow of water if the coefficient of discharge is 0.98. Derive the relation used for solution. **8**

b) Explain principle of working of electromagnetic flow-meter with advantages and disadvantages. **9**

5. a) A mercury U-tube manometer used for measurement of low steam pressure shows a positive head of 35 mm of mercury above atmosphere, but 48 mm of water has condensed above the lower level of mercury in the tube. If the barometer reading is 762.1 mm of mercury, calculate absolute pressure of steam. What percentage error is incurred if the head of condensed water is not taken into account ? **9**

   b) Explain with neat sketch Mclead guage of pressure measurement. **4**

   c) How dynamic and static pressure of flow fluid through pipe is measured ? Draw required sketch for explanation. **4**

6. Write a short notes on the following :

   i) Schlieren interferometer

   ii) Level measurement in Boiler

   iii) Convective and radiative effects on temperature measurement. **18**

SLR-EQ – 152

Seat No.	

M.E. (Mech.-Thermal Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016

Paper – III : ADVANCED HEAT AND MASS TRANSFER

Day and Date : Monday, 19-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt **any two** questions from **each** Section.*

*2) Figures to the **right** indicate **full** marks*

*3) Assume suitable data if **necessary**.*

*4) Use of non -programmable calculator is **allowed**.*

*5) Use of heat transfer data book is **allowed**.*

SECTION – I

1. a) Derive three dimensional heat conduction equation in cylindrical coordinates and reduce it to Laplace equation. State significance of thermal diffusivity. **9**

   b) Give one example of multimode heat transfer and solve the following problem of multimode heat transfer.

   Air at 20°C blows over a hot plate 50 × 75 cm maintained at 250°C. The convection heat transfer coefficient is 25 W/m^{2}K. Calculate convective heat transfer. Assuming that the plate is made up of carbon steel (1%) 2cm thick and that 300W is lost from the plate by radiation, calculate inside plate temper. **8**

2. a) Derive the equation of transient heat transfer of lumped heat capacity system. And explain with one example, unsteady state heat transfer. **9**

   b) A woman informs an engineer husband that she frequently feels cooler in the summer when standing in front of an open refrigerator. The Engineer tells that she is only imagining the things because there is no fan in the refrigerator to blow the cool air over her. A lively argument ensues. Whose side of the argument do you take ? Why ? Explain in detail. **8**

3. a) Explain finite difference method to find temperature distribution in two dimensional plane wall of unit thickness. **6**

   b) Derive the relation of temperature distribution in a rectangular pin fin assuming fin length infinite. **6**

   c) Derive the relation for heat exchange by radiation between infinitely long parallel surfaces. **6**

P.T.O.

SECTION – II

4. a) Water flows with mean velocity of 2 m/s through circular pipe of diameter 5 cm. Wall of pipe is maintained at uniform temperature of 100°C by condensing steam on outside wall. At a location where the fluid will become fully developed fluid flow the bulk mean temperature is observed as 60°C. Find heat transfer coefficient using any dimensionless correlation applicable for flow through pipe. **9**

   b) Explain temperature variation of fluid in convective forced heat transfer through pipe under constant wall temperature and constant heat flux condition. **8**

5. a) In a plant location near a furnace, a net radiant energy flux of 800 W/m^2 is incident on vertical metal surface 3.5 m high and 2 m wide. The metal is insulated on the back side and painted black so that all incoming radiation is lost by free convection to the surrounding air at 30°C. What average temperature will be attained by the plate ? **9**

   b) Engine oil is to be cooled from 80 to 50°C by using single pass counterflow, concentric tube heat exchanger with cooling water available at 20°C. Water flow inside tube ID of 2.5 cm at the rate of 0.08 kg/s and oil flow through the annulus at a rate of 0.16 kg/s the heat transfer coefficient on waterside and oil side are 1000 and 80 W/m^2K respectively. Fouling factor on water and oil side are 0.00018 m^2K/W and 0.0018 m 2°C. Calculate the tube length required. **8**

6. a) Explain regenerative type of heat exchanger with one example. **6**

   b) Types of boundary layer. **6**

   c) Laws of radiation. **6**

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SLR-EQ – 153

Seat No.	

M.E. (Mechanical) Thermal Engineering (Semester – I) (CBCS/CGPA) Examination, 2016
DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY (Paper – IV)

Day and Date : Wednesday, 21-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Solve* ***any two*** *questions from* ***each*** *Section.*

2) Use of statistical table and scientific calculator permitted.

3) ***Assume*** *suitable data if* ***necessary****.*

4) Draw ***neat*** *sketches, flow diagram* ***whenever*** *required.*

5) Use of Non Programmable calculator is ***allowed****.*

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

SECTION – I

1. a) What is research ? Describe objectives of research along with applications. **8**

   b) Explain the steps involved in research process with brief description of each. **9**

2. a) Explain the term process capability (Cp). If central tendency of the process is shifted from mean how the process capability is determined. **7**

   b) A company produces a certain part with two different machines say A and B. Product specification is 20 $\pm$ 0.15 mm. Randomly 20 parts produced by each machine is measured and are given in table.

M/C A	19.97	19.97	19.99	20.01	20.01	20.03	19.94	19.97	19.99	20.02
mm	20.01	19.99	19.97	20.00	20.02	19.95	20.03	19.97	19.98	20.00
M/C B	22.52	22.10	22.29	22.46	21.75	21.33	22.36	22.05	21.87	21.70
mm	20.70	23.51	21.68	21.19	21.42	22.70	22.77	21.43	23.09	22.52

   Determine process capability of each machine and select suitable machine giving justification for the same. Draw the distribution diagram superimposing process capability and upper and lower limits. **10**

3. a) What is mathematical Model ? Describe the steps in formulating mathematical model. **8**

   b) Research assistant is eager find any kind of relationship exists between the force applied and the extension of the material. He conducts the experiment on testing machine and reading is given below establish linear model using calculator. Draw the regression line. Find the residual for force application of 173 N and 97 N. Show on regression line these residuals. **10**

	1	2	3	4	5	6	7	8	9	10
F(N)	62	97	104	108	113	120	120	173	178	198
Ext(μm)	79	126	138	138	138	151	146	188	203	201

SECTION – II

4. a) Patients were subject to blister treatment A, B, C. Measurement is number of days taken required to heal the blister. Determine whether with $\alpha = 0.05$ significance, difference between treatments exist. (ANOVA). **10**

	No. of days required to heal		
	Treatment A	Treatment B	Treatment C
1	5	7	7
2	6	7	9
3	6	8	9
4	7	9	10
5	7	9	10

   b) What is creativity ? Discuss different forms of creativity. **7**

5. a) An experiment was conducted at two levels to determine the effect of temperature and pressure on the yield of chemical. Pressure used at two levels is 100 MPa, 150 MPa. Temperature levels were 60°C and 70°C. Experiment was replicated for all treatments and response (Yield) was measured and indicated in table

i) Represent graphically this experiment.
ii) Determine main effect A(temp) and B (Pr).
iii) Find interaction effect (AB) Represent graphically. From the graph infer whether there is interaction is having significance.
iv) Establish regression equation. (In coded value) factors b(no need to carry out ANOVA). **10**

Temperature deg C A	**Pressure MPa B**	**Response Replicate**	
		1	2
–	–	40	37
+	–	43	50
–	+	59	54
+	+	37	43

b) Discuss fractional factorial design of experiment. Taking example 2^{3-1} factorial problem show confounding. **7**

6. Discuss following (**any 3**) : **18**

a) Randomization, Replication and blocking.
b) Taguchi's concept of Loss function.
c) Taguchi Robust Design.
d) Layout of research report.
e) Sampling theory.
f) Techniques of creativity.

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SLR-EQ – 154

Seat No.	

M.E. Mechanical (Thermal Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – V : ADVANCED THERMODYNAMICS (Elective – I)

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Answer* ***any two*** *questions from each Section.*
2) Assume suitable data if ***necessary****.*
3) Use of non-programmable calculator is ***allowed****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. a) State the third law of thermodynamics. Explain any two corollaries of it. **9**

   b) Derive Maxwell equation. **9**

2. a) State the statements of second law of thermodynamics and explain thermodynamic temperature scale. **9**

   b) Derive $Tds = C_v dT + (T\beta/\alpha)dv$ where β is the coefficient of volume expansion, α is the isothermal compressibility and the other symbol have their usual meaning. **8**

3. a) What is meant by reduced properties ? Explain in detail. **9**

   b) Prove that whenever a system executes a complete cyclic process, the $\int \frac{\delta Q}{T}$ is less than zero or in the limit is equal to zero. Hence prove that entropy is property of system. **8**

P.T.O.

SECTION – II

4. a) Percentage composition by weight of sample of fuel as C = 90%, H_2 = 3.5%, S = 1%, O_2 = 3%. Find the composition of exhaust gases. **9**

   b) Write a note on standard heat of formation and adiabatic flame temperature. **9**

5. a) Write note on FD, BE and MB statics. **9**

   b) Why exergy of fluid at higher temperature more than that at lower temperature ? **8**

6. a) What is transport phenomenon ? **9**

   b) What is meant by partition function and what are the uses of it ? **8**

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SLR-EQ – 158

Seat No.	

M.E. (Mechanical-Thermal Engineering) (Semester – II) (New-CBCS/CGPA) Examination, 2016
DESIGN OF THERMAL SYSTEMS (Paper – VI)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Question No. **1** is **compulsory**.*
*2) Solve **any one** out of question no. **2** and **3**.*
*3) Solve **any two** questions out of question no. **4, 5** and **6**.*
*4) **Use** of non-programmable calculator is **allowed**.*
*5) Assume suitable data **wherever** required.*
*6) Figures to the **right** indicates **full** marks.*

SECTION – I

1. Design a milk cooling system for a dairy whose dairy milk selling is 2000 litres/day. Assume :
   i) Milk is cooled from 25°C and stored at 4°C.
   ii) Thermal conductivity for 100 mm thick PUF insulation and stainless steel sheet of 1 mm thick is 0.026 w/mk and 21 w/mk respectively.
   iii) Inside and outside heat transfer coefficient is 10 w/m^2k.
   iv) Available space for operating dairy is 3m × 3m and height 4m.
   v) Milk is received at 8.00 a.m. and sold by 10.00 p.m.

   Also estimate approximate energy bill, system layout, plant layout. **18**

2. a) A flow rate of 0.8 kg/sec. of water is heated in a heat exchanger by condensing steam at 100°C. When water enters at 15°C, it leaves the heat exchanger at 62°C. If the inlet water temperature were changed to 20°C while its flow rate and the condensing temperature remained constant, what would be its out temperature ? **9**

   b) Plot temperature distribution against length of heat exchanger for counter flow heat exchanger, parallel flow heat exchanger, condenser, evaporator. Explain significance of LMTD, AMTD in design of heat exchanger. **8**

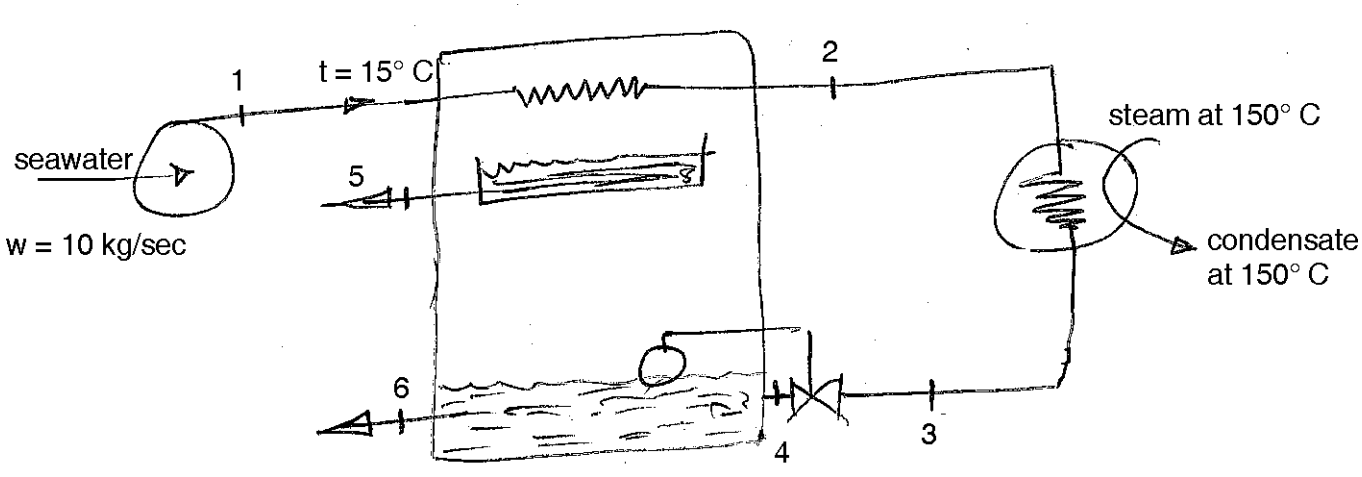
P.T.O.

3. a) A seawater desalination plant operates on the cycle shown in figure. Seawater is pressurised, flow through a heat exchanger. The following conditions and relationships are known.
   1) Temperature and flow rate of entering seawater.
   2) VA_1 and VA_2 of heat exchanger.
   3) Enthalpies of saturated liquid and saturated vapour of seawater and the freshwater as a function of temperature.

   $hf = f_1(t)$ and $hg = f_2(t)$.

   For heat exchangers with one fluid condensing $t_0 = t_i + (t_c - t_i)\left(1 - e^{-VA/mc_p}\right)$.

   Set up an information flow diagram that would be used for a successive substitution system simulation, indicating which equations apply to each block. For convinience in checking, use these variables t_2, t_3, h_3, h_4, h_{f4}, h_{g4}, t_4, m_5, x_4 and q where x_4 is the fraction of vapor at point 4 and q is the rate of heat transfer at the fresh water condenser. **12**



   b) Explain Newton-Raphson method of system simulation. **5**

SECTION – II

4. a) Establish a second degree polynomial that fits hg to t, using the fitted equation compute hg at 80°C. **8**

t°C	0	10	20	30	40	50	60	70	80	90	100
hg	2501.6	2519.9	2538.2	2556.4	2574.4	2592.2	2609.7	2626.9	2643.8	2660.1	2676.0

b) Define coefficient of correlation and explain its significance. **4**

c) Take a typical example of thermal system and derive the relation for time constant of the system. **6**

5. a) A flow rate of 15 m^3/sec. of a gas at a temperature of 50°C and a pressure of 175 KPa is to be compressed to a final pressure of 17500 KPa. The choice of compressor type is influenced by the fact that centrifugal compressors can handle high volume flow rates but develop only low pressure ratios per stage. The reciprocating compressor, on the other hand, is suited to low volume flow rates but can develop high pressure ratios, to combine advantages of each, the compression will be carried out by a centrifugal compressor in series with a reciprocating compressor as shown in figure.

The intercooler returns the temperature of the gas to 50°C. Assume that the gas obeys perfect gas laws. The equations for the cost of the compression are $C_c = 70Q_0 + 1600\frac{P_1}{P_0}$, $C_r = 200\,Q_1 + 800\frac{P_2}{P_1}$

Where C_c = First cost of centrifugal compressor.

C_r = First cost of reciprocating compressor.

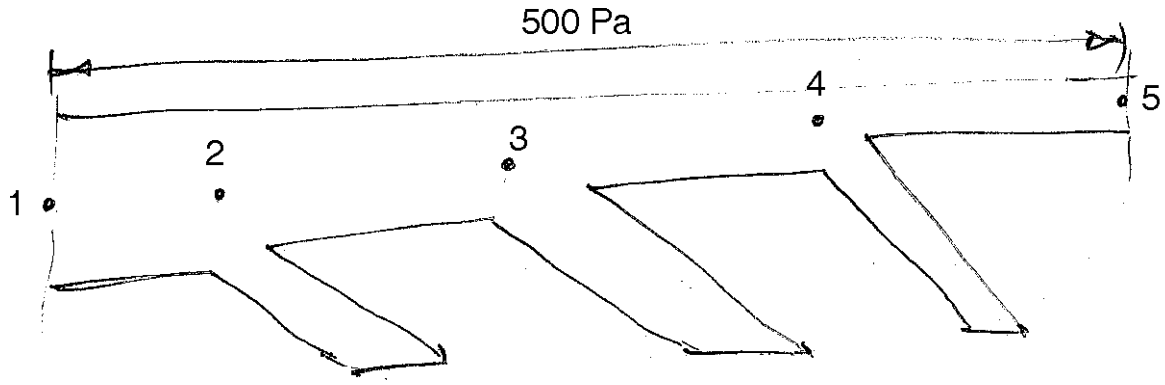
Q = Volume flow rate.

a) Setup the objective function for the total first cost and the constraint equation in terms of the pressure ratios.

b) Using the method of Lagrange multiplier for constrained optimization, solve for the Optimal pressure ratios and minimum total cost. **12**

b) Explain with one example the dynamic programming method of optimization. **5**

6. a) The total pressure drop from point 1 to point 5 in the multi-branch duct system shown in figure is to be 500 Pa. Table given presents the costs for various duct sizes in each of the sections as a function of the pressure drop in the section. Use dynamic programming to determine the pressure drop in each section that results in the minimum total cost of the system.



Section	Pressure drop (Pa)	Cost ($)
1-2	100	222
	150	205
	200	193
2-3	100	180
	150	166
	200	157
3-4	100	135
	150	125
	200	117
4-5	100	93
	150	86
	200	81

12

b) Explain linear programming method of optimization. **5**

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SLR-EQ – 159

Seat No.	

M.E. (Mech. – Thermal Engineering) (Semester – II) Examination, 2016
(New-CBCS/CGPA)
COMPUTATIONAL TECHNIQUES IN THERMAL ENGINEERING (Paper – VII)

Day and Date : Friday, 9-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Answer **any two** questions from **each** Section.*
*2) Assume suitable data, **if necessary**.*
*3) Use of non-programmable calculator is **allowed**.*
*4) Figures to the **right** indicate **full** marks.*

SECTION – I

1. a) Find a real root of the equation $x^6 – x^4 – x^3 – 1 = 0$ correct to three decimal places by the method of false position. **6**

   b) Write algorithm for solution of a system of equation by Gauss-Seidal method. **6**

   c) Explain clearly the difference between partial and ordinary differential equation with one example from thermal engineering. **6**

2. a) What are methods to obtain solution of linear algebraic equation ? Compare of direct and iterative methods. **8**

   b) Use the trapezoidal rule to estimate $\int_0^1 x^3 . dx$ considering five subinterval. **9**

3. a) Using Taylor series method, find y (0.1) correct to three decimal places given that $dy/dx = e^x – y^2$, y (0) = 1. **8**

   b) Fit a parabola $y = a + bx + cx^2$ to the following data. **9**

x	1	2	3	4	5	6	7	8	9
y	2	6	7	8	10	11	11	10	9

P.T.O.

SECTION – II

4. a) Find the gradient of the road at the middle point of the elevation above the datum line of seven points of road which are given below : **9**

x	0	300	600	900	1200	1500	1600
y	135	149	157	183	201	205	193

b) Explain central difference along with table. **8**

5. a) Explain scheme of application of finite difference techniques in 1 D and 2 D heat conduction. Apply the scheme of finite difference techniques to any one heat transfer problem. **8**

b) Apply the finite difference method to a plate of 3 cm × 3 cm. Find temperature at a distance of 1cm from corner in x direction and 1 cm from a corner in y direction. Assume face 1, 2, 3, 4 are maintained at 100, 200, 300, 400°C. **9**

6. Write short notes on **any three** of the following. **18**

a) Galerkin Method

b) Displacement function, element stiffness and load matrices

c) Rayleigh Ritz Method

d) Application of FEM.

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SLR-EQ – 160

Seat No.	

M.E. Mechanical (Thermal Engineering) (Semester – II) Examination, 2016
(New – CBCS/CGPA)
THEORY AND DESIGN OF I.C. ENGINES (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Answer **any two** questions from **each** Section.*
*2) **Assume** suitable data if **necessary**.*
*3) **Use** of non-programmable calculator is **allowed**.*
*4) Figures to the **right** indicate **full** marks.*

SECTION – I

1. a) Explain construction and working of sterling engine with figure. **8**

   b) The bore of cylinder of the four stroke diesel engine is 150 mm. The maximum gas pressure inside the cylinder is limited to 3.5 MPa. The cylinder head is made of gray cast iron FG 200 (S_{ut} = 200 N/mm^2) and factor of safety is 5. Determine the thickness of the cylinder head.

   Stud are used to fix the cylinder head to the cylinder and obtain a leak-proof joint. They are made of steel FeE 250 (Syt = 250 N/mm^2) and factor of safety is 5. Calculate :

   i) Number of stud

   ii) Nominal diameter of stud

   iii) Pitch of stud. **9**

2. a) What are the abnormal combustion in the SI engine, explain any one in detail. **9**

P.T.O.

b) Design a center crankshaft for single cylinder vertical engine considering case of the crank is at top dead center position and subjected to maximum bending moment-Cylinder bore = 150 mm,

L/r ration = 4.75

Maximum gas pressure = 4 Mpa,

Length of stroke = 200 mm,

Weight of flywheel cum belt pulley = 3.5 kN,

Total belt pull = 1.8 kN,

Allowable bending stress = 75 N/mm^2

Allowable compressive stress = 75 N/mm^2

Allowable shear stress = 40 N/mm^2

Allowable bearing pressure = 10 N/mm^2

The main bearing is 350 mm apart and the third bearing is 400 mm apart from the main bearing on its side. The Belts are in horizontal direction, assume l/d ratio = 1 for crank pin. **9**

3. a) What is octane number, explain its importance. How to determine octane number of unknown fuel ? **8**

b) The cylinder of four stroke diesel engine has following specifications :

Brake power = 7.5 Kw

Speed = 1400 rpm

Indicated mean effective pressure = 0.35 MPa

Mechanical efficiency = 80%

Maximum gas pressure = 3.5 MPa

The cylinder liner and head are made of gray cast iron FG 260 (S_{ut} = 260 N/mm^2 and μ = 0.25). The studs are made of plain carbon steel 40C8 (S_{yt} = 380 N/mm^2). The factor of safety for all parts is 6. Calculate.

i) Bore and length of cylinder the cylinder liner.

ii) Thickness of cylinder liner.

iii) Thickness of the cylinder head. **9**

SECTION – II

4. a) Classify lubrication system used for I. C. Engine and explain with figure pressure lubrication system. **9**

   b) Determine the dimension of small and big end bearings of the connecting rod for a diesel engine with the following data :

   Cylinder bore = 100 mm

   Maximum gas pressure = 4 MPa

   (l/d) ratio for piston pin bearing = 2

   (l/d) ratio for crank pin bearing = 1.3

   Allowable bearing pressure for piston pin bearing = 12 MPa

   Allowable bearing pressure for crank pin bearing = 7.5 MP. **9**

5. a) Write note on computer aided design of engine component. **8**

   b) Explain need of lubrication system in IC Engine. Discuss various important properties of lubricating oil. **9**

6. a) Discuss in detail importance of balancing of IC engine. **8**

   b) Design exhaust valve for a horizontal diesel engine the following data :

   Cylinder bore = 250 mm,

   Length of stroke = 300 mm,

   Engine speed = 600 rpm,

   Maximum gas pressure = 4 MPa

   Seat angle = 45°

   Mean velocity of gas through port = 50 m/s

   Allowable bending stress for valve = 50 N/mm^2

   K for steel valve = 0.42.

   Calculate :

   i) Diameter of valve port

   ii) Diameter of the valve head

   iii) Thickness of the valve head

   iv) Diameter of valve stem

   v) Maximum lift of valve. **9**

Data for solving problems

- Reboring allowance for I.C. Engine cylinder.

D	75	100	150	200	250	300	350	400	450	500
C	1.5	2.4	4.0	6.3	8.0	9.5	11.0	12.5	12.5	12.5

Note : D and C are in mm.

- Allowable mean velocities of the gas (ν_p)

Types of Engine	**Mean velocity of gas (m/s)**	
	Inlet Valve	**Exhaust Valve**
Low speed engine	33 – 40	40 – 50
Medium speed engine	35 – 45	50 – 60
High speed engine	80 – 90	90 – 100

SLR-EQ – 161

Seat No.	

M.E. (Mech. – Thermal Engineering) (Semester – II) (New – CBCS/CGPA) Examination, 2016
DESIGN OF REFRIGERATION AND AIR CONDITIONING SYSTEM (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) **Assume** suitable data **if necessary**.*
*4) **Use** of steam tables, psychometric chart, refrigeration property charts is **allowed**.*
*5) **Use** of non-programmable calculator is **allowed**. Solution.*

SECTION – I

1. a) A vapour compression refrigerator uses methyl chloride (R-40) and operates between temperature limits of – 10°C and 45°C. At the entry of compressor, the refrigerant is dry saturated and after compression it acquires a temperature of 60°C. Find COP of the refrigerator.
Properties of R-40 are as follows. **9**

Saturated temperature in °C	Enthalpy in (kJ/kg)		Entropy in (kJ/kg k)	
	Liquid	Vapour	Liquid	Vapour
-10	45.4	460.7	0.183	1.637
45	133.0	483.6	0.485	1.587

b) Explain the two stage cascade refrigeration system with schematic diagram. **9**

2. a) On particular day the atmospheric air was found to have a dry bulb temperature of 30°C and wet bulb temperature of 18°C. The barometric pressure was observed to be 756 mm of Hg. Obtain the following properties, without using psychrometric chart.
1) Relative humidity 2) Specific humidity.
3) Dew point temperature 4) Enthalpy of air per kg of dry air **10**

b) Explain the reciprocating compressor. **7**

P.T.O.

3. a) Explain practical aqua ammonia refrigeration system. **10**

   b) 800 m^3/min of recirculated air at 22°C DBT and 10°C DPT is mixed with 300 m^3/min of fresh air at 30°C DBT and 50% relative humidity adiabatically. Calculate the enthalpy, specific volume, humidity ratio and final DBT of mixture. **7**

SECTION – II

4. a) A hall is maintained to be at 24°C dry bulb temperature and 60% relative humidity under following condition

   Outdoor condition 38°C DBT and 28°C WBT

   Sensible heat load in the room 51.9 Kw

   Latent heat load in the room 19.54 Kw

   Apparatus dew point temperature 10°C

   Quantity of recirculated air from hall 60%

   If quantity of recirculated air is mixed with conditioned air after the cooling coil find the following :

   a) Condition of air leaving the cooling coil
   b) Condition of air before entering the hall
   c) Mass of air entering the cooler
   d) Mass of total air passing through hall
   e) By-pass factor of cooling coil
   f) Capacity of cooling coil. **12**

   b) Explain bypass factor of cooling coil. **6**

5. a) Explain various types of system controls. **9**

   b) Explain the humidified and dehumidified coils. **8**

6. a) Explain air washer with the help of different air conditioning process. **6**

   b) Define aspect ratio and explain the equal friction method of duct design. **6**

   c) Explain unitary based refrigeration system. **6**

SLR-EQ – 162

Seat No.	

M.E. (Mech. – Thermal Engineering) (Semester – II) (New – CBCS/CGPA) Examination, 2016
Paper – X : POWER PLANT ENGINEERING (Elective – II)

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Attempt **any two** questions from **each** Section.*
*2) Figures to the **right** indicate **full** marks.*
*3) Assume suitable data if **necessary**.*
*4) **Use** of non-programmable calculator is **allowed**.*

SECTION – I

1. a) A power plant using steam as a working fluid operates on a Rankine cycle. The boiler and condenser pressure are 30 bar and 1 bar. The condition of steam entering primary mover is dry saturated. Find the thermal efficiency of cycle by neglecting the pump work. **8**

   b) What are electrical and non-electrical equipments in hydroelectric power plant ? **6**

   c) Explain working of pumped storage hydro-electric power plant with neat sketch. **4**

2. a) An inward flow reaction turbine has external and internal diameters as 0.9 m and 0.45 m respectively. The turbine is running at 200 rpm and width of turbine at inlet is 200 mm. The velocity of flow through the runner is constant and is 1.8 m/s. the guide blade makes an angle of 10 to the tangent of wheel and the discharge at outlet of turbine is radial. Draw a velocity triangle and find :

   1) Absolute velocity of water at inlet of runner
   2) Velocity of whirl
   3) Relative velocity at inlet
   4) Runner blade angle
   5) Width of runner at outlet
   6) Mass flow rate of water through the runner
   7) Head at the inlet of turbine
   8) Power developed and efficiency. **8**

P.T.O.

b) Explain working of Schmidt-Hartman boiler with neat sketch. **5**

c) Explain with neat sketch working of spreader stocker. **4**

3. a) Explain mechanical dust collection system also explain working of electrostatic precipitator. **6**

b) Explain electromagnetic transducer with neat sketch. **6**

c) Write a short note on gaseous emission. **5**

SECTION – II

4. a) Explain working of electromechanical regulator with neat sketch. **6**

b) Why it is necessary to operate hydro and steam power plant in combination ? Write in detail. **6**

c) Explain with neat sketch combined gas turbine-steam turbine power plant with its arrangement and its reorientation on T-S diagram. **6**

5. a) The estimate cost of the two power plant station I and II running parallel are Rs. (2500 Kw + 0.550 KWh) and Rs. (2400 Kw + 0.6 Kwh) respectively and supply to the system whose maximum load demand is 100 MW and minimum load demand is 10 MW during year. The load varies as straight line find minimum cost of generation. **7**

b) Write a short note on general tariff system and explain Hopkinson demand rate. **6**

c) Explain AC and DC excitation system. **4**

6. a) How the water is polluted by thermal power plant ? Discuss different ways to prevent water pollution from thermal power plant. **6**

b) Explain protection system used in power plant. **6**

c) Write a short note on Gas analyze. **5**

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SLR-EQ – 166

Seat No.	

M.E. (E&TC-Digital Electronics & Communication System)
(Semester – I) (CBCS) Examination, 2016
RESEARCH METHODOLOGY (Paper – I)

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1) Attempt **any two** questions from **each** Section.*
*2) Figure to the **right** indicates **full** marks.*
*3) Assume suitable data, **if** necessary.*
*4) **Use** of non programmable calculator is **allowed.***

SECTION – I

1. a) Explain various types of research with suitable example. **8**
   b) What are the problems encountered by researchers in India ? **9**

2. a) Explain characteristics of good hypothesis. **8**
   b) Explain the sources from where research problem may be defined. **9**

3. a) What is operation search model ? Explain important topics in operation research. **9**
   b) What is simulation ? Draw flow diagram of simulation. Explain advantages of simulation. **9**

SECTION – II

4. a) Explain types of report. **8**
   b) Explain mechanics of writing a research report. **9**

5. a) Define experiment. What is experimental and non-experimental hypothesis testing research ? **8**
   b) Explain continuous and discrete probability distribution used in statistics. **9**

6. a) Explain types of error with example in detail. **9**
   b) What is ethics in research and why it is important ? **9**

SLR-EQ – 167

Seat No.	

M.E. (E&TC Digital Electronics and Communication Systems) (CBCS) (Semester – I) Examination, 2016
COMMUNICATION NETWORKS (Paper – II)

Day and Date : Saturday, 17-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Figure to **right** indicates **full** marks.*
*2) **All** questions are **compulsory**.*

SECTION – I

1. a) What is RARP ? Explain it in brief. **8**
   b) What is routing ? Explain RIP. **10**

   OR

   b) Draw and explain DHCP. **10**

2. Attempt **any two** : **12**
   a) Explain datagram format.
   b) Draw ATM cell header format and explain it.
   c) Explain pining in detail.

3. Attempt **any one** : **5**
   a) Explain IP addressing scheme.
   b) What is IP in IP encapsulation ? Explain.

SECTION – II

4. a) Explain partially qualified and fully qualified domain name space. **10**
   b) Draw and explain Gigabit Ethernet architecture. **10**

   OR

   b) Explain principle of FTP. **10**

5. Attempt **any two** : **15**
   a) Explain hierarchical name space for machine.
   b) Explain TFTP.
   c) Explain structure of 802.32.

SLR-EQ – 168

Seat No.	

M.E. (E and TC) (Digital Electronics and Communication System)
(Semester – I) Examination, 2016
(CBCS)
Paper – III : CMOS VLSI DESIGN

Day and Date : Monday, 19-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Attempt **any three** questions from **each** Section.*

*2) Figures to **right** indicate **full** marks.*

SECTION – I

1. a) Draw and explain physical structure of an NMOS transistor. **6**

   b) Draw and explain accumulation, depletion and inversion modes of operation of MOS transistor. **5**

2. a) Draw and explain static CMOS Inverter and Switch model of CMOS Inverter. **6**

   b) Explain dynamic power dissipation of CMOS Inverter. **5**

3. a) Draw and explain pass transistor logic. **6**

   b) Explain signal Integrity issues in dynamic designs. **6**

4. Write notes on **any three** of the following : **(4×3=12)**

   a) Technology Scaling

   b) Power and energy Delay

   c) Ratioed CMOS logic

   d) Cascading of dynamic gates.

P.T.O.

SECTION – II

5. a) Explain C^2MOS logic with neat diagram. **5**

   b) Draw and explain Master-Slave edge triggered resistor. Write the timing properties of multiplexer based Master-Slave resistors. **6**

6. a) Explain Clock skew in detail. **5**

   b) Explain any two timing classification methods of digital systems. **6**

7. a) Explain designing of DRAMS. **6**

   b) Design fast multipliers in detail. **6**

8. Write notes on **any three** of the following : **(4×3=12)**

   a) Clock Distribution

   b) Arbiters

   c) PLL for clock synchronization

   d) Designing arithmetic building blocks.

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SLR-EQ – 169

Seat No.	

M.E. (E&TC – Digital Electronics & Communication System)
(Semester – I) (CBCS) Examination, 2016
MODERN DIGITAL SIGNAL PROCESSING (Paper – IV)

Day and Date : Wednesday, 21-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicates* ***full*** *marks.*
3) Assume suitable data if ***required****.*

SECTION – I

1. a) Determine the coefficients of a linear phase FIR filter of length M = 32 which has a symmetric unit sample response and a frequency response that satisfies condition

$$H_r\left(\frac{2\pi(k+\alpha)}{32}\right)=\begin{cases}1 \;, & k=0,1,2,3,4,5\\ T_1 \;, & k=6\\ 0 \;, & k=7,8,\ldots 15\end{cases}$$

where $T_1 = 0.3789795$ for $\alpha = 0$. **8**

b) Explain steps required for design of linear phase FIR filter using windows. **4**

2. a) Draw the block diagram of forward linear prediction. Derive the equation for coefficient of the linear predictor by using 'P' stage lattice filter. **5**

b) Design an ideal band reject filter with a desired frequency response

$$H_d(e^{j\omega}) = 1 \quad \text{for } |\omega| \le \pi/3 \text{ and } |\omega| \ge 2\pi/3$$
$$= 0 \quad \text{otherwise}$$

Find the values of h(n) for N = 11. Find H(z). **7**

3. a) Write short note on anti-imaging filter. **5**

b) Explain polyphase structures in detail. **6**

P.T.O.

SECTION – II

4. a) Design a Chebyshev filter for the following specification using bilinear transformation

$$0.8 \leq \left| H(e^{j\omega}) \right| \leq 1 \quad 0 \leq \omega \leq 0.2\,\pi$$

$$\left| H(e^{j\omega}) \right| \leq 0.2 \quad 0.6\,\pi \leq \omega \leq \pi$$ **8**

b) Write a note on pipelining used in DSP processor. **4**

5. a) Explain the method of periodogram for the estimation of power density spectrum. **4**

b) Convert the analog filter with system function $H_a(s) = \dfrac{s + 0.1}{(s + 0.1)^2 + 9}$ into digital IIR filter by means of impulse invariance method. **8**

6. a) Explain with diagram multiplier adder unit. **5**

b) Explain the relationship between auto correlation and model parameters in detail. **6**

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SLR-EQ – 170

Seat No.	

M.E. (E&TC - Digital Electronics and Communication Systems)
(Semester – I) Examination, 2016
Paper – V : COLOR IMAGE AND VIDEO PROCESSING (Elective – I)
(CBCS Pattern)

Day and Date : Friday, 23-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure to* ***right*** *indicates* ***full*** *marks.*
2) ***All*** *questions are* ***compulsory****.*

SECTION – I

1. Attempt **any two** : **20**
   a) Explain image sampling and quantization in detail.
   b) Explain different color models in detail.
   c) Explain in detail different edge detection operators.

2. Attempt **any two** : **15**
   a) Explain image histogram equalization in detail.
   b) Explain different filters used in color image processing.
   c) Explain Harries operator in detail.

SECTION – II

3. Attempt **any two** : **20**
   a) Explain Edge based segmentation.
   b) Explain block based method for motion detection.
   c) Explain types of videos.

4. Attempt **any two** : **15**
   a) Explain edge linking segmentation.
   b) Explain three dimensional image formation.
   c) Explain MAP detection.

SLR-EQ – 171

Seat No.	

M.E. (E&TC) (Digital Electronics and Communication Systems)
(Semester – I) (CBCS Pattern) Examination, 2016
Elective – I : FUZZY LOGIC (Paper – V)

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Note** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** side indicate the **maximum** marks.*

SECTION – I

1. Attempt **any three** of the following. **(3×5=15)**

   a) Explain Fuzzy Ranking with example.

   b) Explain fuzzification.

   c) Explain logical connectives for fuzzy logic.

   d) Explain extension principle of fuzzy arithmetic.

2. Attempt **any two** of the following. **(2×10=20)**

   a) Suppose we have a universe of integers, Y = {1, 2, 3, 4, 5}. We define the following linguistic terms as a mapping onto Y : "Small" = (1/1) + (0.8/2) + (0.6/3) + (0.4/4) + (0.2/5), and "Large" = (0.2/1) + (0.4/2) + (0.6/3) + (0.8/4) + (1/5), Now modify these two linguistic terms with hedges.

   b) Explain membership value assignment techniques.

   c) Explain Crisp relation in brief.

P.T.O.

SECTION – II

3. Attempt **any three** of the following. **(3×5=15)**

   a) Draw and explain simple fuzzy logic system.

   b) Explain Fuzzy logic in aeroplane landing system.

   c) Explain genetic algorithm.

   d) Explain terms related to FCM.

4. Attempt **any two** of the following. **(2×10=20)**

   a) What is clustering ? Explain HCM & FCM.

   b) Explain Fuzzy logic application in liquid level control.

   c) Explain Fuzzy Cognitive map.

SLR-EQ – 172

Seat No.	

M.E. (E&TC – Digital Electronics and Communication Systems) (Semester – I) (CBCS) Examination, 2016
Elective – I : SPEECH PROCESSING (Paper – V)

Day and Date : Friday, 23-12-2016 Total Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure to* ***right*** *indicates* ***full*** *marks.*
2) ***All*** *questions are* ***compulsory****.*

SECTION – I

1. Attempt **any two** : **20**
   a) Explain different types of speech signals in detail.
   b) How do you estimate the noise in speech signal ? Explain in brief.
   c) Explain Discrete Wavelet Transform (DWT). Also enlist different types of DWT.

2. Attempt **any two** : **15**
   a) Explain speech enhancement techniques.
   b) Explain basic concept of speech processing.
   c) Explain Pitch Frequency Estimation.

SECTION – II

3. Attempt **any two** : **20**
   a) Explain sampling and quantization of speech signal.
   b) Explain Text to Speech morphological analysis.
   c) Explain Viterbi Algorithm.

4. Attempt **any two** : **15**
   a) Explain digital speech coding in detail.
   b) Explain the use of SVM in speech recognition technique.
   c) Explain segmentation of speech wave.

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SLR-EQ – 173

Seat No.	

M.E. (E&TC Digital Electronics and Communication Systems)
(Semester – II) Examination, 2016
MICROWAVE DEVICES AND CIRCUITS (Paper – VI)
(New CBCS Pattern)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Note : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure to ***right*** *indicates* ***maximum*** *marks.*
3) Consider the data ***whenever*** *necessary.*

SECTION – I

1. Attempt **any three** : **15**
   a) Why vacuum tubes are not used at microwave frequency ?
   b) Explain waveguide terminators in detail.
   c) Explain Maxwell's equation for air.
   d) Explain rectangular to circular waveguide transition.

2. Attempt **any two** : **20**
   a) Explain time harmonic field. Also explain Maxwell's equations for time harmonic field.
   b) Explain Helical TWT in detail.
   c) Explain two hole directional coupler with its S parameter.

SECTION – II

3. Attempt **any three** : **15**
   a) Explain MMIC formation.
   b) Explain MESFET in detail.
   c) Explain PIN diode in detail.
   d) Explain parametric amplifier.

4. Attempt **any two** : **20**
   a) Explain TRAPATT diode in detail. Also draw its V-I characteristics.
   b) Explain Tunnel diode in detail. Also draw its V-I characteristics.
   c) Explain Monley-Rowe power relation.

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SLR-EQ – 174

Seat No.	

M.E. (E and TC) Digital Electronics and Communication System (Semester – II) (New-CBCS) Examination, 2016
HIGH SPEED DIGITAL DESIGN (Paper – VII)

Day and Date : Friday, 9-12-2016 Max.Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Attempt* ***any three*** *questions from* ***each*** *Section.*

2) Figures to ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. a) How high range of frequencies matters for high speed digital design ? Answer this question graphically illustrating the relationship between a random digital pulse train and its frequency spectrum. **6**

   b) What is transmission line ? Explain infinitesimal and lumped models of a transmission line and derivation of line impedance. **5**

2. a) Explain with neat diagram buck-type switching regulator, its intuitive model and its necessary waveforms. **6**

   b) What is the use of series regulators ? Explain with neat circuit diagram, power supply network using local regulation. **5**

3. a) Explain power supply isolation and single ended supply isolation. **6**

   b) Explain signaling over lumped transmission media. **6**

4. Write short note on **any three** of the following : **(4×3=12)**

   a) High speed properties of logic gates.

   b) Noise sources in digital system.

   c) Intersymbol interference.

   d) Signaling modes of transmission lines.

P.T.O.

SECTION – II

5. a) Explain grounding in high speed systems. **6**

   b) Explain different noise reduction tools related to power supply. **5**

6. a) Explain with neat diagram, a framework for solving any EMI problem. **6**

   b) Define and explain in brief following terms related to ADC. **5**

      i) SINAD

      ii) SNR

      iii) ENOB

      iv) Analog bandwidth

      v) SFDR

7. a) Write a short note on latency of ADC's. **6**

   b) What is Sampling and Nyquest bandwidth ? Explain effect of antialiasing filters on system dynamic range. **6**

8. Write notes on **any three** of the following : **(4×3=12)**

   a) Prototyping circuits.

   b) Power supply conditioning.

   c) Harmonic sampling.

   d) Distortion and noise in an ideal N bit ADC.

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SLR-EQ – 175

Seat No.	

M.E. (E&TC) (Digital Electronics and Communication System)
(New CBCS) (Semester – II) Examination, 2016
ADVANCED EMBEDDED SYSTEMS (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Note : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicates* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary.*

SECTION – I

1. a) Explain common memory types used in embedded system. **6**
   b) Draw and explain architecture of embedded system. **6**

2. a) Explain how error detection and correction is done for memories. **6**
   b) Explain DRAM refresh techniques. **6**

3. a) How libraries functions are written for embedded system. **6**
   b) What are advantages of writing embedded software in 'C' language ? **5**

SECTION – II

4. a) Which are the key features of ARM 9 processor ? **5**
   b) What is function of watch dog timer ? **6**

5. a) What is real time task scheduling ? Explain terms : **6**
      1) task instance
      2) response time
      3) task precedence.
   b) Explain addressing modes of ARM-9. **6**

6. a) Define and explain inter process communication. **6**
   b) What is priority inversion problem ? How it is solved ? **6**

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SLR-EQ – 176

Seat No.	

M.E. (E&TC – Digital Electronics and Communication Systems)
(Semester – II) (New – CBCS) Examination, 2016
CRYPTOGRAPHY AND NETWORK SECURITY (Paper – IX)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time :11.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure to* ***right*** *indicates* ***full*** *marks.*
2) ***All*** *questions are* ***compulsory****.*

SECTION – I

1. Attempt **any two**. **20**
   a) Explain steganography in details.
   b) Explain triple data encryption with two keys in details.
   c) Explain RAS algorithm.

2. Attempt **any two**. **15**
   a) Explain encryption technique.
   b) Explain principle of ciphers.
   c) What are the types of distribution of Public Key ? Explain any two.

SECTION – II

3. Attempt **any two**. **20**
   a) What is public key infrastructure ? Explain it.
   b) Explain approaches for digital signature technique.
   c) Explain viral threats.

4. Attempt **any two**. **15**
   a) Why authentication is required ?
   b) Explain birthday attack.
   c) Explain message authentication code.

SLR-EQ – 177

Seat No.	

M.E. (E&TC – Digital Electronics and Communication Systems)
(Semester – II) Examination, 2016
Paper – X : (Elective – II) : ARTIFICIAL NEURAL NETWORKS
(New CBCS)

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions : *1) Figures to **right** indicate **full** marks.*
*3) **All** questions are **compulsory**.*

SECTION – I

1. Attempt **any two**. **20**
   a) Explain perceptron learning law for Artificial Neural network model.
   b) Explain Artificial Neural network Terminologies.
   c) Explain Outstar learning law for Artificial Neural network model.

2. Attempt **any two**. **15**
   a) What are the types of activation functions in Neural Network ? Explain.
   b) Define perceptron. Explain the structure of perceptron.
   c) Explain Artificial Neural network model.

SECTION – II

3. Attempt **any two**. **20**
   a) Explain Radial basis function.
   b) Explain Boltzman's Machine in detail.
   c) Explain characteristics recognition using ANN.

4. Attempt **any two**. **15**
   a) Explain ANN application in medical field.
   b) Explain MAXNET.
   c) Explain Gradient type Hopfield network.

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SLR-EQ – 180

Seat No.	

M.E. (E & TC – Digital Electronics and Communication Systems) (Semester – II) (Old – CGPA) Examination, 2016
Paper – VI : RF AND MICROWAVE CIRCUIT DESIGN

Day and Date : Thursday, 8-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1) Figure to* ***right*** *indicates* ***full*** *marks.*
2) ***All*** *questions are* ***compulsory****.*

SECTION – I

1. Attempt **any two** : **20**
   a) Derive the plane wave equation in air and conducting medium.
   b) Explain Maxwell's equation in free space, conducting media and time harmonic field.
   c) What are the transmission line parameters ? Derive and explain them in brief.

2. Attempt **any two** : **15**
   a) Explain Point contact diode.
   b) Why S-parameter is used ? Explain scattering matrix for multi port network.
   c) Explain microwave bipolar junction transistor with its characteristics.

SECTION – II

3. Attempt **any two** : **20**
   a) Explain JFET for microwave in details with characteristics curve. Also enlist the advantages of JFET over BJT for microwave application.
   b) Explain MMIC manufacturing with layout for MMIC in brief.
   c) What is Gunn Effect ? Draw and explain Gunn oscillator with negative resistance region.

4. Attempt **any two** : **15**
   a) Explain Noise figure circle for microwave amplifier.
   b) Give the classes of operation of Microwave amplifiers.
   c) Draw and explain MESFET.

SLR-EQ – 181

Seat No.	

M.E. (E & TC) (Digital Electronics and Communication System)
(Semester – II) (Old CGPA) Examination, 2016
Paper – VII : HIGH SPEED DIGITAL DESIGN

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Attempt **any three** questions from **each** Section.*
*2) Figures to **right** indicate **full** marks.*

SECTION – I

1. a) Explain frequency, time, distance related to high speed digital system. **6**

   b) What is transmission line ? What are the types of transmission line ? Explain lossy transmission lines in brief. **5**

2. a) Explain noise sources in digital system. **6**

   b) Explain signalling over lumped transmission media. **5**

3. a) Explain signalling modes for transmission lines. **6**

   b) Explain power supply network in detail. **6**

4. Write short note on **any three** of the following : **(4×3=12)**

   a) High speed properties of logic gates.

   b) Electrical models of wires.

   c) Symbolic bypass capacitors.

   d) Cross talk.

P.T.O.

SECTION – II

5. a) Explain different simulation tools in detail. **6**

   b) Explain power supply noise reduction and filtering in detail. **5**

6. a) Explain grounding in high speed digital system. **6**

   b) Explain EMI/RFI consideration related to power supply. **5**

7. a) Explain harmonic sampling in detail. **6**

   b) Explain distortion and noise in ideal N bit ADC. **6**

8. Write notes on **any three** of the following : **(4×3=12)**

   a) Power supply conditioning.

   b) Prototyping circuits.

   c) AD 9220 N bit ADC.

   d) Base band antialiasing filter.

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SLR-EQ – 182

Seat No.	

M.E. (E & TC) Digital Electronics and Communication System (Semester – II) (Old – CGPA) Examination, 2016
ADVANCED EMBEDDED SYSTEMS (Paper – VIII)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data* ***if necessary****.*

SECTION – I

1. a) Give advantages of application specific instruction set processor in embedded system. **6**

   b) Explain allocation of memory to program segments and blocks. **6**

2. a) Explain interfacing of SRAM with microcontroller in detail. **5**

   b) Explain conditional loops used in 'C' programming with its syntax. **6**

3. a) Explain with examples various data types used in ARM **6**

   b) Explain 'C' data types used for ARM. **6**

SECTION – II

4. Write short note on :

   a) Memory management RTOS. **6**

   b) Use of semaphores for intertask signaling. **6**

5. a) With the help of diagram explain ARM 9 architecture. **8**

   b) Explain multiplexed, tristate and open drain buses in ARM 9 processor. **4**

6. a) Explain the features of μcos II RTOS. **5**

   b) How to use queues, mail boxes and pipes for data sharing/communication ? **6**

SLR-EQ – 183

Seat No.	

M.E. (E&TC – Digital Electronics and Communication System)
(Semester – II) Examination, 2016
(Old – CGPA)
Paper – IX : WIRELESS AND MOBILE NETWORKS

Day and Date : Wednesday, 14-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Figures to **right** indicate **full** marks.*

*2) **All** questions are **compulsory**.*

SECTION – I

1. Attempt **any two** : **20**

   a) 1) Explain the factors influences on small scale fading.

      2) What are the advantages of wireless communication ?

   b) Explain concept of Doppler shift in multipath propagation. Also explain wireless communication system.

   c) Consider a transmitter which radiates a sinusoidal carrier frequency of 1850 MHz. For a vehicle moving 60 mph, compute the received carrier frequency in mobile is moving a) directly toward the transmitter b) directly away from the transmitter and c) in a direction which is perpendicular to the direction of arrival of transmitted signal.

2. Attempt **any two** : **15**

   a) Explain antenna diversity.

   b) Explain RAKE receiver in brief.

   c) Explain the properties of Block code. Also give the examples of block codes.

P.T.O.

SECTION – II

3. Attempt **any two** : **20**

   a) Explain mobile Ad-hoc networks. Also explain Ad-hoc routing.

   b) Explain collision Avoidance (RTS-CTS) protocols.

   c) Explain TCP segment format for mobile communication.

4. Attempt **any two** : **15**

   a) Explain MAC protocol frame format for 802.11.

   b) Explain Mobile IP in brief.

   c) Explain Wireless Application Protocol.

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SLR-EQ – 184

Seat No.	

M.E. (E & TC) Digital Electronics and Communication System (Semester – II) (CGPA) Examination, 2016
Elective – II : IMAGE AND VIDEO PROCESSING AND BROADCASTING (Old) (Paper – X)

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data if ***required****.*

SECTION – I

1. Write a short note on **any two** : **(5×2=10)**
   1) 2D sampling
   2) DWT
   3) KL transform

2. a) Show that for a stationary pth order AR sequence of length N, its non causal MVR can be written as $H_u = v + b$ and $E(vv^T] = B^2H$ and $E[vb^T] = 0$. **6**

   OR

   Explain maximum entropy restoration in detail.

   b) Explain Bayesian method for image filtering and restoration. **6**

3. a) Explain frequency domain filtering. **6**

   OR

   Explain generalized and iterative methods.

   b) Explain in detail one dimensional causal models. **7**

P.T.O.

SECTION – II

4. Write a short note on **any two** : **(5×2=10)**
   1) Spatial feature extraction.
   2) Region representation.
   3) Boundary extraction.

5. a) Explain detail various approaches for texture. **7**
   b) Explain image compression standards. **6**

   OR

   b) Discuss about the video compression techniques.

6. a) Discuss various operators used in edge detection. **6**
   b) Discuss image analysis in context with geometry shape features. **6**

   OR

   b) Discuss different classification techniques in detail.

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SLR-EQ – 187 (a)

Seat No.	

M.E. (Electronics and Telecommunication Engineering)
Digital Electronics and Communication System
(Semester – III) Examination, 2016
(Self-Learning Subject) (Paper – I) (Old)
MODELING AND SIMULATION OF COMMUNICATION SYSTEM

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**
   a) Explain multi-disciplinary aspects of simulation.
   b) What is performance estimation ?
   c) Explain methodology problem solving for simulation.

2. Solve **any one** question : **(7×1=7)**
   a) Explain classification of system properties for performance evaluation technique.
   b) Explain basic concepts of modeling in detail.

3. Attempt **any three** questions : **(6×3=18)**
   a) Explain the role of simulation in communication engineering system.
   b) Write a note on errors in system and device modeling.
   c) Explain the process of quantization.
   d) Explain validation processes for Random process Models and System model.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**
   a) Explain Seed numbers and vectors.
   b) Explain Histogram method.
   c) Explain frequency domain representation of periodic continuous signals.

5. Solve **any one** question : **(7×1=7)**
   a) Explain techniques for generating Uncorrelated Gaussian Random Numbers.
   b) Explain tools for generating pseudo-random number that are uniformly distributed between 0 and 1.

6. Attempt **any three** questions : **(6×3=18)**
   a) Explain Monte Carlo simulation model for communication system.
   b) Explain properties of Fourier transform.
   c) Write note on Gibbs phenomenon and Hilbert transform.
   d) Explain block diagram representation of systems.

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SLR-EQ – 188

Seat No.	

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
POWER ELECTRONICS (Paper – I)

Day and Date : Thursday, 15-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Explain with suitable diagrams of motor control with emphasis on Traction and Industrial Process Control. **10**

2. a) Draw the input and output characteristics of four of the following devices : **10**
   i) GTO
   ii) DIAC
   iii) TRIAC.

   OR

   b) Describe following ratings as applicable to SCR with help of neat diagram : **10**
   i) Surge current rating
   ii) Short circuit rating
   iii) di/dt rating
   iv) dv/dt rating.

3. a) Compare the performance parameters of a single phase full wave diode rectifier with mid-point and bridge configurations. **15**

   OR

   b) A three phase un-controlled full wave rectifier operates from a 415 V, 50 Hz supply and feeds a resistive load of 50 Ω . Calculate (i) Average output voltage (ii) RMS output voltage (iii) Average and RMS current (iv) Ripple factor. **15**

P.T.O.

SECTION – II

4. With the help of circuit diagram and relevant waveforms, explain the working of single phase half controlled converter with load (i) R (ii) L (iii) R-L-E. What is the advantage of connecting free-wheeling diode in the circuit ? **10**

5. a) Describe the working of single phase fully controlled bridge converter in the following two modes : **15**

   i) Rectifying mode

   ii) Inverting mode

   Also, sketch the waveforms for $\alpha = 45°$, $\alpha = 60°$ and $\alpha = 120°$.

   OR

   b) A three phase fully controlled converter charges a battery from a 3-phase supply of 230 V. The battery emf is 200 V and its internal resistance is 0.5 Ω. The charging current can be assumed to be constant at 20 A. Compute the firing angle delay. **15**

6. a) With the help of circuit diagram and waveforms explain the working of forward converter. Derive for output voltage in terms of input voltage, transformer turns ratio and duty cycle. **10**

   OR

   b) Explain with neat circuit diagram of three phase 180° mode inverter circuit with resistive load. Also draw suitable waveforms. **10**

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SLR-EQ – 189

Seat No.	

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
POWER SYSTEM DYNAMICS AND CONTROL (Paper – II)

Day and Date : Saturday, 17-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. a) Explain in detail the control hierarchy of power system in India and also explain the typical feedback control used in power system control. **9**

   b) Applying Euler's method to the equation $\frac{dy}{dx} = \lambda x$, given $y(x_0)=y_0$, determine its stability zone. **9**

2. a) Explain the voltage instability and frequency problem faced by power system in detail. **8**

   b) Explain the dynamics of a synchronous generator when connected to an infinite bus. **9**

SECTION – II

3. Give the assumption for synchronous machine modelling and derive Park's transformation. **18**

4. a) What is the necessity of prime mover control ? And also explain the basic structure of prime mover and energy supply system. **8**

   b) Explain the reasons for torsional oscillations. **9**

   OR

   Explain D-Q transformation using $\alpha - \beta$ variables. **9**

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SLR-EQ – 190

Seat No.	

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – III : DC DRIVES

Day and Date : Monday, 19-12-2016 Max. Marks : 70

Time: 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :

   a) Draw the speed torque characteristics of separately exited dc motor in constant torque and constant hp region. **8**

   b) Draw and explain speed torque characteristics single phase full wave half control converter fed dc drive in continues and discontinues mode for various value of firing angle. **9**

   OR

   A 220 V, 1500 rpm, 10 A separately exited dc motor is fed from single phase full wave half controlled rectifier with an AC source voltage of 230 V, 50 Hz, R_a = 2 Ohm, conduction can be assume to be continuous. Calculate firing angle for :

   a) Half the rated motor torque and 1000 rpm

   b) Rated motor torque and 500 rpm.

2. Solve **any two** questions from the following : **(2×9=18)**

   a) Derive condition for steady state stability of operating point of motor load combination.

   b) How 4 quadrant operation of dc motor is obtained with single unit of full control converter ?

   c) Draw circuit schematics for following :

      i) 3-phase converter fed single quadrant drive

      ii) 3-phase converter fed four quadrant drive.

P.T.O.

SECTION – II

3. Attempt **all** :

   a) Compare the circulating current mode and circulating current free mode in case of dual converter fed dc drive. **8**

   b) Explain with neat circuit diagram operation of two quadrant chopper fed dc drive. **9**

   OR

   Draw the block diagram speed control drive and state the application of speed control drive.

4. Solve **any two** questions from the following : **(2×9=18)**

   a) Why performance chopper fed dc drive is better as compare to converter fed dc drive ?

   b) Draw the waveform of armature voltage and armature current for single quadrant chopper fed dc drive.

   c) Draw the block diagram closed loop speed control drive operate in constant torque and constant HP region.

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SLR-EQ – 191

Seat No.	

M.E. (Electrical) (Semester – I) (CBCS/CGPA) Examination, 2016
Paper – IV : CONTROL ENGINEERING

Day and Date : Wednesday, 21-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **any four** : **(4×6=24)**
   a) Explain the basic structure of a feedback control system.
   b) Explain with the aid of a sketch, the construction and operation of a Linear Variable Differential Transformer (LVDT).
   c) Explain the constriction and operational features of the electro pneumatic transducer.
   d) Explain the effect of feedback on disturbance rejection in control systems.
   e) Explain the characteristics of the integral controller.

2. Attempt **any one** : **(1×11=11)**
   a) In designing control systems, the following aspects must be taken into account :
      i) Stability
      ii) Noise filtering
      iii) Sensitivity and robustness
      iv) Disturbance rejection.

      Explain the significance of each.
   b) Derive the transfer function model of thermal systems without carrier fluids and with carrier fluids.

SECTION – II

3. Attempt **any four** : **(4×6=24)**
   a) Explain the performance specifications in time domain.
   b) Explain the performance specifications in frequency domain.

P.T.O.

c) State space representation of positional control system.

d) Diagonalize the following system shown

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix} X + \begin{bmatrix} 1 \\ 0 \\ 2 \end{bmatrix} U \qquad Y = [1\ 0\ 0]\ X.$$

e) A unity feedback system is characterized by the open loop transfer function

$$G(s) = \frac{1}{s(0.5s+1)(0.2s+1)}.$$

i) Determine the steady state errors to unit step, unit ramp and unit parabolic inputs.

ii) Determine the rise time, peak time, peak overshoot and settling time of the unit step response of the system.

4. Attempt **any one** : **(1×11=11)**

a) Consider a type-1 unity-feedback system with an open loop transfer function, $G(s) = \frac{k}{s(s+1)}$. It is desired to have the velocity error constant K_v = 10. Furthermore, desire the P.M. of the system be atleast 45°.

b) A linear time invariant system is characterized by the state equation.

$$\begin{bmatrix} \dot{x}1 \\ \dot{x}2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x1 \\ x2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

Where u is a unit step function. Compute the solution of these equations assuming initial condition $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. Use inverse Laplace transform technique.

SLR-EQ – 192

Seat No.	

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2016

Paper – V : EXTRA HIGH VOLTAGE TRANSMISSION SYSTEM (Elective – I)

Day and Date : Friday, 23-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :
   a) What are the different mechanical considerations in EHV line performance ? **8**
   b) Explain the effect of resistance, power loss and skin effect on EHVAC-lines. **9**

   OR

   Derive Mangoldt (Markt-Mengele) Formulae.

2. Solve **any two** questions from the following : **(2×9=18)**
   a) What are the important and useful conclusions can be drawn for preliminary understanding of trends relating to power-handling capacity of a.c. transmission lines and line losses ?
   b) What are the different modes of propagation in EHV-AC lines ?
   c) Describe the charge-potential relations of a transmission line with *n* conductors on a tower.

SECTION – II

3. Attempt **all** :
   a) Explain the clear difference between travelling and standing wave theory. **8**
   b) What are the general principles of the lightning protection problem ? **9**

   OR

   Derive the generalized constants of a distributed parameter transmission line ?

P.T.O.

4. Solve **any two** questions from the following : **(2×9=18)**

   a) Explain if the transmission line is Open-Ended and is excited when double-exponential wave response ?

   b) What is tower footing resistance and explain ? Explain voltage rise and arrester rating.

   c) What is the purpose and significance of power circle diagram and its uses and also explain in detail the receiving end circle diagram for calculating reactive compensation for voltage control buses.

SLR-EQ – 195

Seat No.	

M.E. (Electrical Engineering) (Semester – II) (New – CBCS/CGPA) Examination, 2016
POWER ELECTRONICS APPLICATIONS TO POWER SYSTEM
(Paper – VI)

Day and Date : Thursday, 8-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :

   a) Explain current Controlled Synchronous Link Converter Var Compensator (SLCVC). **8**

   b) Derive the expression for active as well as reactive power flow in a uncompensated lossless transmission line. Draw necessary phasor diagram. **9**

   OR

   b) List out main objectives of load compensation and explain how to balance three phase unbalanced system by using passive elements with relevant diagrams and equations. **9**

2. Attempt **any two** :

   a) Principle of operation of 3-level and 4-level diode clamped multi-level inverters. **9**

   b) Explain following strategies, with reference to current controlled SLCVC. **9**

      i) Sensing the compensator current,

      ii) Sensing the source current.

   c) The particulars of the uncompensated transmission line are V = 220 V, f = 50 Hz, X = 1.2 Ω and $\delta = 80°$. Find

      i) The line current

      ii) The active power P

      iii) The reactive power Q. **9**

P.T.O.

SECTION – II

3. Attempt **all** :

   a) Explain operating control schemes of TSSC and TCSC. **8**

   b) What is the main objective of shunt compensation ? Derive real and reactive power expressions of a shunt compensated at mid-point of a transmission line. **9**

   OR

   b) Classify and explain various possible of HVDC configuration. **9**

4. Attempt **any two** :

   a) Draw equivalent circuit representation and explain with effect source inductance of 6-pulse converter. **9**

   b) Explain principle of turn-off delay angle control of basic GTO thyristor-controlled series capacitor and draw compensating voltage waveforms. **9**

   c) Write short notes on following terms with reference control of HVDC system. **9**

      i) Mode of stabilization

      ii) Current control (limit)

      iii) Voltage Dependent Current Order Limit (VDCOL).

SLR-EQ – 196

Seat No.	

M.E. (Electrical Engineering) (CBCS/CGPA) (Semester – II) Examination, 2016
Paper – VII : POWER QUALITY (New)

Day and Date : Friday, 9-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. a) Define power quality. What are the main objectives of power quality standards ? **9**

   b) What are the causes of sags and swell ? Mention the types of sag and swell. **9**

2. a) Explain for the following related with power quality.
      i) Voltage imbalance
      ii) Under voltage
      iii) Over voltage
      iv) Frequency variation. **8**

   b) What is harmonics ? Explain harmonic distortion with relevant waveforms. **9**

SECTION – II

1. Explain in detail about general procedure for harmonic distortion evaluation at the point of coupling, utility systems, customer facility and industrial facility. **18**

   OR

   What is the need of locating harmonic sources ? How will you find the harmonic sources from point of common coupling ? Give the identification procedure on the basis of voltage indices.

2. a) Explain briefly about for the following harmonic filter.
      i) Active filters ii) Passive filters **9**

   b) Explain in detail about principles of operation of shunt active power filter with neat schematic. **8**

   OR

   Explain design philosophy of filters to reduce harmonic distortion.

SLR-EQ – 197

Seat No.	

M.E. (Electrical Engineering) (Semester – II) (CBCS/CGPA) Examination, 2016
Paper – VIII : AC DRIVES (New)

Day and Date : Saturday, 10-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :
   a) Draw torque slip characteristic of a three-phase induction motor. Also draw motor current on the same characteristic. Explain the shape of torque slip characteristic. **8**
   b) Prove that under E/f control, for a given load torque fall in speed from synchronous to actual motor speed is same for any value of frequency of stator voltage. **9**

2. Solve **any two** : **(2×9=18)**
   a) Compare stator voltage control and E/f control strategies for speed control of a three phase induction motor.
   b) Draw and explain torque and power capability curves for a three phase induction motor. Hence explain constant torque and constant power regions of its operation.
   c) What is closed loop slip control scheme ? With neat block diagram, explain closed loop control of three phase induction motor speed using slip control.

SECTION – II

3. Attempt **all** :
   a) With neat block diagram explain true synchronous mode of speed control in synchronous motor. **8**
   b) Derive the voltage and torque equation of switched reluctance motor. **9**

4. Solve **any two** : **(2×9=18)**
   a) What is purpose of using damper windings in three phase synchronous motor ? Why these windings are not necessary in inverter fed synchronous motors ?
   b) Explain control strategy or close loop control of SRM.
   c) Explain 3ph to 2ph stationary references frame transformation.

SLR-EQ – 198

Seat No.	

M.E. (Electrical Engg.) (Semester – II) (CBCS/CGPA) Examination, 2016
ADVANCED CONTROL ENGINEERING (Paper – IX) (New)

Day and Date : Tuesday, 13-12-2016 Total Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **any two** : **(2×9=18)**

   a) Series compensation scheme with $G(s) = \frac{4e^{-2s}}{2s+1}$ and $Gc(s) = \frac{0.131(2s+1)}{2s}$. Determine the frequency-domain performance measures.

   b) What are the limitations of PID controller ? Explain in detail.

   c) Design the feedback-compensation scheme having the process model and the controller transfer function be $G(s) = \frac{4}{s(2s+1)}$ and $G_c(s) = 2s + 1$ for unit step input.

2. Design the series PID controller for SISO system having the plant dynamics $G(s) = \frac{Ke^{-2s}}{(8s+1)^2}$ and the controller $G_c(s) = K_p\left(1 + \frac{1}{T_i s}\right)(1 + T_d s)$. Estimate the series PID controller parameters by choosing G.M(Am) = 3 and P.M($\varnothing_m$) = $45°$. **(1×8=8)**

3. Design the PI-PD controller for SISO process model $G(s) = \frac{2}{s^2 - 4}$ and PI-PD controller $G_{c1}(s) = K_p\left(1 + \frac{1}{T_i s}\right)$ and $Gc2(s) = K_b + T_d s$. Given model parameters : $k = 2$; $\alpha_1 = 0$ and $\alpha_0 = -4$ using the plot for the optimised coefficients : $c_1 = 0.5$ ------> $d_2 = 1.595$ and $d_1 = 2.12$
   Estimate the PI-PD controller parameters for SISO process. **(1×9=9)**

   OR

Series-feedback compensation scheme with $G(s) = \frac{4e^{-2s}}{4s-1}$ and the controllers $Gc1(s) = \frac{0.262s + 0.131}{2s}$ and Gc2(s) = 0.5(s + 1). Determine the time-domain performance measures for static load disturbances.

a) In the absence of the inner-loop controller.

b) With the inner-loop controller in action.

SECTION – II

4. Attempt **any two** : **(2×9=18)**

   a) Derive the analytical expressions for the parameters of the transfer function with gain and delay is $G(s) = ke^{-\theta s}$.

   b) Describe the first order system by using state-space analysis.

   c) How to measure the critical parameters of a limit cycle output signal by using wavelet transform ?

5. What are the conditions for sustained oscillatory output of FOPDT transfer function model ? **(1×8=8)**

6. Derive the expression for determining exact conditions for existence of limit cycles. **(1×9=9)**

   OR

   How to identify the FOPDT model by using state-space analysis.

SLR-EQ – 201

Seat No.	

M.E. (Electrical Engineering) (Semester – II) (New) Examination, 2016
Paper – X : HIGH VOLTAGE DC TRANSMISSION (Elective – II)
(CGPA/CBCS)

Day and Date : Wednesday, 14-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :
   a) What are the equipment used in HVDC transmission system ? Explain in detail. **8**
   b) In a mono polar HVDC link which is energised with 3-ph, 50 Hz, 400 kV source, the commutation reactance is 10 ohm and the rectifier (six pulse bridge converter) end DC voltage is 500 kV. For delay angle 20°
      i) Find the DC current in the link.
      ii) Find the commutation angle u
      iii) If AC voltage reduced to 200 kV, find the commutation angle u. Assume DC current is constant. **9**
2. Solve **any two** : **(2×9=18)**
   a) With the help of a neat diagram, explain and analyse 6 pulse converter operation in 2 and 3 valve conduction mode.
   b) Explain the working of working basic power controller using VDCOL (Voltage Dependent Current Order Limiter).
   c) Explain firing angle control in detail.

SECTION – II

3. Attempt **all** :
   a) Explain the over current protection. **8**
   b) What are the various types of filters that are employed in HVDC converter station ? Discuss them in detail. **9**
4. Solve **any two** : **(2×9=18)**
   a) What are the causes of over voltages ? Explain protection against over voltages.
   b) Give a detailed account of design aspects of the following filters :
      i) Single tuned filter ii) Double tuned filter
   c) Explain potential applications of MTDC system. What are the types of MTDC systems ? Explain each in detail.

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SLR-EQ – 202

Seat No.	

M.E. (Electrical Engineering) (Semester – III) (Old) Examination, 2016
Self Learning
SMART GRID (Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :

   a) Explain concept of Smart Grid and its characteristics. **8**

   b) Explain in detail the Outage Management System (OMS) and functions of each part of OMS. **9**

   OR

   Write a note on Substation Automation equipments.

2. Solve **any two** questions from the following : **(2×9=18)**

   a) Explain the following terms related to Smart Grid.

      i) Objectives

      ii) Functions

      iii) Challenges

   b) Explain the concept Plug in Hybrid Electric Vehicles.

   c) Enlist energy storage technologies and explain the concept of Superconducting Magnetic Energy Storage (SMES).

P.T.O.

SECTION – II

3. Attempt **all** :

   a) Discuss the technical and economical advantages of microgrid. **8**

   b) Describe the concept power quality conditioning technologies. **9**

   OR

   Give importance of HAN in smart grid.

4. Solve **any two** questions from the following : **(2×9=18)**

   a) Explain concept of microgrid and its need and application. What are the key differences between a Microgrid and a conventional power plant ?

   b) Explain PV system and also write down the types of PV cell.

   c) Explain the term “NAN”. Explain the concept WAN related to smart grid.

SLR-EQ – 234

Seat No.	

M.E. (Electronics and Telecommunication Engg.) (Semester – I) (CGPA) Examination, 2016
ADVANCED LIGHT WAVE COMMUNICATION (Old) (Paper – I)

Day and Date : Wednesday, 21-12-2016 Total Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*

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

3) Assume ***suitable*** *data if required.*

SECTION – I

1. Attempt **any one** of the following questions : **(7×1=7)**
   a) Explain population inversion and operation of injection laser.
   b) A photodiode has a quantum efficiency of 65%, when photons of energy 1.5×10^{-19} joule are incident upon it.
      i) At what wavelength is the photodiode operating ?
      ii) Calculate the incident optical power required to obtain a photocurrent of $2.5\,\mu A$ when the photodiode is operating as described above.

2. Attempt **any two** of the following questions : **(5×2=10)**
   a) Describe linear scattering losses in optical fiber.
   b) Discuss design considerations of digital drive circuit for LASER source.
   c) With neat structure explain working of PIN and avalanche photo detector.

3. Write a short note on (**any three**) : **(6×3=18)**
   a) Intermodal dispersion in a multimode step index fiber.
   b) Optical amplifiers.
   c) Design consideration of receiver for LAN.
   d) Modes in optical fiber.

P.T.O.

SECTION – II

4. Attempt **any one** of the following questions : **(7×1=7)**
   a) With suitable diagram explain working principle of WDM system.
   b) Explain DWDM and compare it with WDM.

5. Attempt **any two** of the following questions : **(5×2=10)**
   a) Explain Passive WDM devices.
   b) Explain graded index fiber with different profiles.
   c) Explain working principle of detector.

6. Write a short note on (**any three**) : **(6×3=18)**
   a) Design consideration of optical multiplex/demultiplex.
   b) Long haul high bandwidth system.
   c) BER and cut off wavelength.
   d) Surface emitter LED.

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SLR-EQ – 235

Seat No.	

M.E. (E & TC Engineering) (Semester – I) (Old-CGPA) Examination, 2016
LINEAR ALGEBRA AND ERROR CONTROL TECHNIQUES (Paper – II)

Day and Date : Friday, 23-12-2016 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Note : *i)* ***All*** *questions* ***compulsory****.*
ii) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
iii) Figures to the ***right*** *indicate* ***full*** *marks.*
iv) ***Use*** *of electronic pocket calculator is* ***allowed****.*

SECTION – I

1. Attempt **any two** questions : **15**

   a) Describe briefly linear transformation and its properties.

   b) Let $A = \begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$, $u = \begin{bmatrix} 6 \\ -5 \end{bmatrix}$ and $v = \begin{bmatrix} 3 \\ -2 \end{bmatrix}$ are u and v Eigen vectors of A ?

   c) Explain the inner product spaces with suitable example.

2. Attempt **any two** questions : **15**

   a) Explain matrix algebra with suitable example.

   b) Write short note on orthogonality.

   c) Explain the vector space with suitable example.

3. Attempt **any one** question : **5**

   a) Explain the Schwarz's Inequality.

   b) Show that 7 is an Eigen value of matrix $A = \begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$. Find corresponding vectors.

P.T.O.

SECTION – II

4. Attempt **any two** questions : **15**

   a) Explain maximum likelihood Algorithm.

   b) Explain Linear Block Code with suitable example.

   c) Draw and explain Cyclic Decoder.

5. Attempt **any two** questions : **15**

   a) Explain BCH decoder.

   b) Devise a syndrome computation circuit for binary double-error correcting (31, 21) BCH code.

   c) Describe in detail structural properties of convolutional codes.

6. Attempt **any one** question : **5**

   a) Explain code based spectral techniques on Fourier transform.

   b) Write short note on distance properties of convolutional codes.

SLR-EQ – 236

Seat No.	

M.E. (E&TC-Digital Electronics and Communication System)
(Semester – I) (Old-CGPA) Examination, 2016
PROBABILITY AND RANDOM PROCESS (Paper – IV)
(CGPA Pattern W.e.f. 2013)

Day and Date : Wednesday, 21-12-2016 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figures to the* ***right*** *indicate* ***full*** *marks.*
2) ***All*** *questions are* ***compulsory****.*

SECTION – I

1. Attempt **any two** . **20**

   a) Explain Laplace Distribution in details.

   b) Explain Moment generation function using generating function.

   c) Six dice are tossed. Using the generating function, to find the probability that the sum of the faces of the dice add to 24.

2. Explain **any two**. **15**

   a) Explain Bay's Theorem.

   b) An urn contains 5 red, 12 green, and 8 yellow balls. Three are drawn without replacement.
      i) What is the probability that a red, a green, and a yellow ball will be drawn ?
      ii) What is the probability that the last ball to be drawn will be green ?

   c) A room contains two urns A and B. A contains nine red balls and one green ball; B contains four red balls and four green balls. The room is darkened; a man stumbles into it, gropes about for an urn, draws two balls without replacement, and leaves the room.
      i) What is the probability that both balls will be red ?
      ii) Suppose that one ball is red and one is green : what is the probability that urn A now contains only eight balls ?

P.T.O.

SECTION – II

3. Explain **any two** . **20**

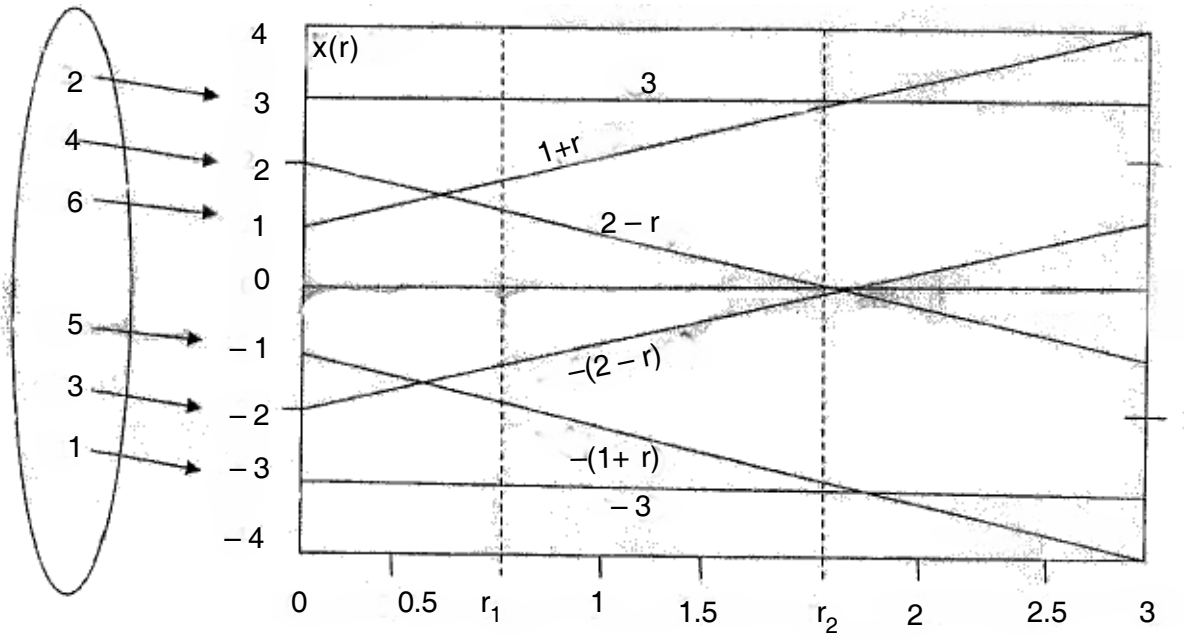
   a) Explain Markov processes in details.

   b) Explain Stationary Random Process.

   c) A die is tossed, and corresponding to the dots S = {1, 2, 3, 4, 5, 6} , a random process X(t) is formed with the following time functions as shown in Fig bellow :

   X(2 : r) = 3, X(4 : r) = (2 – r), X(6 : r) = (1 + r)

   X(1 : r) = – 3, X(3 : r) = – (2 – r), X(5 : r) = – (1 + r)



   Check whether X(t) is stationary.

4. Attempt **any two**. **15**

   a) Explain Ergodic Processes.

   b) A random process X(t) = A, where A is random variable uniformly distributed over [0, 1]. Since E[A]=½ and $R_A(\tau) = E[A^2] = \frac{1}{3}$, this process is stationary, Check whether Ergodicity in the mean or not ?

   c) Define Random process. Also give its interpretations.

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SLR-EQ – 237

Seat No.	

M.E. (Biomedical Engineering) (Semester – III) Examination, 2016
Self Learning Subject : COMPUTER NETWORKING IN MEDICINE
(Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

1. a) Draw and explain protocols and standards of OSI reference model. **7**
   b) Define following terms : **6**
      i) Simplex and full duplex dataflow modes
      ii) Mesh topology
      iii) LAN and WAN.

2. Solve **any 2** : **(6×2=12)**
   a) Explain working of TCP/IP reference model with necessary figures.
   b) Explain procedures of data transmissions through following media with neat figures :
      i) Coaxial cable
      ii) Power lines.
   c) Explain the concept of cyclic codes and checksum codes with each of example.

3. Solve **any 2** : **(5×2=10)**
   a) Discuss relations of services to protocols with one example.
   b) List various error correcting codes and explain any 2 with each of example.
   c) Define line coding and decoding. Also mention their characteristics.

P.T.O.

SECTION – II

4. a) Explain multiplexing and demultiplexing process in transport layer. **7**

   b) Define following terms : **6**

      i) IP address

      ii) Subnets

      iii) Tunneling.

5. Solve **any 2** : **(6×2=12)**

   a) Draw and explain working of FTP. (File Transfer Protocol).

   b) Draw and explain routing process within a datagram network.

   c) Define SMTP and explain protocols of SMTP used in electronic mail with neat figure.

6. Solve **any 2** : **(5×2=10)**

   a) Define DNS and explain its purpose with necessary diagram.

   b) Discuss various duties and Quality of Services (QOS) of transport layer.

   c) Write a short note on :

      i) HTTP and WWW

      ii) Authentication and cryptography.

SLR-EQ – 300 (1)

Seat No.	

M.E. (Electronics Engineering) (Semester – III) (New) Examination, 2016
Self Learning Subject – NETWORK AND INTERNET SECURITY
(Paper – I)

Day and Date : Saturday, 24-12-2016 Max.Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***if*** *necessary.*

SECTION – I

1. a) Discuss wireless network threats and security measures. **7**
   b) Explain biometric techniques for security and identification. **6**

2. Solve **any two** : **(6×2=12)**
   a) Discuss passive security attacks.
   b) Discuss remote user authentication principles.
   c) Discuss different IEEE 802.11 services.

3. Solve **any two** : **(5×2=10)**
   a) Discuss WAP infrastructure.
   b) Discuss cryptographic algorithm for WAP.
   c) Discuss motivation and requirements for Kerberos.

SECTION – II

4. a) Explain internet mail architecture. **7**
   b) Discuss applications of IPsec. **6**

5. Solve **any two** : **(6×2=12)**
   a) Discuss multiple threat malware.
   b) Discuss intrusion detection.
   c) Discuss packet filtering firewall.

6. Solve **any two** : **(5×2=10)**
   a) Discuss Pretty Good Privacy steps implemented and reasons for its growth.
   b) Discuss controls provided by firewall-service, direction, user and behavior.
   c) Discuss encapsulating security payload for IP security.

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SLR-EQ – 300(3)

Seat No.	

M.E. (Electronics Engineering) (Semester – III) (New) Examination, 2016
Paper – I : Self-Learning Subject : ADVANCED SIGNAL AND IMAGE PROCESSING

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Solve **any four** of the following : **20**
   a) Explain Biometric system with the help of neat diagram.
   b) Explain the design cycle of Biometric system.
   c) Explain how fuzzy logic is useful in biomedicine.
   d) Explain the filters used to reduce the noise in medical images.
   e) Explain feature extraction process in medical image processing.

2. Solve the following :
   a) What are the various security and privacy related issues in Biometric system ? Explain. **8**
   b) Explain biomedical image processing with the help of neat diagram. **7**

   OR

   b) Explain how fuzzy logic is useful in industrial automation. **7**

SECTION – II

3. Solve **any four** of the following : **20**
   a) Explain with the help of equations, effect of scaling on power consumption.
   b) Explain how the power is estimated in sequential circuits.
   c) Explain the various power reduction techniques.
   d) Explain the Euclidean GCD algorithm for polynomials.
   e) Explain in detail force directed scheduling algorithm.

4. Solve the following :
   a) Explain Wallace tree multiplier with the help of neat diagram. **8**
   b) Explain simulation and non-simulation based approaches in low power VLSI design. **7**

   OR

   b) Explain the application of DSP processor in Multimedia signal processing. **7**

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SLR-EQ – 301 (3)

Seat No.	

M.E. (CSE) (Semester – III) (New) Examination, 2016
Self Learning Subject : COMPUTER NETWORK ADMINISTRATION
(Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) Q.**1** from Section – **I** and Q.**5** from Section – **II** are **compulsory**.*
*2) Attempt **any two** questions from Q.**2** to Q.**4** for Section – **I** and **any two** questions from Q.**6** to Q.**8** for Section – **II**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

1. Describe current status and future of network management. **7**

2. A) Draw a diagram for Data and Telecommunication network and explain. **7**
   B) Write a note on – Challenges of information technology manager. **7**

3. A) Explain ASN.1 in detail. **7**
   B) Describe Analogy of Telephone network management. **7**

4. A) Describe different organization models of SNMP 1 network management. **7**
   B) Describe elements of system group in MIB. **7**

SECTION – II

5. Explain different SNMP operations. **7**

6. A) Describe MIB leniographic ordering. **7**
   B) List and explain SNMP access policies. **7**

7. A) Explain ATM Remote monitoring with help of ATM RMON MIB. **7**
   B) Explain RMON 1 groups and functions. **7**

8. A) Write a note on – System and application management. **7**
   B) List and explain Enterprise Management solutions. **7**

SLR-EQ – 301(1)

Seat No.	

M.E. (CSE) (Semester – III) (New) Examination, 2016
SELF LEARNING – Bigdata (Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70

Time: 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Answer **any four** : **24**

   a) Illustrate Bigdata management architecture with neat diagram.

   b) Analyze the role of relational databases in Bigdata and explain.

   c) Elaborate Server, Network and Application virtualization.

   d) Provide map-reduce function for matrix multiplication.

   e) What type of database is supported by HBase ? Elaborate its characteristics.

2. Answer the following : **6**

   What is Bigdata Technology Stack ? Elaborate its Layer 0 in detail.

3. Answer the following : **5**

   With the block diagram explain HDFS.

SECTION – II

4. Answer **any four** : **24**

   a) What are map-reduce functions ? Elaborate matrix-vector multiplication using map-reduce.

   b) Explain the company needs for data in motion.

   c) How Bigdata is ethically neutral ? Elaborate.

   d) What are the four elements of Bigdata ethics ? Explain in detail.

   e) How fraud is prevented with Bigdata analytics ? Illustrate with example.

5. Answer the following : **6**

   Elaborate the union, intersection, difference, grouping and aggregation operations by map-reduce.

6. Answer the following : **5**

   What is streaming data ? Explain it in healthcare industry and energy.

SLR-EQ – 302 (3)

Seat No.	

M.E. (Electronics and Telecommunication Engineering)
(Semester – III) Examination, 2016
(Self-Learning Subject)
MODELING AND SIMULATION OF COMMUNICATION SYSTEM
(Paper – I) (New)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**
   a) Explain multi-disciplinary aspects of simulation.
   b) What is performance estimation ?
   c) Explain methodology problem solving for simulation.

2. Solve **any one** question : **(7×1=7)**
   a) Explain classification of system properties for performance evaluation technique.
   b) Explain basic concepts of modeling in detail.

3. Attempt **any three** questions : **(6×3=18)**
   a) Explain the role of simulation in communication engineering system.
   b) Write a note on errors in system and device modeling.
   c) Explain the process of quantization.
   d) Explain validation processes for Random process Models and System model.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**
   a) Explain Seed numbers and vectors.
   b) Explain Histogram method.
   c) Explain frequency domain representation of periodic continuous signals.

5. Solve **any one** question : **(7×1=7)**
   a) Explain techniques for generating Uncorrelated Gaussian Random Numbers.
   b) Explain tools for generating pseudo-random number that are uniformly distributed between 0 and 1.

6. Attempt **any three** questions : **(6×3=18)**
   a) Explain Monte Carlo simulation model for communication system.
   b) Explain properties of Fourier transform.
   c) Write note on Gibbs phenomenon and Hilbert transform.
   d) Explain block diagram representation of systems.

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SLR-EQ – 303 (3)

Seat No.	

M.E. (Electronics and Telecommunication Engineering)
(Digital Electronics and Communication System)
(Semester – III) Examination, 2016
(Self-Learning Subject)
MODELING AND SIMULATION OF COMMUNICATION SYSTEM
(Paper – I) (New)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

1. Solve **any two** questions : **(5×2=10)**
   a) Explain multi-disciplinary aspects of simulation.
   b) What is performance estimation ?
   c) Explain methodology problem solving for simulation.

2. Solve **any one** question : **(7×1=7)**
   a) Explain classification of system properties for performance evaluation technique.
   b) Explain basic concepts of modeling in detail.

3. Attempt **any three** questions : **(6×3=18)**
   a) Explain the role of simulation in communication engineering system.
   b) Write a note on errors in system and device modeling.
   c) Explain the process of quantization.
   d) Explain validation processes for Random process Models and System model.

P.T.O.

SECTION – II

4. Solve **any two** questions : **(5×2=10)**
   a) Explain Seed numbers and vectors.
   b) Explain Histogram method.
   c) Explain frequency domain representation of periodic continuous signals.

5. Solve **any one** question : **(7×1=7)**
   a) Explain techniques for generating Uncorrelated Gaussian Random Numbers.
   b) Explain tools for generating pseudo-random number that are uniformly distributed between 0 and 1.

6. Attempt **any three** questions : **(6×3=18)**
   a) Explain Monte Carlo simulation model for communication system.
   b) Explain properties of Fourier transform.
   c) Write note on Gibbs phenomenon and Hilbert transform.
   d) Explain block diagram representation of systems.

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SLR-EQ – 304

Seat No.	

M.E. (Electrical Engineering) (Semester – III) (New) Examination, 2016
Self Learning
SMART GRID (Paper – I)

Day and Date : Saturday, 24-12-2016 Max. Marks : 70
Time : 11.00 a.m. to 2.00 p.m.

SECTION – I

1. Attempt **all** :

   a) Explain concept of Smart Grid and its characteristics. **8**

   b) Explain in detail the Outage Management System (OMS) and functions of each part of OMS. **9**

   OR

   Write a note on Substation Automation equipments.

2. Solve **any two** questions from the following : **(2×9=18)**

   a) Explain the following terms related to Smart Grid.

      i) Objectives

      ii) Functions

      iii) Challenges

   b) Explain the concept Plug in Hybrid Electric Vehicles.

   c) Enlist energy storage technologies and explain the concept of Superconducting Magnetic Energy Storage (SMES).

P.T.O.

SECTION – II

3. Attempt **all** :

   a) Discuss the technical and economical advantages of microgrid. **8**

   b) Describe the concept power quality conditioning technologies. **9**

   OR

   Give importance of HAN in smart grid.

4. Solve **any two** questions from the following : **(2×9=18)**

   a) Explain concept of microgrid and its need and application. What are the key differences between a Microgrid and a conventional power plant ?

   b) Explain PV system and also write down the types of PV cell.

   c) Explain the term “NAN”. Explain the concept WAN related to smart grid.