M.E. (Civil Structural Engineering) (Semester – I) (CBCS/CGPA Pattern) Examination, 2018 THEORY OF ELASTICITY AND PLASTICITY (Paper – I)

Day and Date : Monday, 7-5-2018 Time: 10.00 a.m. to 2.00 p.m.

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

SECTION - I

- 1. a) Write six compatibility equations in cartesian coordinate for 3-D problem of elasticity.
 - b) By ignoring is the following state of stress is possible $\begin{aligned} \sigma_{x} &= 10x^{2}yz, \, \sigma_{y} = 2xy^{3}z, \, \sigma_{z} = 3x^{3} + y^{3} - 5yz \\ \tau_{xz} &= 0, \, \tau_{xy} = -xy^{2}z, \, \tau_{yz} = -12 \, z^{2}xy^{2} + 14x^{2} \end{aligned}$ If not, what body forces will satisfy the equilibrium equations ? 11
- 2. a) Find stress distribution in a thick cylinder subjected to internal bursting pressure 10 MPa. Take inner and outer radii as 300 mm and 400 mm respectively. Hence find the maximum shear stress developed. 11
 - b) Prove that the stress function ϕ_1 represents the same stress distribution as given by ϕ in polar system when $\phi_1 = \phi + (A \cos \theta + B \sin \theta)r + C$ where A, B and C are arbitrary constants.
- 3. a) Find the principal stresses developed for following state of stress at a point

$$σx = 100 MPa, σy = 80 MPa, σz = 70 MPa$$

 $τxy = 50 MPa, τyz = 40 MPa, τzx = 80 MPa.$
11

b) Derive differential equation of equilibrium for a 2-D problem of elasticity in polar coordinate system. 6

SLR-TD – 1

Max. Marks: 70

5

SECTION - II

4.	a)	Write a short note on "Membrane Analogy".	6
	b)	Find shear stresses in a bar with elliptical cross section subjected to end torsion.	12
5.	a)	Explain Partial, Complete and Over-Complete collapse.	5
	b)	Sketch zones with alternatively positive and negative warp for following cross-section of a shaft subject to torque "T" :	
		i) Equilateral triangle	
		ii) Rectangle with $D/b = 1.4$	
		iii) Square	
		iv) Rectangle with $D/b = 2$.	5
	c)	Find Collapse load for a simply supported circular plate subject to a concentrated load at centre.	8
6.	a)	Write a note on idealized material behavior in plasticity.	6
	b)	State of stress at which a strained material yields is	
		$\sigma_x = 110 \text{ MPa}, \sigma_y = -20 \text{ MPa}, \tau_{xy} = 40 \text{ MPa}$	
		Find the stress in unidirectional tension using Tresca as well as Mises criterion.	11

Seat No.

M.E. (Civil Structures) (Semester – I) (CBCS/CGPA) Examination, 2018 MECHANICS OF STRUCTURES (Paper – II)

Day and Date : Tuesday, 8-5-2018 Time : 10.00 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 required and mention it clearly.

SECTION - I

- 1. A) State and explain Muller Breslan's principle for influence line diagrams of indeterminate structures.
 - B) Draw ILD for shear force and bending moment at C, shown in Fig. 1. 8



Fig. 1

2. A circular ring beam is supported on four columns symmetrically placed, forming a square of side 'L'. The ring beam is subjected to a UDL of 'w' throughout its length. Draw BMD and TMD. Refer Fig. 2.

Fig. 2

SLR-TD – 2 Set P

Total Marks: 70



3. Draw SF, BM, deflection and foundation pressure diagram for a semi-infinite beam on elastic foundation fixed at one end and subjected to Udl of 'w' throughout the length.

OR

3. Draw SF, BM, deflection and foundation pressure diagram for a semi-infinite beam on elastic foundation hinged at one end and subjected to Udl of 'w' throughout the length.

SECTION - II

4. Derive the equation for slope at propped end of beam shown in Fig. 3. 12



Fig. 3

5. Analyse the beam shown in Fig. 4 by stiffness method. Support B sinks down by 10 mm. Take EI = 45000 kNm².
12



Fig. 4

OR

...

11

5. Analyze the frame shown in Fig. 5





- 6. A) Derive the stiffness matrix for a beam element (2D). 5 6
 - B) Derive the force transformation matrix for a truss element (2D).

Seat No.

M.E. (Civil Structures) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – III : ADVANCED DESIGN OF CONCRETE STRUCTURES

Day and Date : Friday, 11-5-2018 Time : 10.00 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 calculator and IS 456, IS 3370 Part IV are allowed.

4) **Neat** sketch should be drawn **wherever** necessary.

SECTION - I

- Design the typical interior panel of a flat slab floor of size 6 m × 6 m supported by columns of size 500 mm × 500 mm. Provide suitable drop. Take live load of 4 kN/m². Use M25 concrete and Fe415 steel. Sketch the reinforcement details of the slab.
- 2. Design a combined rectangular footing for columns located at distance of 4.2 m centre to centre. The overall size of column is 400 mm \times 400 mm and 500 mm \times 500 mm and they are transferring 900 kN and 1200 kN respectively. The centre of the lighter column is 0.7 m from the property line. The safe bearing capacity of the soil is 200 kN/m². Use M20 concrete and Fe500 steel. Sketch the reinforcement details.
- Design a circular tank of capacity 12 lakh litres. The depth of water tank including free board is restricted to 4.8 m. The joint between floor and wall of the tank is rigid. Use I.S. code method of design. Consider M25 concrete and Fe500 steel. 17

SECTION - II

- 4. a) Explain in brief strength concept, stress concept and load balancing concept with neat sketch.
 - b) Design prestressed concrete beam of I section to the following particulars. 10
 - i) Span = 18 m
 - ii) Superimposed load = 35 kN/m

IURES

Total Marks : 70



8

17

SLR-TD - 3

- iii) Safe stress in concrete in compression at transfer at stress = 0.5 fck
- iv) Safe stress in concrete in compression at service = 0.4 fck
- v) Allowable tensile stress in concrete = 0.219 \sqrt{fck}
- vi) Total loss of stress = 18%
- vii) Ultimate stress in steel = 1500 N/mm²
- viii) Safe stress in steel = 60% of ultimate stress
- ix) Cube strength of concrete at 28 days = 35 N/mm^2 .
- 5. a) A prestressed concrete pile 400 mm × 400 mm is prestressed by 40 wires of 2 mm diameter. The wires are uniformly distributed over the section. The wires are initially subjected to a pull of 280 kN. Find the final prestress in the concrete after all losses. Take Es = 2×10^5 mm², Ec 3×10^{-4} mm², relaxation loss = 5%, shrinkage strain = 1.9×10^{-4} , creep strain = 28×10^{-6} per mm² of stress.
 - b) The end block of a post tensioned member is 300 mm wide and 600 mm deep is subjected to an axial prestress force 1150 kN. Design the end block by Guyon's method.
- 6. A prestressed tank of diameter 16 m has to resist an internal head of 4.5 m 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 times ultimate stress, safe stress in concrete at service condition shall remain compressive, stress in steel is 1000 N/mm², loss of prestress is 18%, modular ratio is 8.

8

7 P.T.O.

c) Explain Newmark's- β method of evaluating response of a system subjected to general dynamic loading.

M.E. (Civil-Structure) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – IV : DYNAMICS OF STRUCTURES

Day and Date : Saturday, 12-5-2018

Time : 10.00 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 suitable data if **necessary** and assume it **clearly**.

SECTION - I

- 1. a) With suitable examples define dynamic degrees-of-freedom.
 - b) From first principle derive the differential equation of a simple pendulum of mass m. Obtain the solution if it is given an initial angular displacement θ_0 . Plot the angular displacement versus time graph. 13
- 2. A platform of weight 17.8 kN is being supported by four equal columns which are clamped to the foundation as well as to the platform. Experimentally it is observed that a static force of 4.48 kN applied horizontally to the platform produces a displacement of 2.54 mm. It is estimated that R = 5%. Determine for the structure the following :
 - a) Undamped natural frequency.
 - b) Absolute damping coefficient.
 - c) Logarithmic decrement.

	d)	Number of cycles and time required for the amplitude of motion to reduce from an initial value of 2.54 mm to 0.254 mm.	17
3.	a)	Derive the expression for Duhamel's Integral for damped system.	5
	b)	Explain how damping coefficient can be evaluated by forced vibration test.	5
	\sim	Explain Nowmark's B mothed of avaluating response of a system subjected	





Max. Marks: 70

SLR-TD - 4

SECTION – II

- 4. A uniform simply supported beam of span L, flexural rigidity EI and mass m per unit length is idealized as a two degrees-of-freedom system by lumping the mass at both the one-third points of span such that each lumped mass is mL/3. Find the natural frequencies and corresponding mode shapes of the system. 18
- 5. A two storey frame is subjected to sinusoidal force 890 sin (5.3t) N at the first floor level. Mass of the first floor is 24 tonne and that of second floor is 12 tonne. Stiffness of the first floor is 10.4 kN/mm and that of second floor is 5.2 kN/mm. Obtain expression for total response of each floor by using modal analysis method. Neglect damping.
- 6. a) Derive orthogonality condition for a beam in flexure considering the beam as a continuous system.
 - b) Perform free vibration analysis of a simply supported beam and determine its first three natural frequencies and mode shapes. 11

6

Seat No.

4

8

4

Elective – I : DESIGN OF FOUNDATIONS (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 2.00 p.m.

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

- 2) Make suitable assumption if necessary and mention it clearly.
- 3) Figures to the **right** indicates **full** marks.

M.E. (Civil – Structures) (Semester – I) (CBCS/CGPA) Examination, 2018

SECTION - I

- 1. A) Explain the IS code equation to determine the bearing capacity. How the shape factor, depth factor and inclination factors are calculated in this equation?
 - B) A square footing has to carry load of 1500 kN. Find size of footing for FOS of 2.5. The depth of foundation is 2m. Soil has following properties

G = 2.6, e = 0.6, Sr = 0.5, \emptyset = 30° and C = 10 kN/m².

What will be safe bearing capacity of soil for above case if voids ratio of soil is 0.8 instead of 0.6. Find the size of the footing in this case. Take $N_{c} = 37.5, N_{a} = 22.5 \text{ and } N_{v} = 19.7$.

- 2. A) Describe different types of combined footing with neat sketch. Mention their suitability also.
 - B) Design a strap footing to carry two column loads of 1000 kN and 1800 kN. The centre to centre distance between the columns are 6 m. Size of column are $500 \text{ mm} \times 500 \text{ mm}$ (1000 kN) and 600 mm $\times 600 \text{ mm}$ (1800 kN). Footing area under the columns are respectively $1m \times 2.8m$ and $2.8m \times 2.8m$ connected by strap. Take SBC = 205 kN/m². Use M-20 concrete and Fe-415 steel.

8

Set

Max. Marks: 70

SLR-TD – 5

	.R-TD – 5	SL
5	. A) Explain various steps in designing rigid raft foundation.	3.
6	B) Describe various types of raft foundation.	
5	A) What are different types of settlement which can occure in a foundation ? How are these estimated ?	4.
6	B) Write a short note on different shear failures in soil mass in detail.	
	SECTION – II	
4	A) Write a note on negative skin friction.	5.
o	 B) A square group of 9 piles was driven into a soft clay extending to a larger depth. The diameter and length of the piles were 30 cm and 9m respectively. If the unconfined Compressive strength of clay is 90 kN/m², and the spacing is 90 cm centre to centre, what is the capacity of group ? Assume FOS 2.5 and adhesion factor 0.75. 	
0		0
4 1	 A) With the help of heat sketch show the various components of well foundation. B) Discuss in detail working of procumatic asisson 	6.
4	C) What are the conditions in which drilled piers are more suitable than caisson?	
4	 A) Draw the sketch of block foundation with all 6 degrees of freedom (3 translation and 3 rotation). 	7.
4	B) What do you understand by vibrator isolators ? Describe them.	
3	C) Write short note on permissible amplitude of vibration for machine.	
	. Give the detail classification of pile foundation :	8.
4	A) Describe various types of drilled pier.	
3	B) Describe various types of machine foundation.	
4	C) Discuss the criteria for satisfactory performance of machine foundation.	

Max. Marks: 70

Seat No.

Set P

M.E. (Civil Structures) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – V : ADVANCES IN CONCRETE COMPOSITES (Elective – I)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 2.00 p.m.

Note : Answer any two full questions from each Section.

SECTION - I

1.	a)	Explain the properties of constituent materials of Fiber reinforced concrete.	6
	b)	Explain the materials used in Ferro cement.	6
	c)	What are the applications of Fiber Reinforced Concrete ?	6
2.	a)	Explain the advantages and disadvantages of Ferro cement.	6
	b)	Explain the mechanical properties of Ferro cement. Explain the application of Ferro cement.	6
	c)	What is meant by Fiber Reinforced Concrete. Explain the different types of Fibers used for construction Fiber Reinforced Concrete.	6
3.	a)	Explain the Mix proportion of FRC ? Explain the properties of freshly mixed concrete of FRC.	6
	b)	Explain the mechanical properties of Fiber reinforced concrete.	6
	c)	Explain the factors affecting the properties of Fiber Reinforced Concrete.	6
		SECTION – II	
4.	a)	Explain different physical and chemical properties of Silica Fumes.	6
	b)	Write on Mechanical properties and durability of Silica Fume concrete.	6
	c)	Write a note on application and advantages of Silica Fume concrete.	5
5.	a)	Explain properties of constituent materials of Polymer Concrete.	6
	b)	Write on Polymer impregnated concrete.	6
	c)	Write a note on Application of Polymer concrete.	5
6.	a)	Explain properties of Silica Fume concrete in fresh state.	6
	b)	Write on classification of polymer concrete.	6
	c)	Write note on types of polymer concrete.	5

Seat No.

M.E. (Civil-Structures) (Semester – II) (CBCS/CGPA) Examination, 2018 THEORY OF PLATES AND SHELLS (Paper – VI)

Day and Date : Tuesday, 15-5-2018

Time : 10.00 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, if **required** and mention it **clearly**.

SECTION - I

1.	a)	Enlist different types of plates. State the assumption made in thin plate theory.	6
	b)	Differentiate between rectangular and circular plates.	6
2.	De rec	erive differential equation for the deflection surface of a laterally loaded ctangular plates.	11
3.	Ap su	plying Navier's solution, obtain expression for maximum deflection of a simply pported square plate subjected to point load P at centre.	11
4.	Us po	sing finite difference method, calculate moments and deflections at different ints of a square plate of side 'a' subjected to a patch load.	12
		SECTION – II	
5.	a)	Give types of shells with the help of neat sketches.	5
	b)	Obtain equilibrium equations for thin shell surfaces.	6
6.	Ob the	otain differential equation of equilibrium for cylindrical shells using membrane eory.	11
7.	De cyl	erive Governing differential equation for symmetrically loaded circular lindrical shell.	12
8.	Wı	rite notes on :	12
	1)	Donnel's equation	
	2)	Pucher's function.	



Max. Marks: 70

Seat

No.

SLR-TD – 9

Total Marks: 70

Set P

M.E. (Civil-Structure) (Semester – II) (CBCS/CGPA) Examination, 2018 FINITE ELEMENT METHOD (Paper – VII)

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 2.00 p.m.

Instructions : 1) Question 1 and Question 5 are compulsory.

2) Solve any two Question from remaining question of each Section.

3) Use non-programmable calculator whenever required.

SECTION - I

1. Find the change in length of the stepped bar shown below :

Dia. of bars... A, B, C are 30 mm, 60 mm and 45 mm respectively. Lengths of bars A, B, C are 150 mm, 300 mm and 250 mm respectively. Assume left end of bar 'A' as fixed. At junction of bars 'A' and 'B' an axial load of 250 kN acts rightwards. At junction of bars 'B' and 'C' an axial load of 125 kN acts leftwards. At right end of bar 'C' an axial load of 80 kN acts rightwards. E = 200 GPa.

11

- 2. Using Lagrange's polynomials find shape function for four noded rectangle $2a \times 2b$ origin at centroid.
- What do you understand by consistent load vector ? Find consistent load vector for prismatic beam of span 4.5 m carrying 15 kN point load at 1/3rd of span from left end and UDL of intensity 6 kN/m on right half span.
- 4. Write notes on :

1)	Discretization	6
2)	Convergence requirement of polynomials.	6

SECTION - II

5. Write shape functions for four noded rectangle as shown in Fig. No. 1 find the consistent load vector if point load 15 kN acts at (6, 4) away from it making an angle of 30° with X-axis acting.



6. Write note on :

10

- 1) Write short note on ACM/BFS element of plate bending.
- 2) Any six elements for shell analysis and discuss.
- 7. What do you understand by lumped and consistent mass matrices ? How do you consistent mass matrix for beam element ?10
- 8. Develop strain displacement matrix for rectangular axis symmetrical element. **10**

M.E. (Civil Structure) (Semester – II) (CBCS/CGPA) Examination, 2018 **EARTHQUAKE ENGINEERING (Paper – VIII)**

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 2.00 p.m.

Instructions : 1) Solve any two questions from each Section.

- 2) Use of IS : 1893 and IS : 13920 in exam is permitted.
- 3) Figures to the **right** indicate **full** marks.
- 4) Assume suitable data if necessary and assume it clearly.

SECTION - I

- 1. a) Differentiate between magnitude and intensity of an earthquake. What are the different magnitude scales ? How intensity of an earthquake is evaluated ? Also define iso-seismal lines. 10
 - b) What do you understand by soil liquefaction ? Explain various remedial measures to control soil liquefaction.
- 2. From first principle obtain the governing differential equation of a single degree-of-freedom system subjected to ground displacement y_a in terms of absolute displacement y. Obtain its solution and deduce the expression for transmissibility from it. Plot the graph of transmissibility verses frequency ratio for R = 0 and R = 10%.
- 3. a) Explain the concept of proportional damping.
 - b) Explain the step by step procedure of modal analysis of a MDOF system subjected to ground acceleration. 12

SLR-TD – 10

Max. Marks: 70

17

5

8



Seat No.

5

6

7

SECTION - II

- 4. a) Explain the terms design basis earthquake and maximum considered earthquake.
 - b) Explain the design philosophy for seismic forces with reference to minor, moderate and severe earthquakes. How it is different from the gravity load design ?
 - c) What are the planning aspects for horizontal and vertical layouts of a building ?
- 5. A five storey building 4 m \times 4 m in plan is supported by four columns of size 530 mm \times 530 mm at each corner. Evaluate lateral forces acting on the structure. Assume following data.
 - i) Slab thickness 125 mm
 - ii) Floor finish 60 mm thick.
 - iii) Live load 4 kN/m².
 - iv) Beam size 230 mm × 450 mm
 - v) Wall of thickness 230 mm is provided on all the beams with 25% wall openings.
 - vi) Seismic zone IV.
 - vii) Storey height 3.6 m for bottom two stories and 3 m for the remaining. **17**
- 6. a) What do you understand by ductility of structure ? Explain its importance. How will you make RCC structures, steel and timber structures ductile ? 10
 - b) What is base isolation ? What are its advantages ? Explain various base isolation devices.

Seat No.

M.E. (Civil – Structures) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – IX : ADVANCED DESIGN OF STEEL STRUCTURES

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 2.00 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. Determine the shears and moments in columns and beams of a building frame with moment resisting joints as shown in Figure 1, by cantilever method. The cross sections area of the columns are as shown in Fig. No. 1.



Fig. No. 1

2. a) Explain local buckling of thin element with neat sketch. 5 5 b) Write on high rise tabular frames. c) Find the moment of resistance of the hot section 100 mm × 125 mm × 6 mm with lip 30 mm. 7



Total Marks: 70

3. The effective span of a through type girder railway bridge is 44 m for a single lane B.G. track. The cross girders a speed at 4.4 m apart. The stringers are spaced at 2 m between centre line. The weight of stock and check rails are 0.5 kN/m and 0.4 kN/m. Wooden sleepers of size 2.80 m × 250 mm × 250 mm are placed 0.45 m c/c. Unit weight of wooden sleepers is 7.4 kN/m³. The main girders are provided at 6.5 m apart, determine the design forces in top, bottom, vertical and diagonal members of central panel. Design the bottom member and vertical member. The bridges is to carry a equivalent U.D.L. line load of 4500 kN for B.M. and 4800 kN for shear force.

SECTION - II

- 4. a) Write the design procedure of composite beams.
 - b) Determine the values of fully plastic moment of the frame, when loaded up to portal collapse. The portal frame has verticals AB = 2.8 m, CD = 5.2 m and horizontal portion BC = 6.2 m. The end A and D are fixed. A horizontal load of 38 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.
- 5. a) A fixed beam of span 5.2 m carries a uniform distributed load 5 kN/m on the right hand 4 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.
 - b) Explain different collapse mechanism.
- 6. a) Design a cased column to carry a load of 1250 kN. The effective length of column is 4.6 m.
 - b) Design a composite foot bridge having clear width of 4 m and effective span of 12.5 m. The bridge is to be designed for live load of 4 kN/m². Assume kerb 45 cm × 35 cm and two steel girders at 2 m c/c are provided.
 9

5

18

12

5

Seat No.

M.E. (Civil Structures) (Semester - II) Examination, 2018 Paper – X : (Elective – II) : DESIGN OF R.C.C. BRIDGES (CBCS/CGPA)

Day and Date : Wednesday, 23-5-2018 Time: 10.00 a.m. to 2.00 p.m.

> Instructions : 1) Solve any three questions each from Section I and Section II.

- 2) Figures to the **right** indicates **full** marks.
- 3) Assume suitable data if necessary and mention it clearly.

SECTION - I

- 1. Answer the following :
 - A) What are the characteristics of an ideal site for a major bridge across a river?
 - B) What is the significance of the impact factor and how it is estimated ?
 - C) What are the requirements of bar sizes and spacing to ensure crack control in concrete?
 - D) List three methods for load distribution among the longitudinal girders of a T beam bridge. Explain briefly any one.
- 2. Design a solid deck slab for two lane bridge with following data :
 - a) Effective span 7.0 m
 - b) Carriage way width 9 m
 - c) Kerb -600×300 on both side
 - d) Live load IRC Class A (two lane)
 - e) Wearing coat 100 mm thick
 - f) Use M 25 concrete and Fe 415 steel
 - q) Use $\alpha = 2.704$.
- 3. Answer the following :
 - A) Explain IRC class B loading in detail.
 - B) Write a note on Piegude's theory.

11

6

6

SLR-TD – 13

Max. Marks: 70

 $(3 \times 4 = 12)$



- 4. A RCC T beam type bridge having deck slab of 220 mm thick, wearing coat of 80 mm thick, three longitudinal girders and five cross girders. Design longitudinal girders for following additional data,
 - a) Carriage way width 9 m
 - b) Span of bridge 16 m
 - c) Live load IRC Class A two lane
 - d) Kerb 600 mm wide, 380 mm deep
 - e) Web thickness for longitudinal and cross girder 300 mm
 - f) Longitudinal girder spacing 3.0 m
 - g) Use M 25 concrete and Fe 415 steel.

SECTION - II

- 5. Verify the adequacy of pier for the following data : Top width of pier – 1.8 m, Height of pier upto springing level – 10 m, C/C distance of bearing – 1 m, Side batter 1:14, HFL – 1.5 m below the bearing level, span of bridge – 18 m, Self weight of the superstructure = 200 kN/m, Live load – IRC class AA tracked, Material of pier = M20 concrete.
- Verify the suitability of abutment as shown in the fig 1. Use following data Density of soil – 18 kN/m³, Friction angle of soil (θ)= 30°.
 Coefficient of friction – 0.5, Live load IRC class AA tracked.



Fig. 1

12

7.	A) Design a elastomeric unreinforced bearing pad for following da	ata
	Vertical load (sustained) = 178 kN,	
	Vertical load (dynamic) = 58 kN,	
	Horizontal force = 90 kN	
	Modulus of rigidity of elastomer – 1.1 N/mm ²	
	Coefficient of friction = 0.4 .	6
	B) Write a note on reinforced earth abutment.	5
8.	Write a note on following (any four) :	(4×3=12)
	a) Cantilever method of construction.	
	b) Types of bridge pier with their suitability	
	c) Expansion joints	
	d) Function of approach slab	
	e) Importance of bridge inspection.	

Seat No.

M.E. (Mech.) Design Engineering (Semester – I) (CBCS/CGPA) Examination, 2018 COMPUTATIONAL TECHNIQUES IN DESIGN ENGINEERING (Paper – I)

Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 p.m.

2

Δ

1

3

t

3

4

7 12 21

5

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

- 2) Use of Non programmable calculator is **allowed**.
- 3) Figures to right indicates full marks.
- 4) Assume suitable data if **necessary**.

SECTION - I

- 1. a) Write a short note on spline interpolation. Write a note on cubic spline interpolation.
 - b) What is least square principle ? Also explain about weighted least square methods.

Fit a curve of the type $v = at^2 + bt + c$ to the following data. **10**

		-	Ŭ				_ _ .	<u> </u>	
2.	a)	What	are	itera	tive r	neth	ods fo	r solvi	ng linear simultaneous equations ?
		Solve	e the	follo	wing	equa	ation b	y Gai	uss Seidal Method up to 4 iterations.
		20x +	- v –	z = -	-18, 3	2x –	3y + 2	0z = -	-18, 2x – 3y + 20z = 25.

6

32

b) A is 80 feet wide. The depth d in feet at a distance x feet from one bank is given by the following table :

X	0	10	20	30	40	50	60	70	80
у	0	4	7	9	12	15	14	8	3

Find approximately area of cross section.

SLR-TD – 16

Set P

Total Marks: 70

8

9

3. a) Using central differences derive the Bessel formula. Hence find f(27.5) from the following table using Bessels formula.

X	25	26	27	28	29	30
У	4	3.846	3.704	3.571	3.448	3.333

b) From the following table find the maximum and minimum values of y

x	-2	-1	0	1	2	3	4
У	2	-0.25	0	-0.25	2	15.75	56

SECTION - II

- 4. a) Write a note on mathematical modelling of rectilinear motion of a particle of mass m.
 - b) Write a note on Eulers method and Eulers Modified Methods. Hence solve $y' = x + |\sqrt{y}|$ with initial conditions y = 1 at x = 0, for the range $0 \le x \le 0.6$ in steps of 0.2.
- 5. a) Write a note on Shooting method for solving a boundary value problems. Using it solve y'' = y, y(0) = 0 and y(1) = 1.17.
 - b) Solve $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ in 0 < x < 5, $t \ge 0$ given that u(x, 0) = 20, u(0, t) = 0, u(5, t) = 100.

Compute u for the time step with h = 1 by Crank Nicholson method.

6. a) Write a classification of Partial differential equations. Given the values of u(x, y) on the boundary of the square in the Figure given below satisfying $\nabla^2 u = 0$. 9



- b) Write a note on power method to solve eigen value problem.
- c) Derive the Picards nth approximation formula for solving differential equation.

4

4

9

8

8



Total Marks : 70

SLR-TD – 17

Time : 10.00 a.m. to 1.00 p.m.

Day and Date : Tuesday, 8-5-2018

Instructions : 1) Answer any three questions from each Section.

2) Figures to the right indicate full marks.

M.E. (Mechanical-Design) (Semester - I) (CBCS/CGPA) Examination, 2018

MACHINE DYNAMICS (Paper – II)

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

SECTION - I

1. Derive equation of motion and find natural frequencies and mode shape of system given below :

Take
$$M_1 = M_2 = M$$
 and $K_1 = K_2 = K$ and $K_3 = 0$.

2. a) Explain principle of dynamic vibration absorber.

- b) What is meant by coordinate coupling ? Explain types of coupling and their different combinations.
- 3. Explain the following :
 - a) Lagrange's equation.
 - b) Rayleigh Damping and
 - c) Modal Analysis.





5

6

12

Find fundamental natural frequency using Rayleigh method of system shown below :





- 6. Write note on Phase-Plane method and Duffing's equation. 11
- Write note on random vibrations and related terms. Also brief about process to obtain response of linear systems to stationary excitation.
- 8. Explain in detail the terms "Machine Conditioning and Monitoring" and "Fault Diagnoses". Give detailed procedure of experimental Modal Analysis.
 12

Seat No.

M.E. (Mechanical Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 SOLID MECHANICS (Paper – III)

Day and Date : Friday, 11-5-2018 Time : 10.00 a.m. to 1.00 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)	State the strain components using stress – strain relationship.	3
	b)	Derive the compatibility equation for plane stress problem in Cartesian coordinates.	8
2.	Inv	vestigate what problem of plane stress can be solved by using the following	
	Air 0 :	y stress function $\phi = \frac{3F}{4h} \left[xy - \frac{xy^3}{3h^2} \right]$ for the region included by y = ± h and ≤ x ≤ 1.	12
3.	De un	rive the expression for the stresses induced in the solid rotating disc of iform thickness. State practical applications.	11
4.	a)	Write a note on torsion of rolled profiles.	6
	b)	Derive the relation between the elastic constants E, $\boldsymbol{\mu}$ and G with usual notations.	6
		SECTION – II	
5.	a)	State the assumptions made in theory of contact stresses ?	3
	b)	Derive the expression for pressure and area of contact in case of two cylindrical rollers in contact subjected to compressive load.	8
		P.	т.о.

SLR-TD – 18

Set P

Max. Marks : 70

Locate the shear centre for the following section having uniform thickness of 2 mm.



- Derive the expression for torque and angle of twist for a prismatic bar having elliptical cross section.
 11
- 8. Write a note on any two of the following :
 - i) Pure bending of prismatic bar.
 - ii) Membrane analogy.
 - iii) Contact stresses in involute teeth gears.

12

Set

Ρ

Seat No.

M.E. Mechanical (Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – IV : DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY

Day ar Time :	nd Date : Saturday, 12-5-2018 N 10.00 a.m. to 1.00 p.m.	/lax. Marks : 70
Ins	 tructions : 1) Solve any five questions. 2) Figures to the right indicate full marks. 	
1. a)	What is hypothesis and its testing ?	7
b)	Explain various steps in simulation experiments and their validation	tion. 7
2. a)	What are the types of research proposal ? Explain contents of the proposal.	e research 7
b)	Explain research design process.	7
3. a) b)	How will you select research journal for publication of your research procedure of publication in research journal. Explain Taguchi method of parameter design. Give steps used.	h ? Explain 7 7
4. a) b)	Explain steps in DOE. How to write research objectives, purpose and motivations ?	7 7
5. a) b)	Explain ethical and legal aspects of research. Explain various research problem solving approaches.	7 7
6. a) b)	Explain fitting response curves and surfaces in process optimisa What precautions are to be observed while writing a report ?	tion. 7 7
7. W a) b)	rite short notes on any two : Errors in experiments. Robust design.	14

- c) Empirical models and importance in the research.
- d) Condensing data in reports.

P.T.O.

SYNTHESIS AND ANALYSIS OF MECHANISM AND MACHINES

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Answer any three questions from each Section.

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

M.E. (Mechanical-Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018

(Elective – I) (Paper – V)

- 3) Assume suitable data if necessary and mention it clearly.
- 4) Use non programmable calculators is allowed.

SECTION - I

1.	. a) Explain function, path, motion generation.	4
	b) Determine the Chebyshev spacing for a function $y = 2x^2 + \sqrt{x}$, for a ratio $0 < x < 2$ with 4-accuracy points. Also obtain the correct values of y at accuracy points.	ange 7
~		-
2.	. a) Discuss three position synthesis of four bar mechanism.	6
	 b) To determine link of four bar mechanism that will one of its position sa the following specifications. 	atisfy
	$W_1 = 10 \text{ rad/sec} \alpha_1 = 0$	
	$W_2 = 5 \text{ rad/sec}$ $\alpha_2 = 0$	
	$W_3 = -0 \text{ rad/sec} \alpha_3 = 86.6 \text{ rad/sec}^2$	
	Comment on the resulting mechanism.	6
3.	a) Explain crank follower synthesis of five accuracy point.	6
	b) Explain in brief branch and order defects.	5
4.	. Write notes on the following :	11
	a) Cups and crunodes	
	b) Relative poles of the four bar linkages.	

Seat

No.

SLR-TD – 20

Set

Max. Marks: 70

SECTION - II

5.	a)	Derive the equation of coupler curves for a four bar linkage by Samuel Robert method.	6
	b)	Explain the procedure for construction of circle point.	6
6.	a)	Discuss the application of spatial mechanism.	5
	b)	Explain Eulerian rotation transformation and Eulerian angle for spatial mechanism.	6
7.	a)	Explain the application of spatial mechanism to robotics with suitable examples.	6
	b)	Explain branch and order detects.	5
8.	Wr	rite notes on the following :	11
	a)	Eulerian angles	
	b)	Denavit-Harternberg Parameter.	

Seat	
No.	

SLR-TD – 21

Set P

M.E. (Mechanical Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Elective – I : INDUSTRIAL INSTRUMENTATION (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Attempt any three questions from each Section.

- 2) Figures to right indicate full marks.
- 3) Draw neat sketches wherever necessary.

SECTION - I

1.	a)	Explain functional elements of a measurement system.	6
	b)	What are the different criteria's for selection of the instrument ?	6
2.	a)	Derive an expression for output response of second order system to a step input.	6
	b)	Define the following : i) Threshold ii) Dead Zone iii) Fidelity iv) Static Sensitivity v) Range and Span.	5
3.	a)	Explain variable inductance transducer for linear and rotary motion.	6
	D)	Explain pneumatic and optical amplifying element.	5
4.	Wi i) ii) iii) iv) v)	rite short notes on (any four) : Hydraulic load cell Prony brake dynamometer D-A converter Filters Capacitive type transducer	12
	vi)	Electrodynamic transducer.	

Max. Marks: 70

SECTION - II

5.	a) Explain law of intermediate temperatures and law of intermediate metals.	6
	b) Explain sliding vane type 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 wear behavior monitoring.	6
	b) Explain dead weight tester.	5
8.	Write short notes on (any four) :	12
	i) Mc Leod Gauge	
	ii) Thermisters	
	iii) Electromagnetic flow meter	
	iv) Electrodynamic type microphone	
	 v) System analysis by harmonic testing 	
	vi) Corrosion monitoring.	

Seat No.

M.E. Mechanical (Design Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Elective – I (Paper – V) **RELIABILITY ENGINEERING**

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

2) Assume suitable data if necessary.

3) Figure to **right** indicates marks.

SECTION - I

- 1. A) Discuss Taguchi's loss function concept.
 - B) In an accelerated test to determine the time to failure of friction clutches, the results showed that the : Minimum duration = 5 hr, Maximum duration = 10 hr, Mean duration = 7 hr, Coefficient of variation = 0.1. Assuming a beta distribution, determine the probability that clutch, during the accelerated test, will fail within 9 hours.
- 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 difference ?

Original	130	135	128	127
Light	115	112	120	113

B) The PDF for the time to failure of the drivetrain on a Regional Transit Authority bus is given by

f(t) = 0.2 - 0.02t

$$0 \le t \le 10$$
 years

Find

- 1) Show that the hazard rate function is increasing, indicating continuous wear out over time.
- 2) Find the MTTF.
- 3) The median time to failure
- 4) Find the mode of the failure distribution.
- 5) The standard deviation.

6 P.T.O.

SLR-TD – 22

Set

Total Marks: 70

5

6



 $(4 \times 3 = 12)$

- 3. Write short note (any three) :
 - 1) Bayesian theorem of probability
 - 2) Life Cycle of product
 - 3) Hazard rate function
 - 4) Robust Design.

- 4. A) What are the main steps used for performing FMECA.
 - B) Consider a system composed of three subsystems with the estimated failure rates of $\lambda_1 = 0.005$, $\lambda_2 = 0.003$, and $\lambda_3 = 0.001$ failure per hour, respectively. The system has a mission time of 25 hours. A system reliability of 0.95 is required. Find the reliability requirement for the subsystems.
- 5. A) A network made up of seven independent units representing a system is shown in figure. Each unit's reliability, Ri for i = 1, 2, 3, 4 and 5, is given. Calculate the network reliability by using the network reduction method.



Figure : 01 A seven independent-unit reliability network.

- B) Compare the two equipment condition monitoring technique :
 - 1) X-rays radiography
 - 2) Infrared Spectrometer.
- 6. Write short note (any three) :
 - 1) Discuss the need for maintainability
 - 2) Condition monitoring techniques
 - 3) Reliability evaluation methods
 - 4) Cause and effect diagram.

Set P

6

 $(4 \times 3 = 12)$

5

6

Seat No.

M.E. Mechanical (Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VI : ADVANCED DESIGN ENGINEERING

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Use of Calculator is allowed.
- 3) Figures to the **right** indicate **full** marks.
- 4) Assume additional data, if necessary and mention it clearly.

SECTION - I

1.	A)	Explain CEP and CPM cams.	5
	B)	What is wear ? Explain various types of major wear. Explain factors affecting wear rate.	6
2.	A)	What is friction ? Explain various theories of friction.	6
	B)	Explain viscosity, kinematic and dynamic viscosity, its units. What is effect of pressure on viscosity ?	6
3.	A)	Derive from basic principles the two dimensional Reynolds equation for hydrodynamic lubrications. State the assumptions made.	6
	B)	Explain the significance of Sommerfeld number.	6
4.	Α	hydrodynamic journal bearing is subjected to radial load of 10 kN. The	

permissible unit bearing pressure is 1000 KPa. The length to diameter ratio is 1. The radius of journal is about 800 times the radial clearance. The viscosity of lubricating oil in working condition is 30×10^{-9} Ns/mm². Calculate

- i) The length of bearing
- ii) The diameter of journal
- iii) Coefficient of friction
- iv) Power lost in friction
- v) Total flow of oil

The journal rotates at 1440 rpm

L/d	3	h _o /c	S	CFV	FV	FR	P/P _{max}	Ψ
1	0.4	0.6	0.264	5.79	3.99	0.497	0.484	63.10
1	0.2	0.8	0.631	12.8	3.59	0.28	0.529	74.02

11

Set P

Max. Marks: 70

_

SECTION - II

5.	A)	Write note on hydrostatic and elasto hydrodynamic bearings.	6
	B)	Write note on Rayleigh distribution.	5
6.	A)	Derive expression : Z(t) . R(t) = f(t).	6
	B)	Write note on reliability testing.	6
7.	A)	MTTF of a particular electronics component is 800 hr. Calculate the hazard rate. What is probability that a similar component will fail in a operating time of a) 200 hrs b) 400 hrs c) 1200 hrs?	6
	B)	What are principles employed in design of forging ?	6
8.	A)	Explain the methods of reducing thermal stresses.	6
	B)	Write note on thermal stresses in cylindrical shell.	5

Soat

Seat	
No.	

SLR-TD – 25

Set P

Total Marks: 70

M.E. (Mechanical – Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 FINITE ELEMENT ANALYSIS (Paper – VII)

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 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 weighted Residual Method.	6
	b)	Write short note on history of FEA along with its applications.	5
2.	a)	Explain principal of minimum potential energy approach.	6
	b)	What is meant by discretization of a structure ? Discuss the various aspects to be considered while discretising a structure for finite element analysis.	6
3.	a)	Derive element stiffness matrix and element equation for simple bar element using potential energy method.	6
	b)	Explain general procedure of finite element analysis.	5
4.	Wri	ite short note on (attempt any two).	12
	a)	FDM and FVM	
	b)	Rayleigh Ritz method	
	c)	Finite element formulation.	

SECTION - II

5. a)	Explain Lagrange's polynomial sh element.	ape function for 2-D quadrilateral 6)
b)	Explain in brief Iso-parametric, Su elements along with its use.	b-parametric and Super-parametric 5	;

6. Find the temperature distribution in 1-D straight fin. Also calculate amount of heat source 'Q' at the starting node so as to maintain 100°C temperature. Assume h = 0.1 watt/mm²c, length of element = 25 mm, outside temperature = 20°c, Cross sectional area of element 100mm², perimeter of fin section = 40 mm.
12



7.	a)	Explain sub-modelling and sub-structuring methods to improve modelling efficiency.	6
	b)	Explain modal analysis with suitable example.	5
8.	Wr	ite short note on (attempt any two).	12
	a)	Model validity and model accuracy	
	b)	Concept of mapping	

c) Fatigue analysis.

Seat

No.

M.E. (Mechanical – Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 EXPERIMENTAL STRESS ANALYSIS (Paper – VIII)

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 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) Derive the expression for the light intensity observed through analyzer when the stressed model is kept in plane polariscope.
 - b) Explain the Babinet Soleil Compensator method.
- 2. a) A 2-D photo elastic model of a connecting rod was loaded in circular polariscope. The isochromatics fringe order at the point of interest was 4. 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 1100 N, the fringe order at centre of disc was observed to be 3. Calculate maximum shear stress at the point of interest if connecting rod has a thickness of 6 mm.
- b) Explain in details holography.53. a) Explain oblique incidence method.6b) Explain in brief :5
 - i) Isoclinic
 - ii) Isochromatic
 - iii) Random light
 - iv) Monochromatic light.

SLR-TD – 26



Max. Marks : 70

8

4

6

11

- 4. Write short note on :
 - a) Dynamic Photo elasticity
 - b) Fringe sharpening.

$\mathsf{SECTION}-\mathsf{II}$

5.	a)	The strain readings measured by an equiangular rosette at a point in the stressed body are as follows $\epsilon a = -845$ micro-strain, $\epsilon b = 1220$ micro-strain, $\epsilon c = 710$ micro-strain. Determine the principal strains, principal stresses, its directions and maximum shear stress. Take E = 210 GPa and $\mu = 0.285$.	8
	b)	Explain selection of strain gauges.	4
6.	a) b)	Explain different configuration of Wheatstone bridge circuit. Explain temperature compensation for a strain gauge.	7 4
7.	a) b)	Explain moiré fringe method. Explain torque measurement by strain gauges.	6 5
8.	Wı a) b)	rite short note on : Dynamics strain measurement. Commercial strain gauge indicators.	11

Set

Seat	
No.	

M.E. Mechanical (Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 INDUSTRIAL PRODUCT DESIGN (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 p.m. Total Marks : 70

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 maintainability considerations in product design with suitable examples.	7
	b)	Explain ergonomics aspects in the design of elevator. What changes will you suggest in the elevator to make it more ergonomic compliant ?	7
2.	a)	What is value analysis and cost reduction ? How they are interrelated ?	7
	b)	What are the challenges in product development ? Discuss the importance of a product designer in the organization structure of an industry.	7
3.	a)	Explain color composition and conversion of colors of engineering products.	7
	b)	What is study of market requirement ? How market requirement is found for new industrial product ?	7
4.	a)	Discuss the ergonomic and aesthetic design considerations used in the washing machine with the help of neat sketches. Suggest some modifications to the design to add to its aesthetics and ergonomics without disturbing the functional design.	7
	b)	In what way industrial product is different than consumer product ? Justify with examples.	7

5.	a)	What do you mean by setting specifications ? How specifications are set for the product ?	7
	b)	Explain use of symmetry and balance in the product design.	7
6.	a)	What is anthropometric data ? How will you select this data in the design of a new product ?	7
	b)	Explain the importance of standardization in industrial product design.	7
7.	a)	Explain the design and development process of industrial product.	7
	b)	Explain importance of innovativeness in the consumer product design with examples.	7

Seat

No.

SLR-TD – 28

Set P

Total Marks: 70

M.E. Mechanical (Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 (Elective – II) : INDUSTRIAL TRIBOLOGY (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 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.	De wh	rive Reynolds equation with usual notations. What are assumptions made ile deriving this equation ? Explain how this can be used to obtain	
	pre	essure 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	
		 Specific heat of lubricant = 1.76 kJ/kg°C 	
	Ca	Iculate :	
		1) Load carrying capacity.	
		2) Flow requirement in 1/min.	
		3) Viscous power loss.	
		4) Temp. rise.	

SLR	-TD – 28	
3.	a) From two dimensional Reynolds equation derive an expre pressure distribution in narrow width Tapered pad bearing	ession for gs. 8
	b) What is Sommerfeld number ? State its significance in be design.	aring 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 l	ubrication. 6
	b) Differentiate between squeeze film lubrication and hydro of lubrication.	dynamic 7
6.	 a) Compare gas lubricated bearings with oil lubricated bearing following parameters. 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. 	ngs based on 6
7.	Using ErtelGrubin theory derive relation. $\frac{ho}{R} = 1.19 \left[\frac{\mu o Ua}{R}\right]^{\frac{8}{11}} \left[\frac{ELR}{W}\right]^{\frac{1}{11}}$	11
8.	 Briefly discuss : Lubrication in wire drawing and extrusion. Piston oin lubrication. Desirable properties of bearing material. 	4 4 3

Set

M.E. (Mechanical Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018

ENGINEERING FRACTURE MECHANICS (Paper – X) (Elective – II)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m. Total Marks: 70

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 surface energy release rate with respect to fracture mechanics. **7**
 - b) 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 700 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.
- 2. a) Explain stress intensity factors for different geometries.
 - b) Calculate the fracture toughness and fracture resistance of a material for which a plate test with central crack gives the following information: Width (W) = 50 cm, thickness (B) = 1.9 cm, crack length (2a) = 5 cm, failure load P = 1335 KN. The yield strength = 480 MPa. E = 100 GPa.
- 3. Write short note on following.
 - a) Clip gauge
 - b) Interferometry and holography technique for determination of fracture toughness
 - c) Griffith energy criteria.

7

18

7

7

18

SECTION - II

- 4. a) Define J-integral. Discuss the significance and limitations of J-integral as a fracture parameter.
 - b) Consider a large plate with small centre crack. The initial total crack length 2a = 20 mm. The plate is subjected to repeated remote stress cycles from $\sigma_{min.} = 0$ MPa to $\sigma_{max.} = 75$ MPa. The initial crack grows as stress cycles are applied. The critical stress intensity factor K_c for fracture initiation is $25 \text{ MPa} \sqrt{m}$. Assume that Paris law will be applicable to the plate material to characterize the fatigue crack growth $\frac{da}{dN} = C(\Delta k)^m$, where $C = 1 \times 10^{-9}$, m = 3. Find final half crack length a_f at fracture initiation. Also find number of cycles before crack initiation of the plate.
- 5. a) Estimate the failure load under the uni-axial tension for a centre cracked panel of aluminum alloy of width W = 500 mm and thickness B = 6 mm for the following values of crack length 2a = 20 mm and 2a = 30 mm. Yield stress $\sigma_y = 350$ MPa and fracture toughness $K_{IC} = 80$ MPa \sqrt{m} . **10**
 - b) Explain S-N diagram with suitable figure.
- 6. Write short note on following.
 - i) Plastic constraint factor
 - ii) Paris law
 - iii) Types of creep.

Set

Seat No.

M.E. (Mechanical Design Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 THEORY AND ANALYSIS OF COMPOSITE MATERIALS (Paper – X) (Elective – II)

Day and Date : Wednesday, 23-5-2018

Time : 10.00 a.m. to 1.00 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 particulate composites and pre pegs.
 - B) As shown in below Figure, a 60° angle graphite/epoxy lamina is subjected only to a shear stress $\tau_{xy} = 2$ 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 No. [1].



Strain gage rosette on an angle lamina

P.T.O.

Max. Marks: 70

6

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)	Derive an expression for nine independent constants for orthotropic materials.	7
3.	A)	How are composites classified ?	5
	B)	Explain Wu-tensor theory.	7
	C)	Explain fibre composites.	5
		SECTION - II	
4.	A)	Explain special cases of laminates in macro mechanical behaviour of laminate.	8
	B)	Explain load deflection behaviour of metal plates with figures related to strength of laminates.	9
5.	A)	Explain basic principle of fracture mechanics and effect of discontinuity in laminates.	10
	B)	Explain maximum strain theory.	7
6.	A)	Explain lay up and curing process for manufacturing composites.	12

B) How interlaminar stresses are confirmed by experimentally ? 6

71 1			`	· · · · · · · · · · · · · · · · · · ·	
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	V 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	α1	µm/m/°C	8.6	6.1	0.02
Transverse coefficient of thermal expansion	α2	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

 TABLE NO. [1]

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

-3-

	Ν	A.E. Mechanical (Design Engineering) (Semester – II) (Examination, 2018	CBCS/CGPA)
	E	NGINEERING DESIGN OPTIMIZATION (Elective – II) (P	aper – X)
Day Time	and : 1	d Date : Wednesday, 23-5-2018 0.00 a.m. to 1.00 p.m.	Total Marks : 70
	I	 Instructions : 1) Solve any five questions. 2) Make suitable assumptions if required and st clearly. 3) Use of non-programmable calculator is allow 4) Figures to right indicate full marks. 	ate them red .
1.	a) b)	Explain need for optimization and historical development. Give engineering applications of optimization.	7
2.	a)	Find the dimensions of a box of largest volume that can be ins sphere of unit radius.	cribed in a
	b)	Write the Taylor's series expansion of a function f (X).	6
3.	a)	Explain how any linear programming problem can be express standard form.	ed in the
	b)	What is multi-objective optimization ? What are different methors same ?	ods of the
4.	a) b)	Explain exhaustive search method. Explain Golden section method.	7
5.	a) b)	Explain the difference between random jumping and random wall Explain the procedure of scaling of design variables.	k methods.
6.	a) b)	What are the characteristics of mechanical systems ? Explain the algorithm of Sequential Quadratic Programming M	ethod.
7.	a)	What is the purpose of mutation ? How is it implemented in GAs	? 7
	b)	Explain the principle on which Genetic Algorithms are based a Genetic Algorithms differ from the traditional methods of optim	nd how ization.

Seat

No.

SLR-TD – 31

Set Ρ

Seat No.

M.E. (Electronics) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – I : CMOS VLSI DESIGN

Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 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 PMOS transistor and explain cut off	
		region, nonsaturation region and saturation region.	6
	b)	What is technology scaling for MOS transistor ?	5
2.	a)	What is noise margin of CMOS inverter ? How it can be obtained from VTC of CMOS inverter ?	6
	b)	Explain dynamic power dissipation of CMOS inverter.	6
3.	a)	Design sum output of full adder using dynamic CMOS logic.	6
	b)	Explain signal integrity issues in dynamic design.	6
4.	Wr	rite notes on any three of following : (4×3=1	2)
	a)	Second order effects for MOSFET	
	b)	Speed of CMOS logic	
	c)	Ratioed CMOS logic	

d) Short circuit power dissipation for CMOS inverter.



Set P

Max. Marks : 70

SECTION - II

5.	a)	Explain principle of bistability for latches.	6
	b)	Explain static SR flip flops.	5
6.	a)	Explain C ² MOS master slave positive edge triggered register.	6
	b)	Explain latch based clocking.	6
7.	a)	What are sources of clock skew and jitter ?	6
	b)	Explain designing of DRAMS.	6
8.	a)	What are fast multipliers ? Explain in detail.	6
	b)	Explain use of PLL for clock synchronization.	6

SLR-TD – 33

Seat No.

Set P

M.E. (Electronics Engg.) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – II : ADVANCED DIGITAL SIGNAL PROCESSING

Day and Date : Tuesday, 8-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

2) Figures to **right** indicate **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)	Discuss a pipelined architecture for implementing the schur algorithm.	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)	Explain the relationship between the autocorrelation and model parameter.	6
3.	1) 2)	Explain the design of optimum equiripple linear phase FIR filter.	6 5
	<i>_</i>)		J
		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
5.	1)	Explain with equation frequency transformation in designing IIR filters.	6
	2)	Design a digital low pass Butterworth filter using bilinear transformation with pass band and stop band cut-off frequencies 600 rad/sec and 1600 rad/sec respectively. The pass hand attenuation is 2 db and stop hand	
		attenuation is -10 db.	6
6.	1)	What is Haar Wavelet transform ? Discuss atleast two properties of Haar Wavelet Transform.	6
	2)	Explain the use of scaling function in case of multiresolution system.	5

Max. Marks: 70

Set

Max. Marks: 70

Seat	
No.	

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 ADVANCED NETWORK ENGINEERING (Paper – III)

Day and Date : Friday, 11-5-2018 Time : 10.00 a.m. to 1.00 p.m.

> Instructions : 1) Figures to the right indicate full marks. 2) Assume suitable data if required.

SECTION - I

- 1. Answer following questions :
 - 1) What is senders and receivers window in TCP ? How problem related to small packet communication is overcame in TCP ? List various timers related to TCP.
 - 2) What is management information base ? Draw architectural model of network management and describe it neatly.
 - 3) What are the types of cryptographic algorithms ? Explain any one algorithm in detail. Compare public key and private key cryptography system.
- 2. Answer **any two** from following questions :
 - 1) What is the difference between privacy and security ? Draw IPSec header format and explain it in detail.
 - 2) What are packet level filters ? Discuss security and packet filter specifications.
 - 3) Draw IPv6 datagram header format and describe each field in detail.
- 3. Answer following questions :
 - 1) Draw ARP packet format and explain each field in detail. 6
 - 2) What is tail drop policy in TCP ? Discuss random early discard policy in TCP routing.

OR

2) Discuss SNMP protocol and SNMP message format.

5

5

P.T.O.

(3×4=12)

(2×6=12)

SLR-TD - 34

SECTION - II

- 4. Answer following questions :
 - 1) What is multimedia? What are the different multimedia applications? What are the problems faced by multimedia over internet?
 - 2) How video objects are represented ? Draw and explain block diagram of content based video encoding and decoding related to Mpeg-4.
 - 3) What is tunnel encapsulation in case of DVMRP ? Draw header format related to DVMRP and explain.
- 5. Answer any two from following questions :

(2×6=12)

6

5

(3×4=12)

- 1) How motion is estimated in Mpeg-4? Explain spatial and temporal salability in Mpeg-4.
- 2) Draw RTP header format and explain it neatly.
- 3) Compare between Mpeg-2, Mpeg-4 and H.264 standards.
- 6. Answer following questions :
 - 1) What is multimedia streaming ? Explain multimedia streaming over internet in detail.
 - 2) Discuss QoS in network for multimedia system.

OR

2) What is RSVP for multimedia communication ? List different RSVP features. 5

SLR-TD – 35

Set

Seat No.

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – IV : RANDOM SIGNALS AND PROCESSES

Day and Date : Saturday, 12-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

- 1. Attempt following :
 - a) Define the probability density function ? Give the properties of probability density function.
 - b) If the probability density function of a random variable X is

$$f_{X}(x) = \begin{cases} \frac{1}{4} & \text{for } |x| < 2\\ 0 & \text{otherwise} \end{cases}$$

Find :

i)
$$P(X < 1)$$

- ii) P(2X + 3 > 5)
- iii) Mean and variance.

OR

b) If the probability density function of a continuous random variable X is

$$f_X(x) = \begin{cases} c(2+3x) & \text{for } 0 < x < 2\\ 0 & \text{otherwise} \end{cases}$$

find the value of c and the distribution function $F_x(x)$.

- 2. Attempt any two of the following :
 - a) State the axioms of probability. Prove that the probability of an impossible event is zero.
 P.T.O.

Max. Marks : 70

5

6

6

(2×6=12)

SLR-TD – 35

- b) Given is a binary transmission channel with two possible input message symbols $m_0 = 0$ and $m_1 = 1$ and two possible output symbols $r_0 = 0$ and $r_1 = 1$. Consider the priori probabilities are $P(m_0) = .65$ and $P(m_1) = 0.35$ and the transmission probabilities are $P(r_0/m_0) = 0.67$ and $P(r_0/m_1) = .1$. Find
 - i) $P(r_0)$ and $P(r_1)$
 - ii) $P(m_0/r_0)$
 - iii) $P(m_0 \cap r_0)$.
- c) An urn contains two black balls and three white balls. Two balls are selected at random from the urn without replacement and the sequence of colors is noted. Find the probability that both balls are black.
- 3. Attempt any two of the following :

(2×6=12)

a) If X and Y are independent random variables with density functions :

$$f_{x}(x) = e^{-x}$$
 and

 $f_y(y) = 3e^{-3y}$

Find the probability density function of Z = X + Y.

- b) Explain in brief how to obtain the expected value and variance of sum of two random variables.
- c) Two random variables X and Y have mean and variance of

 $\mu_x = 0$, Variance of X = 1 $\mu_y = 1$, Variance of Y = 9.

The correlation coefficient of these two random variables is $\rho = 0.5$.

- i) Find the mean value of X + Y.
- ii) Find the variance of X + Y.
- iii) Find E[(X + Y) (X Y)].

SECTION – II

- 4. Attempt **any two** of the following :
 - a) Write short note on :

Estimation of autocorrelation function.

b) Consider a random process be X(t) = Bcos (25 t + θ) where B is constant and θ is random variable with uniformly distributed in ($-\pi$, π). Determine whether the process is stationary or not ?

 $(2 \times 6 = 12)$

5

6

 $(2 \times 6 = 12)$

c) An ergodic random process has an autocorrelation function of the form $R_{xx}(\tau) = 10e^{-|\tau|} - Ae^{-|\tau|}$

where A is a constant.

- i) Find the mean value and variance of the process.
- ii) Find the largest value of A for which the expression can be a valid autocorrelation function.
- 5. Attempt the following :
 - a) Write short note on matched filter.
 - b) An ergodic random process has an autocorrelation function RXX (τ) = 50 δ (t) + 36. Determine the value of the spectral density of the process at ω = 10.
- 6. Attempt any two of the following :
 - a) Explain how to estimate the frequency response of linear systems using frequency domain techniques.
 - 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.



- c) Define following with respect to two random processes :
 - i) Cross correlation
 - ii) Cross covariance
 - iii) Cross correlation coefficient.

Seat	
No.	

Set P

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018

Paper – V : Elective – I : DESIGN OF WIRELESS SYSTEM

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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) Design a QPSK modulator and demodulator using RFMD RF 2713.	7
	b) Design a BJT LC Oscillator for 25 to 500 MHz.	6
2.	Solve any two :	
	a) What are PLL fractional N synthesizers ?	6
	b) What is direct digital synthesis ? Explain different methods.	6
	c) With suitable example explain third order intercept point.	6
3.	Solve any two :	
	a) Design a passive loop PLL Synthesizer with a center frequency 2.45 GHz Assume other suitable parameters.	5
	b) What are SAW filters ? What are issues associated with it ?	5
	c) Discuss behavior of a typical capacitor and inductor at high frequency.	5
	SECTION – II	
4.	 a) Draw and explain dual gate single ended narrow band MOSFET mixer for upto 250 MHz. Discuss design steps. 	r 7
	b) Draw and explain in brief a log amplifier, with integrator and buffer amplifier used in a receiver's AGC circuit.	[;] 6

Total Marks : 70

SLR-TD - 36

5. Solve any two	:
------------------	---

	a)	Give a brief overview of methodology used for communication system simulation.	6
	b)	Explain how QOS in IEEE 802.11 WLAN system can be analyzed by suitable simulation.	6
	c)	Draw and explain 50 Ω LC power splitter/combiner with 0°. Also design it for f_r = 915 MHz with Z_{\rm IN} = Z_{\rm OUT} = 50 \ \Omega .	6
6.	Sc	olve any two :	
	a)	Explain splitters used in communication systems.	5
	b)	Design shunt PIN SPST RF switch and small RF signal series PIN SPST switch.	5
	c)	Discuss AGC and issues associated with it.	5

Seat No.

M.E. (Electronics Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Elective – I : WIRELESS SENSOR NETWORKS (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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) Explain S MAC.	7
	b) Explain classification of routing protocols used in WSN.	6
2.	Solve any two :	
	a) Explain flooding and gossiping.	6
	b) What are the characteristics of WSN ?	6
	c) Explain any two applications of WSN.	6
3.	Solve any two :	
	a) Discuss how energy efficiency can be achieved at MAC layer.	5
	b) Give overview of Super Harvard architecture of WSN node.	5
	c) Explain optimized link state routing.	5
	SECTION – II	
4.	a) Explain ZigBee functional laver architecture and protocol stack.	7

,		0	,		1	
b)	What a	re the chal	llenges for tim	e synchror	nization ?	6

r – v)

Max. Marks: 70

Set P

SLR-TD – 37

5. Solve any two :

	a) Explain any one passive power conservation mechanism.	6	
	b) Explain Ad hoc positioning system (APS).	6	
	c) Explain any two non functional aspects of operating systems used in WSN node.	l 6	
6.	δ. Solve any two :		
	a) Explain any one type of range free localization.	5	
	b) Explain any one type of event driven localization.	5	
	c) Explain one way message exchange used in time synchronization.	5	

P.T.O.

Seat No.

M.E. (Electronics) (Semester – I) (CBCS/CGPA) Examination, 2018 IMAGE AND VIDEO PROCESSING (Elective – I) (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

1. Solve any four questions :

- 1) What is quantization ? Explain visual quantization.
- 2) What is sampling in image processing ? Explain 2-D sampling theory.
- 3) Explain details Hadamard transform.
- 4) What is the use of wiener filter in image restoration ? Explain.
- 5) Explain 4 ×4 Harr transform.
- 2. Solve the following questions :
 - What need of smoothing and sharping in spatial domain image enhancement ? Explain in details. (1×7=7)
 - 2) With reference to following example, explain Histogram equalization.

 $(1 \times 8 = 8)$



Total Marks: 70

 $(4 \times 5 = 20)$

SLR-TD – 39

Set

SECTION - II

- 3. Solve **any four** questions :
 - 1) Explain details chain code for boundary detection.
 - 2) Explain edge detection method such as canny edge detection.
 - 3) Explain MPEG 4, MPEG 7 in details.
 - 4) What is coding redundancy ? Explain brief details.
 - 5) Explain image compression standards.
- 4. Solve the following questions :
 - Explain Huffman coding for given below example and find out efficiency of Huffman coding. (1×8=8)

5	6	4	3
2	6	4	4
3	3	5	2
2	3	4	4

 Explain boundary representation, region representation and moment representation. (1×7=7)

(4×5=20)

Seat No.

M.E. (Electronics Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VI : RESEARCH METHODOLOGY

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 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)	With suitable engineering example explain desirable features of a research proposal.	6
	b)	With suitable engineering example explain difference between theoretical and applied research.	6
2.	a)	With suitable engineering example compare simulation and modeling.	5
	b)	With suitable engineering example explain why we need to simulate. OR	5
	c)	Discuss significance of validation criteria used in research.	5
3.	a)	With suitable engineering example explain typical steps in research design.	7
	b)	With suitable engineering example explain importance of defining research problem.	6
		OR	
	c)	Explain Monte Carlo simulation.	6

SLR-TD – 41

Max. Marks: 70

Set P

SECTION - II

4.	a)	Explain guidelines for design of experiments.	6
	b)	Explain citation and its significance.	6
5.	a)	Write a short note on virtual lab.	5
	b)	Write a short note on use of ICT for research. OR	5
	c)	With suitable example, explain how to write an 'abstract' for research publication.	5
6.	a)	With suitable example explain strategy for experimentation.	7
	b)	Discuss a structure of a typical project report. OR	6
	c)	Explain types of errors in design of experiments.	6

Seat No.

> M.E. (Electronics) (Semester – II) (CBCS/CGPA) Examination, 2018 **EMBEDDED SYSTEM DESIGN (Paper – VII)**

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to **right** indicate **full** marks.
- 3) Assume suitable data wherever necessary.
- 1. Explain **any five** instructions.
 - 1) STM
 - 2) STR
 - 3) BEQ
 - 4) MVN
 - 5) LDMIA
 - 6) LDC.
- 2. Explain Bus architecture of ARM9. 10 3. Explain TIMER programming in ARM9. 10 OR 10 Explain embedded system design process. 4. Explain embedded system software development tools. 10 5. Explain memory management in RTOS. 10 6. Explain system design example of data compression in CCD camera. 15



Set

Total Marks: 70

(5×3=15)

Seat

No.

M.E.	(Electronics	Engineering) (Sem	ester – II) (CBCS/CGPA)
		Examination, 20	018

Examination, 2018 Paper – VIII: PERIPHERAL SYSTEM DESIGN AND INTERFACING

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

- 1. Answer following questions :
 - 1) Compare between RS 232 and RS 485 standards. Comment on selection of transmission line, shunt capacitance and transmission line termination.
 - 2) Explain enumeration process in USB.
 - 3) What are the drawbacks of ISA bus system? Discuss various functions provided by EISA.
- 2. Answer any two from following questions :
 - 1) What are the functions of GPIB controller, talker and listener ? Discuss GPIB bus operation in brief.
 - 2) What is 4mA to 20mA current loop? List various components of 4mA to 20mA current loop system. How an additional transducer is added in 4mA to 20mA current loop system?
 - 3) Explain interrupt handling in PCI bus system.
- 3. Answer following questions :
 - 1) List various versions of USB. Explain different data transfer types in USB communication. Draw USB packet format and list different fields in USB packet.
 - 2) Draw I/O read and write operation cycles in 8 bit ISA and explain them in brief.

OR

2) Discuss RS-232 D centronics interface in detail.

5

6

5

P.T.O.

SLR-TD – 43

Set

Max. Marks: 70

 $(2 \times 6 = 12)$

 $(3 \times 4 = 12)$

SLR-TD - 43

4. Answer following questions :

SECTION - II

1) What are DMA controller, video controller and keyboard controller in case

	of the PC ?	
2	2) Explain receiver buffer register, transmitter holding register, divisor la register and interrupt latch enable register in case of PC 16550 UART	tch Γ.
3	3) What are the advantages of use of PLC in control system ? What are selection criteria of PLC for certain application ?	e the
5. A	nswer any two from following questions :	(2×6=12)
1	 Draw block diagram of automatic controller and explain. 	
2	Compare PI, PD and PID controllers.	
3	3) Draw HART telegraph structure and describe it.	
6. A	nswer following questions :	
1	 Explain different layers in DeviceNet protocol. Draw and explain mess format in case of DeviceNet. 	sage 6
2	2) Discuss MODBUS protocol related to RS-485 communication.	5
	OR	
2	 List characteristics of profibus master and slave. Draw profibus telegr format and explain in detail. 	am 5

(3×4=12)

Seat No.

M.E. (Electronics) (Semester – II) (CBCS/CGPA) Examination, 2018 ADVANCED CONTROL SYSTEMS (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 p.m.

> **N. B.**: 1) Figures to the **right** indicates **full** marks. 2) Assume suitable data whenever necessary.

SECTION - I

- 1. Attempt any two :
 - a) Obtain the state variable representation of the system, with following transfer function G(s) = $\frac{s+3}{(s+2)^2(s+5)}$.
 - b) Evaluate the observability of the system with

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \text{ and } C = \begin{bmatrix} 3 & 4 & 1 \end{bmatrix}$$

c) Explain digital control system in detail.

2. Attempt any two :

- a) Explain zero order hold block.
- b) Obtain inverse z transform for $X(z) = \frac{z+2}{(z-2)z^2}$.
- c) Explain the rules for construction of Root locus.
- 3. a) Obtain stability of the control system with characteristic polynomial.

$$\Delta(z) = z^4 - 0.9 z^3 + 0.14 z^2 + 0.216z + 0.032 = 0.$$
 5

b) Explain steady state error and error constants of digital control system. 6

P.T.O.

SLR-TD – 44

Max. Marks: 70

 $(6 \times 2 = 12)$

 $(6 \times 2 = 12)$

Set

SECTION - II

4. Attempt any two :

- a) Explain pole placement control problem using Ackerman's equation.
- b) For the system represented by

$$\dot{\mathbf{x}} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} \mathbf{x} + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \mathbf{y}$$

y = [1 0 0] x

Design a full order observer such that the observer eigen values are at $-2 \pm j 2\sqrt{3}$ and -5.

- c) Explain converting MIMO problems to SISO problem.
- 5. Attempt any two :

a) The negative feedback control system has the forward path transfer function

as
$$\frac{Y(s)}{V(s)} = \frac{10}{s(s+1)}$$
, with H(s) = 5.

Determine the sensitivity of the closed loop transfer function with respect to G at w = 1 rad/sec.

- b) Explain internal stability by drawing neat block diagram.
- c) Explain servo systems.
- 6. a) Explain analysis of Robustness for control system.
 6
 b) Explain closed loop stability of MIMO control systems.
 5

(6×2=12)
Set

Seat No.

M.E. (Electronics Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 MOBILE TECHNOLOGY (Elective – II) (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 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) Explain the processes of MS registration and call termination.	7
	b) Explain Gn and Gp GPRS interfaces.	7
2.	Answer any two :	12
	a) Explain WAP network configuration.	
	b) Describe GPRS attach and detach procedures.	
	c) Explain about commonly used mobility databases.	
3.	a) List the steps involved in VLR failure restoration.	5
	b) Explain security techniques implemented in mobile station.	4
	OR	
	b) Write a note on EDGE.	4
	SECTION – II	
4.	a) Describe the phases and evolution of CDMA 2000.	7

b) What are different types of handover, UMTS supports ? Explain in detail. **7**

Max. Marks: 70

5.	Answer any two :	12
	a) Describe different types of attacks observed in mobile computing.	
	b) Briefly explain uplink channelization and scrambling.	
	c) What is EVDO ? Explain EVDO forward link.	
6.	a) With diagram explain UTRAN architecture.	5
	b) Explain commonly used security protocols.	4
	OR	
	b) Briefly write about CDMA evolution.	4

Seat No.

M.E. (Electronics Engg.) (Semester - II) (CBCS/CGPA) Examination, 2018 Elective – II : REAL TIME SYSTEMS (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to right indicate full marks.
- 3) Assume suitable data if required.

SECTION - I

1.	1) 2)	Explain Rate Monotonic scheduling algorithm in detail.Image: Comparison of the scheduling of th	6 5
2.	1) 2)	Describe desired language characteristic used for Real Time Systems.Explain the concept of package used in Real Time System.	6 6
3.	1) 2)	Explain task Scheduling mechanism in programming of Real Time Systems. Explain timing specification and requirement used in good real time language.	6 6
		SECTION – II	
4.	1) 2)	Discuss concurrency control issues during execution of database. Discuss one method of disk scheduling algorithms used in Real Time data base.	6 6
5.	1) 2)	Explain in detail continuous based protocol. Explain Deadline Based protocol with different constraints.	6 6
6.	1)	Discuss various obtaining parameter values in reliability evaluation techniques.	6
	2)	Explain any one reliability model for Hardware Redundancy.	5



Total Marks: 70

SLR-TD – 46

Seat No.

M.E. (Electronics) (Semester – II) (CBCS/CGPA) Examination, 2018 VLSI IN SIGNAL PROCESSING (Elective – II) (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1. Solve any two :

- a) Draw the Block diagram and SFG for y(n) = ax(n) + bx(n 1) + cx(n 3).
- b) Explain critical loop, loop bound and iteration bound with the help of example.
- c) Explain pipelining and parallel processing. Explain their advantages.

2. Solve any two :

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



- 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).

For DFG shown below find iteration (1) (2) (1) (1) (2) (3) (4) (5) (6) (1) (1) (2) (1) (2) (1) (1) (2) (1) (2) (1) (1) (1) (2) (1) (1) (1) (2) (1) (1) (1) (2) (1) (1) (1) (1) (2) (1) (1) (1) (1) (1) (2) (1)



Max. Marks: 70

SLR-TD – 47

14

iii) Is this valid pipelining if not obtaining an appropriate pipelining ckt with



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



- 3. Write a note on :
 - a) Retiming and its properties
 - b) LPM algorithm.

SECTION - II

4.	Solve any two:	14
	a) Write a note on systolic design for matrix-matrix multiplication.	
	b) Explain applications of unfolding.	
	c) Explain parallel carry save array multipliers.	
5.	Solve any two :	14
	a) Design B2 filter for FIR systolic array.	
	b) Explain the concept of unfolding. List out its properties.	

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

Variable name	Tin
а	0
b	1
С	2
d	3
е	4
f	5
g	6
h	7

- 6. Write a note on :
 - a) Parallel carry ripple array multipliers
 - b) Folding transformation.

Seat	
No.	

M.E. (CSE) (Semester – I) (CBCS/CGPA) Examination, 2018 **THEORY OF COMPUTATION (Paper – I)**

Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1. Answer any four :

- a) Explain proof by induction with an example.
- b) What are decidable languages ? Prove that A_{DEA} is decidable language.
- c) Define a relation and an equivalence relation with proper examples.
- d) What are enumerators ? Prove that a language is turing recognizable iff some enumerator enumerates it.
- e) Illustrate E_{DFA} and EQ_{DFA} in decidability and prove that they are decidable languages.
- 2. Answer the following : What is diagonalization method? Illustrate with an example.
- 3. Answer the following : 5 Give a formal definition of a TM. Design a TM for a language $L = \{X^*X | X \in \{a,b\}^*\}$.

SECTION – II

- 4. Answer any four :
 - a) If $R_{TM} = \{ <M > | M \text{ is a TM and } L(M) \text{ is a regular language} \}$, then prove that R_{TM} is undecidable.
 - b) Illustrate PCP Problem and prove that PCP is undecidable.
 - c) What is time complexity ? Brief out the time complexity of a TM.
 - d) Elaborate NP completeness with example.
 - e) Elaborate growth rate of functions.
- 5. Answer the following : Elaborate recursion theorem and prove that MIN_{TM} is not turing recognizable.
- 6. Answer the following : What are tractable and intractable problems ? Explain in detail.

Total Marks: 70

24

6

24

5

6

SLR-TD – 53

Set

P.T.O.

Seat No.

M.E. (Computer Science and Engg.) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – II : ADVANCED OPERATING SYSTEM

Day and Date : Tuesday, 8-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

I. Answer any two :

- 1) What are distributed systems ? Give four applications of distributed systems.
- 2) List the differences between microkernel model and monolithic kernel model of distributed systems.
- 3) Explain the working of workstation server model of distributed system.

II. Answer any two :

- 1) What is a non-idempotent operation ? Describe a mechanism for implementing exactly once IPC semantics in this case.
- 2) With example explain blocking and non blocking send and receive primitives in message passing.
- 3) Why clock synchronization is necessary in distributed systems ? Explain with example.
- III. 1) What is client-server binding in RPC ? Explain the three client-servers binding methods in RPC.
 - 2) Define happened-before relation. What are the conditions satisfied by happened-before relation ?

SECTION – II

IV. Answer any two :

- 1) Explain different models for organizing threads.
- 2) With example explain the concept of strict 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.

Total Marks : 70

10

10

10

5

10

Set P

SLR-TD – 54

- V. Answer any two :
 - 1) What is processor thrashing ? Give two situations that can lead to processor thrashing.
 - 2) 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.
 - 3) Most DSM systems in which caching is managed by the operating system use write-invalidate scheme for consistency instead of write-update scheme. Explain why ?
- 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 ?

Seat	
No.	

M.E. (CSE) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – III : ANALYSIS OF ALGORITHM

Day and Date : Friday, 11-5-2018

Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

- 1. Solve :
 - A) What is Asymptotic notation ?
 - B) Analyse following algorithm

INSERTION _SORT(A)

j=2 to A. length

key = A[j]

// Insert A[j] into sorted sequence

i = j -1

while i > 0 and A[i] > key

A[i+1] = A[i]

i = i–1

A[i + 1] = key

15



SLR-TD – 55

Total Marks: 70

2. Solve any one :

- A) Explain All Pair shortest path with example.
- B) Compute minimum cost spanning tree with Prim's algorithm.



3. Solve any one :

- A) Explain optimal binary search trees.
- B) Explain reliability design.

SECTION – II

4. Solve : 15
a) What is Clique Decision Problem (CDP) and show that CNF-satisfiability α CDP.
b) What is Node Cover Decision Problem ?
5. Solve any one : 10
a) Explain odd-even merge application with example of PRAM.
b) Solve the Boolean OR and AND problem on the CREW and EREW PARAM.
6. Solve any one : 10
a) Explain convex hull
b) Explain Voronoi Diagram.

Set

Seat No.

M.E. (Computer Sci. and Engineering) (Semester – I) (CBCS/CGPA) **Examination**, 2018 **RESEARCH METHODOLOGY (Paper – IV)**

Day and Date : Saturday, 12-5-2018

Total Marks: 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. (4) and Q. No. (8) are compulsory.

- 2) Attempt any two from remaining questions in each Section.
- 3) Assume suitable data if needed.
- 4) Figures to the right indicate full marks.

SECTION - I

1.	a)	Explain in short the significance of Research. What are the points that need to	
		be remembered for understanding the significance of research ?	6
	b)	With the help of diagram explain research process in detail.	6
2.	a)	What is the need for defining a research problem ?	6
	b)	Differentiate Research Methods and Research Methodology with an	
		example.	6
3.	a)	List out different research designs ? Explain any one of them.	6
	b)	Explain in brief features of good design.	6
4.	a)	Describe the process of collection of secondary data. What are the desirable	Э
		characteristics of secondary data ?	6
	b)	Elaborate the process of telephone interviews with merits and demerits.	5
		ρτ	0

SECTION - II

5.	a)	With the help of flow diagram elaborate the procedure for hypothesis testing.	6
	b)	Elaborate null hypothesis and alternative hypothesis with example.	6
6.	a)	Write a short note on Plagiarism.	6
	b)	What is the difference between a conference paper and a journal paper ?	6
7.	a)	List types of report and explain any one.	6
	b)	Explain the technique and importance of oral presentation.	6
8.	a)	What things are to be considered while reading a scientific paper ?	6
	b)	What are the precautions that need to be taken while writing a research report ?	5

Seat No.

M.E. (Computer Science and Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – V : DATA MINING (Elective – I)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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.
- 1. Objective Questions :

Choose the correct alternatives :

- 1) Data scrubbing is which of the following ?
 - A process to reject data from the data warehouse and to create the necessary indexes
 - B) A process to load the data in the data warehouse and to create the necessary indexes
 - C) A process to upgrade the quality of data after it is moved into a data warehouse
 - D) A process to upgrade the quality of data before it is moved into a data warehouse
- 2) The load and index is which of the following
 - A) A process to reject data from the data warehouse and to create the necessary indexes
 - B) A process to load the data in the data warehouse and to create the necessary indexes
 - C) A process to upgrade the quality of data after it is moved into a data warehouse
 - D) A process to upgrade the quality of data before it is moved into a data warehouse

Set D

SLR-TD – 57

Total Marks : 70

14

Set P

SLR-T	D – 57	-2-			
3)	Data transformation	n includes which o	of th	e following ?	
	A) A process to cha	ange data from a	aeta	alled level to a	summary level
	 B) A process to characterized and the second sec	ange data from a	sum	imary level to	a detailed level
	C) Joining data from	from one source into	var	lous sources	or data
	D) Separating data		into	vanous sourc	
4)	I ne full form of OLA	AP IS	D)	Oralia a Adurar	
	 A) Online Analytica C) Online Advance 	d Processing	D)	Online Advar	ticed Processing
	C) Online Advance		נים :		
5)	nonvolatile collectio	s a subject-oriente	ea, i ort a	ntegrated, tim of managemei	ie-variant, nt decisions
	A) Data Mining		B)	Data Wareho	usina
	C) Document Minin	a	D)	Text Mining	
6)	The data is stored.	retrieved and upo	, late	d in	
-,	A) OLAP	B) OLTP	C)	SMTP	D) FTP
7)	An s by knowledge work	ystem is market-c ers, including ma	orier nag	nted and is use ers, executive	ed for data analysis
	A) OLAP		B)	OLTP	
	C) Both of the above	/e	D)	None of the a	above
8)		_ is a good alterna	ative	e to the star so	chema.
	A) Star schema		B)	Snowflake sc	hema
	C) Fact constellation	on	D)	Star-snowflak	ke schema
9)	The managed by operat	exposes the inf tional systems.	orm	nation being ca	aptured, stored and
	A) top-down view		B)	data warehou	use view
	C) data source view	N	D)	business que	ery view
10)	The type of relation	ship in star scher	na i	S	
	A) many to many	B) one to one	C)	one to many	D) many to one
11)	The	allows the sel	ecti	on of the relev	ant information
,					

necessary for the data warehouse.

A) top-down view B) data warehouse view

C) data source view D) business query view SLR-TD – 57 -3-12) Which of the following is not a component of a data warehouse? A) Metadata B) Current detail data C) Lightly summarized data D) Component Key 13) Which of the following is not a kind of data warehouse application? A) Information processing B) Analytical processing C) Data mining D) Transaction processing 14) A data warehouse is which of the following : A) Can be updated by end users B) Contains numerous naming conventions and formats C) Organized around important subject areas D) Contains only current data 2. Attempt any three : 14 a) What is a business model? b) List the basic elements of Data Mining. c) What is modeling of Datawarehouse ? d) Compare between classification and clustering. 3. a) List the steps in KDD Process. Explain each step. 10 b) What is Association Rule Mining? How is it carried out? 4 4. a) How is tree based classification carried out ? 10 b) How is extraction done using Neural Networks? 4 5. a) How is knowledge extracted from the web? 10 b) List and explain the data Mining primitives. 4 6. a) Elaborate on the architectures of Data Mining? 8 b) How is indexing of Multimedia material performed? 6 7. a) What are types of Web Mining? 8 b) What is Query language ? How is it's GUI developed ? 6

Total Marks: 70

Seat No.

M.E. (Computer Science and Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – V (Elective – I) : MOBILE COMPUTING

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instruction : All questions are compulsory.

SECTION - I

- 1. Solve any two :
 - a) List types of modulations used in wireless communication. Explain phase shift keying with diagram.
 - b) How MACA can avoid hidden terminals problem ? Explain with neat sketch.
 - c) Draw and explain the protocol architecture of GSM for signaling.

2. Solve any two :

- a) Explain direct sequence spread spectrum with diagram of transmitter and receiver.
- b) Discuss comparison of SDMA, TDMA, FDMA and CDMA mechanisms.
- c) Explain MTC and MOC in GSM.
- 3. What is multipath propagation ? Discuss its effects.

OR

Explain code division multiple access.

4. Draw and explain GPRS architecture reference model.

SECTION - II

5. Solve any two :

- a) Draw and explain IEEE 802.11 protocol architecture and bridging.
- b) Explain agent solicitation and agent advertisement in agent discovery phase.
- c) Write note on Palm OS.



12

12

5

6

Explain transaction oriented TCP.

8. Write note on WML script.

Seat No.

M.E. (Computer Science and Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 ARTIFICIAL NEURAL NETWORKS AND GENETIC ALGORITHMS (Elective – I) (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

1.	Answer any three :	15
	a) Develop the Macullah Pitts model.	
	b) What is learning ? Derive a simple expression.	
	c) State and explain the Delta training rule.	
	d) What are self organizing Kohenen's map ?	
2.	Answer any one :	10
	a) How does Discrete Perceptron work as a classifier ?	
	b) State and derive the error back propagation algorithm.	
3.	Answer any one :	10
	a) How does K-means clustering algorithm work ?	
	b) How are Hamming nets and Maxnets used for classification ?	

SLR-TD – 59

Set P

Total Marks : 70

4.	Answer any three :	15
	a) What is auto-association ?	
	b) What is a BAM network ?	
	c) What is simulated annealing ?	
	d) Elaborate on the concepts used in random search.	
5.	Answer any one :	10
	a) Explain the working of a simple Genetic Algorithm with a flow chart.	
	b) What is gradient descent ? How does it work ?	
6.	Answer any one :	10
	a) List and elaborate on the applications of ANN.	
	b) What are the operators that GA uses ? Elaborate on each.	

SECTION - II

Seat No.

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VI : INTERNET ROUTING ALGORITHM

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 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 :
 - a) Write a short note on IP Protocol Stack Architecture.
 - b) What are the similarities and differences between IS-IS and OSPF ?
 - c) 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.
- II. Write answer to any two questions :
 - a) Draw the diagram depicting protocol layering in IP architecture.
 - b) Consider the following network topology. The number listed next to the links is assumed to be bandwidth. Determine the widest path from node 2 to node 5 using widest path algorithm, computed at node i (Dijkstra based).





Total Marks : 70

(2×5=10)

 $(2 \times 5 = 10)$

Set P

SLR-TD – 61

- III. a) What are the different states in the BGP finite state machine ?
 - b) What are the primary operational considerations in regard to the RIP protocol ?

SECTION - II

- IV. Write answer to **any two** questions :
 - a) List three differences between a distance vector protocol and a link state protocol.
 - 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 :
 - a) What are the basic requirements of Longest Prefix matching algorithm ?
 - b) Write a short note on allocation of IP prefixes and AS number.
 - c) Illustrate search and update operations in a binary tree with example.
- VI. a) Explain the grid of tries type of two-dimensional packet classification algorithm and state its advantages.
 1
 - b) What are the sub-protocols of a link state protocol?

```
SLR-TD – 61
```

10

5

(2×5=10)

 $(2 \times 5 = 10)$

Seat No.

Set P

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VII : ADVANCED DATABASE CONCEPTS

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 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** questions.
- 5) Assume suitable data wherever necessary.

SECTION - I

1.	a)	Apply criteria 1 and 2 to simplify global query. Show stepwise result.	8
		$PJ_{NAME, TAX}(EMP JN_{DEPTNUM = DEPTNUM} SL AREA =_{"NORTH"} DEPT)$	
		DF(EMP JN _{DEPTNUM = DEPTNUM} SL _{DEPTNUM < 10} DEPT)	
	b)	Compare data partitioning techniques in parallel database. How the skew in distribution of tuples is handled ?	7
2.	a)	Explain concurrency control based on locking in distributed database.	5
	b)	How to detect deadlock in distributed database.	5
3.	a)	Explain any four features of distributed vs. centralized database.	5
	b)	What are the contents of catalogs ? What is the use of catalogs in distributed databases ?	5
4.	a)	Explain methods available for joining two relations locally. Also explain evaluation cost for each method.	5
	b)	Describe a good way to parallelize the following operations :1) Aggregation by count method.2) Aggregation by average method.	5
		P.1	г. О .

Total Marks: 70

SECTION - II

5.	a) What are the two types of time and how they are different ? Why does it make sense to have both types of time associated with a tuple.	8
	b) Write a short note on space filling curve.	7
6.	a) What are complex data types ? How they are defined in SQL.b) Explain nesting and unnesting of relations with example.	5 5
7.	a) What are different ways of querying multimedia data ?b) What are the different issues to be considered in storage of multimedia data ?	5 5
8.	A car Rental company maintains a database for all vehicles in its current fleet. For all vehicles, it includes the vehicle identification number, licence number, manufacturer, model, date of purchase and color. Special data are included for certain types of vehicles :	
	Trucks : cargo capacity	
	Sports car : horsepower, renter age requirement	
	Vans : number of passengers	
	Off-road vehicles : ground clearance, drivetrain (four or two wheel drive)	
	Construct appropriate structured types. Use inheritance where appropriate.	10

Seat No.

M.E. (Computer Science and Engg.) (Semester – II) (CBCS/CGPA) Examination, 2018 PARALLEL COMPUTER ARCHITECTURE (Paper – VIII)

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) All questions from Section – I and II are compulsory.

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

3) Assume data if necessary.

SECTION - I

- 1. Attempt **any three** of the following :
 - a) Explain two basic approaches to instruction scheduling.
 - b) Write difference between superscalar processors and VLIW architectures.
 - c) Discuss the principle of the operation of ILP-Processors.
 - d) Explain features of IBM Power 1.
- Describe in detail two different kinds of RAW dependency and two corresponding kinds of latencies.
 10
- 3. Attempt **any one** of the following :
 - a) Describe in detail logical layout of FX pipelines (RICS and CICS pipelines).
 - b) Draw design space of shelving. Discuss operand fetch policy in detail.

SECTION – II

- 4. Attempt **any three** of the following :
 - a) What is annulment ? State four variants which are distinguished by whether the delay slot annulled or not ?
 - b) List the main features of the PentiumPro.
 - c) What are the three aspects which give to the basic approaches in branch handling ?
 - d) Write in detail the memory consistency models.

SLR-TD – 63

Set P

Max. Marks: 70

(5×3=15)

(5×3=15)

 $(1 \times 10 = 10)$

- 5. Attempt **any one** of the following :
 - a) Discuss two architectural concepts which can be used for checking the result of operation.
 - b) Explain and assess the basic delayed branching scheme.
- 6. Attempt any one of the following :
 - a) Explain main features of R10000. Draw diagram of core part of the micro architecture of the R10000.
 - b) Draw and explain a block diagram of IBM Power 4. Draw a pipeline layout of IBM Power 4. Explain stages of the pipeline.

(1×10=10)

(1×10=10)

Seat

5

No. ______ 5

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 GRID COMPUTING (Elective – II) (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 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**) :
 - A) Briefly describe the layered Grid architecture.
 - B) Which are those four primary requirements must be addressed in selecting network protocol bindings within an OGSA context ?
 - C) What are the key risk factors are vulnerability of grid computing deployments ?
 - D) What is the Worldwide LHC Computing Grid ? Briefly introduce its three tiers.
 - E) Compare Grid computing and Cloud computing environments.
- 2. Write answer to **any one** question :
 - A) What is Semantic Gird ? What are the functionalities and issues addressed at the knowledge layer of Semantic Grid ?
 - B) Describe with figure the three varieties of VO service structures.
- 3. Briefly describe variety of higher-level Grid services that collectively address the diverse requirements of e-Business and e-Science applications.

Total Marks : 70

Set P

SLR-TD – 64

10

 $(4 \times 5 = 20)$

SECTION - II

- 4. Write answer to **any four** questions (5 marks for **each**) :
 - A) Write a short note on parallel computing technique used for image stretching (resampling) in virtual sky application of Grid computing.
 - B) What is Strasbourg Ontology ?
 - C) Briefly describe the topology of the "Encyclopedia of Life (EOL)" GRID application system.
 - D) What is combinatorial chemistry ? Explain SPLIT and MIX approach.
 - E) Write a short note on data mining and visualization application over GRID.
- 5. Write answer to **any one** question :

10

- A) Explain the schematic three-layered architecture adopted to San Diego Supercomputer Center (SDSC) in developing next generation Grid portals.
- B) Describe the architecture of "MONTAGE" GRID application.
- 6. Write a short note on applications of GARUDA Grid.

SLR-TD – 65

Seat	
No.	

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Elective – II : REAL TIME OPERATING SYSTEM (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instruction : 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** indicates **full** marks.

SECTION - I

1.	Explain phases of software life cycle.	7		
2.	A) Describe state charts with example.B) Explain synchronization mechanism – event flags and signals with example.	7 7		
3.	A) Describe kernel hierarchy. Explain polled loop system with example.B) Explain foreground/background systems with example.	7 7		
4.	A) Explain deadlock and deadlock avoidance in intertask communication.B) Describe process stack management in detail.	7 7		
	SECTION – II			
5.	Write short note on – scheduling is NP complete.	7		
6.	A) Write short note on reliability. How system reliability is calculated ?B) Discuss techniques for performing system integration.	7 7		
7.	A) Write note on real time databases.B) What is response time ? How it is calculated ?	7 7		
8.	A) Explain classical queuing theory.B) Describe in detail method to reduce memory loading.	7 7		

Set P

Max. Marks: 70

M	.E. (Computer Sciend	e and Engineering) (Semester – II) (C Examination, 2018	BCS/CGPA)
	Elective – II : NAT	URAL LANGUAGE PROCESSING (Par	per – IX)
Day Tim	Day and Date : Monday, 21-5-2018 Max. Marks : 7 Time : 10.00 a.m. to 1.00 p.m.		
	Instructions :	 All questions are compulsory. Figures to the right indicate full marks. Assume suitable data where necessary 	У.
		SECTION - I	
1.	Answer any three : a) What are grammars b) What are the goals c) List the different typ d) What is local word g	s ? Explain. of NLP ? es of parsers. grouping ?	15
2.	Answer any one : a) How does a core pa b) What is a Kriya Rup	arser work ? ba chart ?	10
3.	Answer any one : a) Elaborate on Karak b) What are Lakshan o	a sharing. charts ? How do they deal with sense ambig	10 guity ?
		SECTION - II	
4.	Answer any three : a) What is Anusaraka b) Is machine translati c) What is a LFG ? d) Compare between	? on possible ? _FG and TAG.	15
5.	Answer any one : a) Formulate Anusara b) How are Wh mover	ka as a language accessor. nents in questions dealt with using LFG ?	10
6.	Answer any one : a) Compare between b) List GB theories an	TAG and GB. d elaborate them.	10

Seat No.

Set Ρ

SLR-TD - 66

Seat No.

M.E. (CSE) (Semester – II) (CBCS/CGPA) Examination, 2018 Elective – II : INFRASTRUCTURE MANAGEMENT (Paper – IX)

Day and Date : Monday, 21-5-2018

Time: 10.00 a.m. to 1.00 p.m.

Instructions : 1) All questions are compulsory.

- 2) Assume suitable data if necessary.
- 3) Figures to the **right** indicate **full** marks.

SECTION - I

1. Attempt any four :

- 1) Explain Cost Estimation of Complexity issues.
- 2) Explain in brief growth of internet.
- 3) What is ITIL ? Explain it in detail.
- 4) Explain patterns for IT system management.
- 5) What are the IT Services ? Explain continuity management.

2. Attempt any one :

- 1) What is infrastructure management and explain IM activities in detail ?
- 2) Explain in detail IT infrastructure design factors and considerations.
- 3. Write note on Service Level Management.

SLR -TD – 67



(4×5=20)

 $(1 \times 10 = 10)$

Max. Marks: 70

SECTION - II

4.	Attempt any four :	(4×5=20)
	1) Explain Release Management in detail.	
	2) What is data retention and explain in detail ?	
	3) Explain incident management in detail.	
	4) Explain Archive and Retrieve.	
	5) Explain Environmental Policies in IM.	
5.	Attempt any one :	(1×10=10)
	1) Explain problem management and change management in IM.	
	2) Explain storage and security management in detail.	
6.	Explain Regulatory issues in IM.	5

Seat No.

Set P

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Elective – III : WEB TECHNOLOGY (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Answer any five questions from each Section.

- 2) Figures to **right** indicate **full** marks.
- 3) Assume **suitable** data if necessary.

SECTION - I

- 1. Explain online payment gateways and their significance. (5×7=35)
- 2. Explain session tracking methods in ASP.
- 3. Display all the elements of html pages using Java script ?
- 4. Describe server object in ASP programming.
- 5. Create an HTML page to accept name and email id and validate the email id using java script before sending to server.
- 6. Explain different elements in XML Schema.

SECTION - II

- 7. Explain web 2.0 and web 3.0 implement strategies. (5×7=35)
- 8. Explain feature of Servlet. Explain any two JSP object.
- 9. Describe various object in JSP pages.
- 10. Describe various security issues of web servers.
- 11. Explain and compare GET and POST request in details.
- 12. Explain Mashups and RSS.

Max. Marks: 70

Seat No.

M.E. (CSE) (Semester – II) (CBCS/CGPA) Examination, 2018 BUSINESS INTELLIGENT SYSTEM (Elective – III) (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

- 1. Write answers to **any five** questions :
 - 1) Explain architecture of BI.
 - 2) Explain six major categories of decision support tools.
 - 3) Define business performance management and compare with BI.
 - 4) What is KPI and what are its distinguishing characteristics ?
 - 5) How does NLP relates to text mining ?
 - 6) Explain text mining with its process. Explain popular application area of text mining.

SECTION - II

- 2. Write answers to any five questions :
 - 1) What are the major types of BI implementation influencing factor ?
 - 2) What is on-demand BI ? Explain its benefits.
 - 3) Define reality mining. Explain types of data used.
 - 4) Describe mobile social networking.
 - 5) What is collaborative decision making ? Explain its benefits.
 - 6) What is RFID ? What kinds of data used through RFID ?



Set

Max. Marks: 70

SLR-TD – 69

(5×7=35)

(5×7=35)

Seat

No.

P.T.O.

Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Day and Date : Wednesday, 23-5-2018

SECTION - I

M.E. (CSE) – II (CBCS/CGPA) Examination, 2018 OBJECT ORIENTED SOFTWARE ENGINEERING AND DESIGN PATTERNS (Elective – III) (Paper – X)

1. Answer briefly :

- 1) How model expressed in software in domain model engineering ?
- 2) Describe about the activity diagrams in detail.
- 3) Explain architectural styles software architecture.
- What is UML ? Explain objects and classes. Also describe inheritance and polymorphism in detail.
 10

OR

What is Software Architecture ? Also explain foundations of software architecture.

- 3. Write short notes on (any two): (5×2=10)
 - a) Crunching knowledge in domain model engineering
 - b) Use case modeling
 - c) Software architectureo-relationships to other disciplines.



SLR-TD – 70



15

SLR-TD - 70

SECTION - II

4.	Answer briefly :	(5×3=15)
	1) Explain execution architecture view in detail.	
	2) Describe Quantity Archetype Pattern.	
	3) Explain patterns for organization of work.	
5.	Explain Global Analysis Software Architecture Design. Also Describe St	yles
	of Component-and-Connector Viewtype.	10
	OR	
	Explain object management patterns and adaptation pattern in detail.	10
6.	Write short notes on (any two) :	(5×2=10)
	a) Code Architecture View	
	b) Model Driven Architecture with Archetype Patterns	
	c) Structural Patterns.	
SLR-TD – 71

Seat	
No.	

M.E. (Computer Science and Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018

Paper – X : WIRELESS AD-HOC NETWORK (Elective – III)

Day and Date : Wednesday, 23-5-2018

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. 4 and Q. No. 8 are compulsory.

- 2) Attempt **any two** from remaining questions in **each** Section.
- 3) Assume suitable data if needed.
- 4) Figures to the **right** indicate **full** marks.

SECTION - I

1.	A)	Explain following characteristics of Channel – i) Path Loss ii) Fading.	6
	B)	What is On-Demand Approach ? Explain in detail AODV protocol.	6
2.	A)	Explain Wireless sensor networks. Discuss technical challenges WSN.	6
	B)	Write a short note on Digital Radio Properties.	6
3.	A)	Explain in detail IEEE 802.11 DCF and RTS-CTS (medium access) mechanism.	6
	B)	Explain in detail Zone Routing Protocol.	6
4.	A)	Explain IEEE 802.11a standard in details.	6
	B)	Why is a need for specialized MAC in wireless networks ?	5
		SECTION – II	
5.	A)	Explain with neat diagram the architectural framework of an Ad-hoc multicast protocol.	6
	B)	What are security issues in wireless ad-hoc networks ? Discuss them in details.	6
6.	A)	What are the issues in designing a multicast routing protocol ? Explain with diagram source-initiated multicast protocol.	6
	B)	List and explain various network layer attacks in Ad-hoc WANs.	6
7.	A)	Write a short note on energy efficient multicasting in WAN.	6
	B)	Give the comparison of various TCP solutions for Ad-hoc wireless networks.	6
8.	A)	Why does traditional TCP does not perform well in Ad-hoc WANs ?	6
	B)	Explain with diagram tree initialization, maintenance and route optimization phases in BEMRP.	5

Total Marks: 70

Set P

|--|

Seat No.

M.E. (Electronics and Telecommunication Engineering) (Semester – I) (CBCS) Examination, 2018 RESEARCH METHODOLOGY (Paper – I)

Day and Date : Monday, 7-5-2018 Total Time : 10.00 a.m. to 1.00 p.m.		Total Marks : 70
	N.B.: All questions are compulsory.	
	SECTION – I	
1.	Solve any two :	(5×2=10)
	a) What are the steps involved in scientific thinking?	
	b) What is need of defining a problem ?	
	c) State purpose of research and enlist broad objectives of research	arch.
2.	Solve any one :	(7×1=7)
	a) Explain Monte Carlo method with example.	
	b) With the help of block diagram explain research process.	
3.	Solve any three :	(6×3=18)
	a) State difference between :	
	i) Qualitative and quantitative research	
	ii) Descriptive research and analytical research.	
	b) What are the objectives of literature review ?	
	c) What are the ways of collection of data ?	
	d) Explain dynamic mathematical model with example.	
	SECTION – II	
4.	Solve any two :	(2×5=10)
	1) Designate the basic principles of experimental designs.	
	2) Explain in brief the layout of research report.	

3) What is role of probability and statistics in simulation ?

P.T.O.

SLR-TD – 75

Set

- 5. Attempt any one :
 - 1) Explain in detail essential characteristics of a good experimental design.
 - 2) Define the term 'Experiment'. Differentiate between research design and experimental design.
- 6. Write a short note on any three :
 - 1) Report structure
 - 2) Need of precision
 - 3) Writing technical report
 - 4) Statistical distribution
 - 5) Patent.

(3×6=18)

(1×7=7)

Seat No.

M.E. (Electronics and Telecommunication Engg.) (Semester – I) (CBCS) Examination, 2018 ANTENNA THEORY AND DESIGN (Paper – II)

Day and Date : Tuesday, 8-5-2018

Time : 10.00 a.m. to 1.00 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.

- a) Explain the radiation mechanism of a microstrip antenna.
- b) Explain pattern multiplication with some examples.
- c) Explain broadside array radiation pattern with mathematical expression.
- 2. Solve any one question.
 - a) Derive the expression for electric field intensity at a point due to two non isotropic sources which has equal amplitude and in phase to each other.
 - b) Explain different feeding mechanism of microstrip antenna.
- 3. Attempt any three questions.
 - a) Explain cavity model for the analysis of microstrip antenna.
 - b) Explain broadbanding using stacked elements.
 - c) Derive an equation for array factor for array of two isotropic point source of equal amplitude and spacing.
 - d) Explain the characteristics of microstrip antenna and also mention its advantages and disadvantages.

 $(5 \times 2 = 10)$

 $(7 \times 1 = 7)$

 $(6 \times 3 = 18)$

Set

Max. Marks: 70

SLR-TD – 76

SECTION - II

- 4. Solve **any two** questions.
 - a) Write a note on composite material substrate.
 - b) Justify selection of shape of patch affects on bandwidth of microstrip antenna.
 - c) Explain linear array design with microstrip patches using corporate feed arrays.
- 5. Solve any one question.
 - a) Explain about the aperture coupled microstrip antenna for broad band antennas.
 - b) Explain parallel feed, one and two dimension excitation methods for microstrip antenna.
- 6. Attempt any three questions.
 - a) Explain in brief design consideration of rectangular microstrip antenna.
 - b) Explain desirable substrate characteristics for antenna fabrication.
 - c) Write a note on semiconductor substrate and ferimagnetic substrate.
 - d) Explain linear array design with microstrip patches using series feed arrays.

(5×2=10)

 $(7 \times 1 = 7)$

(6×3=18)

Seat	
No.	

M.E. (Electronics & Telecommunication Engg.) (Semester – I) (CBCS) Examination, 2018 **PROBABILITY AND STOCHASTIC PROCESSES (Paper – III)**

Day and Date : Friday, 11-5-2018 Time : 10.00 a.m. to 1.00 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 :

- a) Define with suitable example :
 - i) Sample Space
 - ii) Mutually exclusive events
 - iii) Independence events.
- b) State properties of CDF of random variables.
- c) Discuss the Properties of Covariance in brief.

2. Attempt any one :

- a) Explain MAP estimation in brief.
- b) Consider a family that has two children. We are interested in the children's genders. Our sample space is $S = \{(G, G), (G, B), (B, G), (B, B)\}$. Also assume that all four possible outcomes are equally likely.
 - i) What is the probability that both children are girls given that the first child is a girl?
 - ii) We ask the father : "Do you have at least one daughter"? He responds "Yes!" Given this extra information, what is the probability that both children are girls ? In other words, what is the probability that both children are girls given that we know at least one of them is a girl?

P.T.O.

SLR-TD – 77

Set

Max. Marks: 70

 $(6 \times 2 = 12)$

 $(7 \times 1 = 7)$

- 3. Attempt any two :
 - a) Consider the following joint probability density function of X and Y

$$\mathsf{F}_{\mathsf{X}\mathsf{Y}}(\mathsf{x},\mathsf{y}) = \begin{cases} 9e^{-3\mathsf{x}}e^{-3\mathsf{y}} & \mathsf{x},\,\mathsf{y} \geq 0\\ 0 & \text{otherwise} \end{cases}$$

- i) Check whether this is a valid density function.
- ii) Find the probability that the random variable X is between 0 & 1.
- iii) Show that the random variables X & Y are independent of each other.
- b) Suppose the random variables X and Y have the joint density function defined by

$$F(x, y) = \begin{cases} c(2x + y) & 2 < x < 6, 0 < y < 5 \\ 0 & \text{otherwise} \end{cases}$$

- i) Find the Constant value c.
- ii) Marginal CDF for X and Y.
- iii) Joint Distribution Function.
- c) Explain linear estimation of random variables from random vectors.

SECTION - II

- 4. Attempt any two :
 - a) Explain wide sense stationary process and stochastic process.
 - b) Explain different classification states of Reducible Chain.
 - c) Explain in detail (M/M/I, M/M/N) queue.

5. Attempt any one :

- a) What do you mean by Estimation of spectral density and cross spectral density ?
- b) List and explain the properties of poisson process.

(8×2=16)

 $(7 \times 1 = 7)$

 $(6 \times 2 = 12)$

6. Attempt any two :

- a) Customer arrive at a one man barber shop according to a Poisson process with mean arrival time of 20 min. Customers spend an average time of 15 minutes in barber chair. If an hour is used as a unit of time then :
 - i) What is the probability that a customer need not wait for a haircut ?
 - ii) What is the expected number of customers in the barber shop and in the queue ?
 - iii) How much time can a customer expect to spend in the barber shop ?
 - iv) Find the average time that a customer spends in the queue.
- b) Explain in detail chapman Kolmogorov equations and classification of states.
- c) Discuss estimation of autocorrelation function using frequency domain technique.

(8×2=16)

Seat No.

M.E. (E&TC) (Semester – I) (CBCS) Examination, 2018 Paper – IV : ADVANCED NETWORK SYSTEMS

Day and Date : Saturday, 12-5 -2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : • *All* questions are *compulsory*.

Figures to right indicate full marks.

SECTION - I

- 1. Attempt any three :
 - a) What is ARP? Discuss the necessity and time out of ARP cache.
 - b) Explain recursive and iterative resolution. Comment on caching.
 - c) What are different types of records in DNS message format? Explain any one record format.
 - d) Explain the format of IPsec authentication header.
- 2. Answer the following :
 - a) Which errors are handled by ICMP ? Explain any one error reporting.
 - b) Explain IPsec encapsulating security payload.
- 3. What is TFTP ?What are different types of messages used by TFTP ? Explain each with format.

SECTION – II

4.	Attempt any three :	(5×3=15)
	a) Evaluin the TICDAN NON everall architecture	

- a) Explain the TISPAN–NGN overall architecture.
- b) Explain the classical IP over ATM model.



Total Marks: 70

 $(5 \times 3 = 15)$

 $(5 \times 2 = 10)$

10

P.T.O.

SLR-TD – 78

Set

(5×2=10)

- c) Explain the reservation styles in ReSerVation Protocol. (RSVP).
- d) Explain the necessity of carrier extension in Gigabit ethernet.
- 5. Answer the following :
 - a) Explain the ATM cell header format.
 - b) Draw and explain functioning of MPEG audio encoder.
- 6. Explain the functions of ATM Adaptation Layer (AAL) sublayers. Explain the process of generating ATM cells by adding headers to user data stream in AAL1.

10

Seat No.

M.E. (Electronics and Telecommunication) (Semester – I) (CBCS) Examination, 2018 Paper – V : OPTICAL NETWORKS (Elective – I)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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 two** :
 - a) Discuss how "loop diversity" can be achieved in SONET/SDH rings.
 - b) Explain the principle of operation of Fabry Perot (FP) filter.
 - c) List and explain the different topologies used in optical networks.
- 2. Solve any one :
 - a) Describe the pointer concept in SONET and functional components of SONET.
 - b) Explain the OTN layered model.
- 3. Write short note (any three) :
 - a) DWDM Tunable Laser light source.
 - b) Methods of clock exchange.
 - c) Optical Add/Drop Multiplexer.
 - d) Digital wrapper and control planes in optical transport network.

Set P

Max. Marks: 70

SLR-TD – 79

(5×2=10)

 $(7 \times 1 = 7)$

(6×3=18)

SECTION - II

4.	Attempt any two :	(5×2=10)
	a) Explain the migration to IP optical networking.	
	b) Explain domain service model and unified service model.	
	c) How nesting can be done between LSPS and OSPS ?	
5.	Attempt any one :	(7×1=7)
	a) Explain internet transport network protocol stack.	
	b) Explain the process of label swapping and traffic forwarding.	
6.	Attempt any three :	(6×3=18)
	a) Explain the mapping of MPLS labels to WDM channels.	
	b) Explain IP and optical backbone.	
	c) Explain the process of IP and lambda forwarding.	
	d) Explain how granularity of labels is supported by wavelength in switching.	optical

Sea No	at .	Set	Ρ
Μ	I.E. (Electronics and Telecommunication Engineering) (S (CBCS) Examination, 2018 SPEECH AND VIDEO PROCESSING (Elective – I) (Paper	emester r – V)	— I)
Day Tim	and Date : Monday, 14-5-2018 e : 10.00 a.m. to 1.00 p.m.	Total Mark	ks : 70
	SECTION - I		
1.	Attempt any two :	(7×	2=14)
	a) Explain in detail digital simulation of speech signal.		
	b) Explain in detail pitch estimation.		
	c) Explain the various acoustic phonetics.		
2.	Attempt any one :	(7	×1=7)
	a) Explain in detail time and frequency analysis of speech.		
	b) Describe briefly NLMS filter.		
3.	Attempt any two :	(7×	2=14)
	a) Explain various speech enhancement techniques.		
	b) Describe HMM algorithm for speech recognition.		
	c) Explain Baye's rule.		
	SECTION – II		
4.	Attempt any two :	(7×	2=14)
	a) Explain photometric image formation.		
	b) Explain 3D motion models.		

SLR-TD - 80

5. Attempt any one : (7×1=7) a) Explain in detail global motion estimation. b) Explain in detail Pixel based motion estimation. (7×2=14) 6. Write short note on any two : a) Waveform based coding.

- b) Mesh based motion estimation.
- c) Geometric image formation.

SLR-TD - 81

Seat No.

M.E. (E & TC) (Semester – I) (CBCS) Examination, 2018 Elective – I : ADVANCED VLSI DESIGN (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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 decimator and expander.	5
	b)	Explain static and dynamic D-latch.	5
	c)	Draw signal flow graph representation and data broadcast structure of FIR filter given by $y(n) = a x(n) + b x(n - 1) + c x(n - 2) + d x(n - 3)$.	4
2.	a)	Explain the use of pipelining and parallel processing for reducing power consumption and increasing speed.	8
	b)	For given structure, $T_M = 8$ units and $T_A = 2$ units. If desired clock period is 5 units. Draw fine grain pipelined structure of given filter.	6
		$x(n)$ $C \longrightarrow b \longrightarrow a \xrightarrow{a} \xrightarrow{a} \xrightarrow{b} y(n)$	

3.	a)	Construct an 2 × 3 linear convolution using modified Winograd algorithm with $m(p) = p(p - 1) (p^2 + 1)$.	8
	b)	Explain bit serial FIR filter and draw dependence graph of Baugh-Wooley multiplier.	6
4.	a)	Explain modified Booth recoding algorithm used for multiplication. State its advantage.	8
	b)	What is Horner's rule ? Why its architecture is not implementable ?	6
			P.T.O.

Set

Total Marks: 70

5. a) For IIR filter whose transfer function is given by $H(Z) = \frac{bcz^{-1}}{1-az^{-1}} + d$ and its SFG is **8**



Find roundoff noise for scaled system.

	b)	Explain algorithm for computing CSD format of W-bit number.	6
6.	a)	Give the DCVSL implementation of logic function $f = ABC + (A+B)$.	8
	b)	Write a note on clock skew. How clock distribution is done to reduce clock skew.	6
7.	a)	Draw state transition diagram for a static CMOS NAND NOR gate.	8
	b)	Explain switching activity.	6

Seat

No.

M.E. (Electronics and Telecommunication Engg.) (Semester – I) (CGPA) Examination, 2018 ADVANCED LIGHT WAVE COMMUNICATION (Old) (Paper – I)

Day and Date : Monday, 7-5-2018 Time : 2.30 p.m. to 5.30 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 :
 - a) What are different types of laser ? Explain any one in detail.
 - b) Explain detection process in p-i-n photodiode.
- 2. Attempt **any two** of the following questions :
 - a) Briefly explain the reasons for pulse broadening due to material dispersion in optical fiber ?
 - b) Discuss different noise sources in photo detector optical receivers.
 - c) With the help of block diagram explain functions of major elements of an optical fiber receiver.
- 3. Write a short note on (any three) :
 - a) Numerical Aperture
 - b) EDFA
 - c) Surface emitter LED
 - d) Quantum efficiency and responsivity of optical detector.

SLR-TD – 82

Set P

Total Marks: 70

 $(7 \times 1 = 7)$

(5×2=10)

 $(6 \times 3 = 18)$

SECTION - II

4.	Attempt any one of the following questions :	(7×1=7)
	a) Describe the use of active and passive components in WDM system	n.
	b) Explain the rise time budget of point to point optical link.	
5.	Attempt any two of the following questions :	(5×2=10)
	a) Explain DWDM system design parameters.	
	b) Describe types of optical fibers in detail.	
	c) Explain BER and cut off wavelength.	
6.	Write a short note on (any three) :	(6×3=18)
	a) Optical LAN	
	b) Optical ADD/DROP multiplexer in WDM	
	c) Soliton system	
	d) Mode coupling.	

 $(2 \times 7.5 = 15)$

Seat No.

M.E. (E and TC) (Semester – I) (Old CGPA) Examination, 2018 LINEAR ALGEBRA AND ERROR CONTROL TECHNIQUES (Paper – II)

Day and Date : Tuesday, 8-5-2018 Time : 2.30 p.m. to 5.30 p.m.

SECTION - I

1. Solve any four :

- a) In V₃ (R), where R is the field of real numbers, examine each of the following sets of vectors for linear dependence :
 - i) $\{(1, 2, 0), (0, 3, 1), (-1, 0, 1)\}$
 - ii) {(-1, 2, 1), (3, 0, -1), (-5, 4, 3)}.
- b) Let U and V be vector spaces over the field F and let T is a linear transformation from U into V. Suppose that U is finite dimensional, then prove that rank (T) + nullify(T) = dim U.
- c) Define linear transformation. Show that the mapping T : $V_2(R) \rightarrow V_3(R)$ defined as T(a, b) = (a + b, a - b, b) is a linear transformation from V₂(R) into $V_3(R)$. Find the range, rank, null space and nullity of T.
- d) If α , β are vectors in an inner product space V(F) then prove using triangle inequality $|| \alpha + \beta || \le || \alpha || + || \beta ||$.
- e) Define orthogonality of set of vectors in an inner product space. Show that any orthogonal set of non-zero vectors in an inner product space V is linearly independent.

2. Solve any two :

- a) Let R be the Field or real numbers. Which of the following are subspaces of $V_3(R)$
 - i) $\{(x, 2y, 3z) : x, y, z \in R\}$
 - ii) $\{(x, x, x) : x \in R\}$.

Max. Marks: 70

SLR-TD – 83

 $(4 \times 5 = 20)$

- b) Define basis of vector space. Show that the vectors (1, 2, 1), (2, 1, 0) (1, -1, 2) form a basis for R₃.
- c) Prove that the intersection of any two subspaces W_1 and W_2 of a vector space V(F) is also a subspace of V(F). Under what condition is the union of two subspaces is a subspace ?

SECTION - II

3. Solve any four :

- a) For systematic (7, 4) cyclic code, find out generator and parity check matrix for given generator polynomial $g(x) = x^3 + x + 1$.
- b) If minimal polynomial of BCH code are

$$\Phi_1(\mathsf{x}) = \mathsf{1} + \mathsf{x} + \mathsf{x}^4, \ \Phi_3(\mathsf{x}) = \mathsf{1} + \mathsf{x} + \mathsf{x}^2 + \mathsf{x}^3 + \mathsf{x}^4, \ \Phi_5(\mathsf{x}) = \mathsf{1} + \mathsf{x} + \mathsf{x}^2$$

Find the generator polynomial for triple error correcting BCH code.

- c) Find the generator polynomial for R-S code which has double symbol error correcting capability.
- d) Check whether given polynomial is primitive or not :
 - i) $1 + X + X_4$
 - ii) $1 + X + X_2 + X_3 + X_4$.
- e) Explain viterbi decoding algorithm used in convolutional codes.

4. Solve any two :

- a) Draw the state diagram, tree diagram and trellis diagram for the encoder having generator sequences 011, 110, 111.
- b) The generator polynomial for a (15, 7) cyclic code is $g(x) = 1 + x_4 + x_6 + x_7 + x_8$. Find code vector for message polynomial $D(x) = x_2 + x_3 + x_4$ in systematic form. Assume that first and last bits of this code vector corrupted. Find the syndrome.
- c) For (7, 3) cyclic code, check whether given generator polynomial $g(x) = 1 + x + x_2 + x_4$ generates cyclic code or not. Encode the message 110 using systematic method.

(4×5=20)

 $(2 \times 7.5 = 15)$

Seat No.

Set P

Total Marks: 70

 $(3 \times 6 = 18)$

 $(1 \times 7 = 7)$

M.E. (Electronics and Telecommunication Engg.) (Semester – II) (CBCS) Examination, 2018 RF AND MICROWAVE CIRCUIT DESIGN (Paper – VI)

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 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. Attempt **any three** of the following questions.
 - a) For a 2-port network define the s parameters. Also the meaning of s parameters.
 - b) What are the different methods of increasing the bandwidth of an amplifier ? Explain any one method in detail.
 - c) Explain the concept of intermodulation distortion for a high power amplifier. What is its significance ?
 - d) Explain the operation of a single ended mixer.
- 2. Attempt **any one** of the following questions.
 - a) Explain the concept of constant VSWR circles for an amplifier design.
 - b) The s parameters for the HP HFET 102 GaAs FET at 2 GHz with a bias voltage V_{gs} = 0 are given as follows

 $(Z_0 = 50 \ \Omega).$

S11 = 0.894∠–60.6°

S21 = 3.122∠123.6°

S12 = 0.020∠62.4°

S22 = 0.781∠–27.6°

Determine the stability of this transistor by using the k- Δ test and the μ test and plot the stability circles on a Smith Chart.

SLR-TD - 84

 $(3 \times 6 = 18)$

With a neat circuit diagram, explain the operation of a double balanced Gillbert active mixer. What are its advantages ? (1×10=10)

- 4. Attempt **any three** of the following questions.
 - a) Write a note on dielectric resonator oscillator.
 - b) For the filter configuration shown in fig 1, the following parameters are given $Z_0 = 50 \Omega$, $Z_G = Z_L = Z_0$, $R = 10 \Omega$, L = 50 nH, C = 0.47 pF and the generator voltage is $V_G = 5V$. Find the loaded, unloaded and external quality factors. Also find the power generated by the source and the power absorbed by the load.



c) The low pass filter shown in fig.2 has a cut-off frequency of 1 rad/s and a transfer function H(s) $\frac{1}{s^3 + 2s^2 + 2s + 1}$

Denormalize the given filter for a cut-off frequency of 10 KHz. Find the new transfer function and circuit diagram.



Fig. 2

d) Explain the requirements of a GaAs MMIC Foundry.

-3-

SLR-TD – 84

- 5. Attempt **any one** of the following questions.
 - a) Explain the concept of buffered oscillator design. What is its advantage ?
 - b) Explain Richards transformations for filter implementation.
- 6. A normalized low pass filter is shown in fig.3. Use Richards transformations, Kurodas identities and impedence denormalization for fabrication using microstrip lines. The specification required for the filter are : cut off frequency of 4 GHz and characteristic impedence of 50 Ω . (1×10=10)



Fig. 3

Seat No.

M.E. (Electronics and Telecommunication) (Semester – II) (CBCS) Examination, 2018 Paper – VII : ADVANCED SIGNAL PROCESSING

Day and Date : Thursday, 17-5-2018

Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

1.	Attempt any two :	15
	a) Explain in detail Adaptive system with suitable example.	
	b) Explain in detail maximum likelihood estimation.	
	c) Write short note on Cramer Rao bound.	
2.	Attempt any two :	12
	a) Describe in brief principle of orthogonality.	
	b) Explain in a detail kalman filter algorithm.	
	c) Compare Non-adaptive versus adaptive filters.	
3.	Attempt any one :	8
	a) Derive the expression of Wiener Hopf equation.	
	b) Explain in detail Gram-Schmidt Orthogonalization.	

SLR-TD - 85

Set P

Total Marks: 70

SECTION - II

4.	Attempt any two :	15
	a) Explain in detail Constant modulus algorithm.	
	b) Explain in detail Echo cancellation with suitable example.	
	c) Write short note on CM equalizer.	
5.	Attempt any two :	12
	a) Explain in detail linear predictive coding.	
	b) Explain in detail noise cancellation.	
	c) Describe briefly multistage realization with suitable example.	
6.	Attempt any one :	8
	a) Derive the expression of change in sampling rate.	
	b) Write short note on interpolation and decimation.	

Set

Total Marks: 70

 $(4 \times 4 = 16)$

 $(2 \times 6 = 12)$

 $(4 \times 4 = 16)$

(2×6=12)

Seat No.

M.E. (Electronics and Telecommunication Engg.) (Semester – II) (CBCS) Examination, 2018 WIRELESS COMMUNICATION (Paper – VIII)

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

1. Solve any four :

- 1) Explain indoor propagation model.
- 2) Discuss the ground reflection (two ray) model.
- 3) Explain basic propagation mechanism in mobile radio propagation.
- 4) What are the types of small scale fading ?
- 5) Describe the Rayleigh and Ricean fading distributions.

2. A) Solve any two :

- 1) Explain the PN sequences.
- 2) Write a note on Walsh codes.
- 3) Explain WSSUS channel modeling in detail.
- B) Discuss the concept of frequency reuse in cellular communication. 7

SECTION - II

3. Solve any four :

- 1) Compare 3G and 4G wireless networks.
- 2) Describe the cyclic prefix in OFDM.
- 3) Explain the MIMO spatial multiplexing.
- 4) What is UWB ? Write its features and applications.
- 5) Discuss the frequency and timing offset issues in OFDM.

4. A) Solve any two :

- 1) Explain with necessary diagram, operation of OFDM transreceiver.
- 2) Explain SVD and Eigen modes of the MIMO channel.
- 3) Write a note on WCDMA and WIMAX.
- B) Explain Bit-Error rate performance of UWB.

Seat	
No.	

M.E. (E and TC) (Semester – II) CBCS Examination, 2018 **CRYPTOGRAPHY AND NETWORK SECURITY (Paper – IX)**

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instruction : All qu	estions are compulsory .
----------------------	---------------------------------

SECTION - I

1. Attempt any three : a) Explain what is network security attack? Discuss on related services and mechanisms.

- b) Explain on steganography with drawbacks.
- c) Discuss with suitable example transposition technique of cryptography.
- d) Explain concept of block ciphers.

2. Attempt any one : 10 a) Explain with figure single round of DES. b) Explain principles of public key crypto systems. 3. Explain the D-H algorithm with example. 10 SECTION - II 4. Attempt any three : $(5 \times 3 = 15)$ a) Write a note on firewall.

- b) Write a note on Elgamal Digital Signature Techniques.
- c) Define PGP. Explain features of PGP.
- d) Explain S/MIME.

5. Attempt any one : a) What is virus ? Explain different types of viruses.

- b) List IP security application and services.
- 6. Describe digital signature standards in detail.



Set

 $(5 \times 3 = 15)$

10

10

Total Marks: 70

Seat No.

M.E. (Electronics and Telecommunication) (Semester – II) (CBCS) Examination, 2018 Paper – X : WIRELESS SENSOR NETWORK AND OPTIMIZATION (Elective – II)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Note : All questions are compulsory.

SECTION - I

1. Solve any three :

- A) State four Category 1 Wireless Sensor Network applications and explain any one.
- B) What are the hardware components of wireless sensor node and explain it.
- C) What is need for gateways ? Explain WSN to Internet communication.
- D) Explain Single-hop versus Multiple-hop wireless sensor networks.

2. A) What is PAN? $(3 \times 1 = 3)$

B) Explain hidden node and exposed node problem in WSN. $(8 \times 1 = 8)$

OR

B) Discuss key design issues of wireless sensor network. (8×1=8)

SECTION - II

3. Solve any three :

- A) Discuss design goals of MAC protocol for Ad hoc wireless networks.
- B) Define characteristics of ideal routing protocol for Ad hoc wireless network.
- C) What is hidden and exposed terminal problem ? Explain with neat diagram.
- D) Explain need of energy management in Ad hoc wireless network.
- 4. A) Write a note on battery characteristics. B) Discuss design issues of MAC protocol for Ad hoc wireless networks. (8×1=8)

OR

B) Explain destination sequenced distance vector routing protocol with neat diagram. (8×1=8)

SLR-TD – 88

Max. Marks: 70

(8×3=24)

(3×1=3)

$(8 \times 3 = 24)$

Set

Seat No.

M.E. (Electronics and Telecommunication Engg.) (Semester – II) (CBCS) **Examination**, 2018

Paper – X : WAVELET TRANSFORM AND APPLICATIONS (Elective – II)

Day and Date : Wednesday, 23-5-2018

Time : 10.00 a.m. to 1.00 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 guestions :
 - a) Explain the limitation Fourier Transform and Discrete Fourier Transform and resolution of the limitation by Wavelet transform.
 - b) Explain time and frequency time resolution in wavelet transform.
- 2. Attempt any two of the following questions : (5×2=10)
 - a) Explain Wavelet decomposition and reconstruction of functions in $L^{2}(R)$.
 - b) Discuss about Multi Resolution Analysis.
 - c) Explain Wavelet basis function.
- 3. Write a short note on (any three) :
 - a) Necessary and sufficient condition for orthonormality.
 - b) Continuous Wavelet Transform with necessary conditions.
 - c) Biorthogonality and biorthogonal basis for construction of wavelets.
 - d) Criteria for wavelet selections with example.

SLR-TD – 89



Total Marks: 70

 $(7 \times 1 = 7)$

 $(6 \times 3 = 18)$

SECTION - II

4.	Attempt any one of the following :	(7×1=7)
	a) Explain Video Compression using Multi resolution technique.	
	b) Discuss about audio compression using DWT.	
5.	Attempt any two of the following :	(5×2=10)
	a) Explain image fusion using wavelet transform.	
	b) Explain the use of discrete wavelet sub-band in face recognition.	
	c) Describe edge detection using Wavelet transform.	
6.	Write a short note on (any three) :	(6×3=18)
	a) Object Isolation	
	b) Transform coding	
	c) Digital mammography	
	d) Wireless digital communication based on DWT.	

				SLI	R-TD -	- 90
Sea No.	it				Set	Ρ
	M.E. (Electroni	cs and Telecom	m. Engg.) (C	BCS) (Semest	ter — II)	
	Elective – II :		BEDDED SY	STEMS (Paper	r — X)	
Day Tim	v and Date : Wednes le : 10.00 a.m. to 1.0	day, 23-5-2018 0 p.m.		M	ax. Marks	s: 70
	Instructions : 1) 2) 3)	All questions are Assume suitable of Figure to right inc	compulsory . data if necess dicates full ma	sary. arks.		
		SECT	ION – I			
1.	Attempt any two : a) Explain the Virtu b) Give the feature c) Explain ARM 11	al Memory Systen s of ARM 11. block diagram in d	n. detail.			(6×2)
2.	Attempt any two : a) Explain embedd b) Explain data type c) Explain the prog	ed system design es supported by M ram status registe	challenges. IP 11 CPU pro rs.	ocessor.		(6×2)
3.	Attempt any two :					(6×2)
	a) Explain memoryb) Explain the instruction registers.	organization in AF uction bit pattern c	RM 11. If MRC and M	ICR instructions	of CP 15	5
	c) Explain MP Core	architecture with	Jazelle techn	ology.		
		SECT	ION – II			
4.	Attempt any two : a) Explain POSIX t management.	hreads, mutex ma	nagement an	d semaphore	ŗ	(6×2)
	needs used in e	pept of various que mbedded system.	eues, stack ar	io optimization (or memoi	ſ y

c) Write different features of μcos II RTOS.

(6×2)

(5×2)

- 5. Attempt any two :
 - a) Explain task management and time management in μcos II RTOS.
 - b) Explain Task states associated with μ cos II RTOS.
 - c) Explain shell programming and system programming in Linux.

6. Attempt **any two** :

- a) Write short note on LCD interfacing LCD interfacing.
- b) Write short note on HDMI Port, audio jack and micro usb power cable.
- c) Write a program to toggle two LED using Raspberry Pi.

SLR-TD – 92

Seat No.

Set P

M.E. (E and TC) (Semester – II) (Old CGPA) Examination, 2018 CRYPTOGRAPHY AND NETWORK SECURITY (Paper – IX) (Elective – II)

Day Tim	/ and Date : Tuesday, 15-5-2018 le : 2.30 p.m. to 5.30 p.m.	Total Marks : 70
	Instruction : All questions are compulsory.	
	SECTION - I	
1.	 Solve any three : a) Explain OSI security architecture in detail. b) What is Symmetric Cipher Model ? Explain with neat diagram c) Write a note on DES. d) Explain blowfish algorithm. 	(8×3=24)
2.	 a) Explain Avalanche Effect. b) What is Cipher Feedback ? OR b) Explain RSA algorithm with suitable example. 	3 8 8
	SECTION – II	
3.	 Solve any three : a) What is virus ? Discuss different types of viruses. b) Draw and explain IP Security Architecture. c) Explain X.509 certificate. d) Write a note on malicious software. 	(8×3=24)
4.	a) Discuss difference between MIME and S/MIME.b) Explain firewall design principles.OR	3 8
	b) Explain applications and benefits of IPSec.	8

SLR - TD - 94

M.E. (E and TC) (Part – II) (Old CGPA) Examination, 2018

Mobile Computing (Elective – III)

Day and Date : Friday 17 May 2018		Max. Marks : 7		
Tim	e:	2.30 p.m. to 5.30pm		
N.E	3.: <i>1</i>	All questions are compulsory.		
		SECTION – I		
Q 1	. Sc	olve any three :	(8×3=2	24)
	a. b. c. d.	Explain the GSM system for mobile. Explain Wireless LAN Explain location management in internet. Explain multicast transport services.		
Q2:	-			
	a.	Draw TDMA		3
	b.	Explain Dynamic source routing protocol OR		8
	b.	Explain I-TCP connection setup and draw TCP protocol.		8
		SECTION – I I		
Q 3. Solve any three :		(8×3=24)		
	a. b. c. d.	Explain the concept of error and packet loss in wireless networks. Explain public key infrastructure. Explain Remote Procedure Call (RPC) mechanism Explain Symbian OS architecture.		
Q4				
a. b.	E> E> O	xplain quality of service in wireless networks xplain Security model in Mobile networks. R		3 8
b.	Exp	blain Mobile Middleware Architecture.		8

Seat

No.

M.E. (Mechanical – CAD/CAM) (Semester – I) (CBCS/CGPA) Examination, 2018

ADVANCED MACHINE DESIGN (Paper – I)

Day and Date : Monday, 7-5-2018

Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to the **right** indicate the **full** marks.
- *3)* Assume suitable data if necessary and state it **clearly**.
- 4) Answers to **both** the Sections are to be written in a single answer book.
- 5) Draw neat sketches/figures wherever necessary.

SECTION - I

[18 0 24]	
1. For the given stress matrix, determine principal stress $\begin{bmatrix} T_{ij} \end{bmatrix} = \begin{bmatrix} 0 & -50 & 0 \\ 24 & 0 & 32 \end{bmatrix}$.	13
 2. a) Write a note on : i) State of stress at a point. ii) State of strain at a point. 	6
b) Explain the Mohr's circle for three dimensional state of stress.	5
 3. a) Explain the relationship between various elastic constants in terms of rectangular stress-strain components. b) Compute Lame's coefficient for the material with modulus of elasticity 'E' (kPa) and Poission's ratio equal to 0.3. 	6 5
SECTION – II	
4. a) Explain the concept of endurance limit for ferrous and non ferrous material with S-N diagram.b) Explain the significance of factor of safety in the design.	8 5
5. a) Explain the concept of thin walled and thick walled cylinder.b) Write short note on finite and infinite life.	6 5
6. Explain different theories of failures in briefly (all theories).	11

Set

SLR-TD - 101

Total Marks: 70

SLR-TD - 102

Seat No.

Set P

Max. Marks: 70

M.E. Mechanical (CAD/CAM) (Semester – I) (CBCS/CGPA) Examination, 2018 COMPUTER AIDED MANUFACTURING (Paper – II)

Day and Date : Tuesday, 8-5-2018 Time : 10.00 a.m. to 1.00 p.m.

	 Instructions : 1) Figures to right indicate full marks. 2) All questions are compulsory. 3) Assume suitable data wherever required. 			
1.	. a) Explain work holding and tool holding features of CNC machine.	6		
	b) Explain effect of heat treatment on machining operation.	6		
2.	a) Explain ISO nomenclature of tools and tool grades.	6		
	b) Explain working principle, construction and applications of LASER cu	tting. 6		
3.	a) Explain abrasive wire cut EDM.	6		
	b) Explain use of pallets for work holding and palletizing of fixtures.	6		
4.	. a) Explain CMM working principle and application with diagram.	6		
	b) Explain CMM inspection routines for measuring roundness.	6		
5.	a) Explain types and remedies of tolerance stacking.	6		
	b) What are the different types of common CNC controllers ?	6		
6.	. Write short notes on any two :	10		
	1) Tool wear and failure.			
	2) Automatic tool changer in CNC.			
	3) Economics of machining parameters.			
I				
---	--	--	--	--
I				

Seat

No.

SLR-TD – 103

Set

M.E. Mechanical (CAD/CAM) (Semester – I) (CBCS/CGPA) Examination, 2018 FINITE ELEMENT ANALYSIS (Paper – III)

Day and Date : Friday, 11-5-2018 Time : 10.00 a.m. to 1.00 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 properties of global stiffness matrix for one dimensional bar element.	6
	b) Briefly explain the steps involved in FEA with example.	6
2.	a) Explain factors affecting accuracy of finite element analysis.	6
	b) Explain principal of minimum potential energy.	5
3.	a) Explain Lagrangian and Hermite shape function of beam elements.	6
	b) Write a short note on principal of virtual work.	5
4.	Write short note on :	12
	a) Weighted Residual method.	

- b) Formulation of iso-parametric elements.

SECTION - II

5.	a) Explain convergence criterion of iso-parametric elements.	6
	b) Explain finite element analysis of nonlinear analysis with suitable example.	5

6. Explain with suitable example governing equation of one dimensional heat transfer problem. Discuss various types of boundary conditions used in solving

Total Marks: 70

____ L

	heat transfer problems.	12
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) Eigen value analysis.	

SLR-TD – 104

Seat No.

Set

M.E. Mechanical (CAD-CAM) (Semester - I) (CBCS/CGPA) Examination, 2018 Paper – IV : DESIGN OF EXPERIMENTS AND RESEARCH **METHODOLOGY**

Day and Date : Saturday, 12-5-2018

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Solve any two questions from each Section.

- 2) Figures to 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 wit chart.	h flow 9
	b)	Explain sponsoring agent's requirements for a research proposal.	8
2.	a)	What is literature review in research ? Explain its importance methods.	e and 8
	b)	Explain research problem formulation with suitable example.	9
3.	Wi 1) 2) 3) 4)	rite short notes on (any three) : Field study for research. Selection of samples. Creativity. Process of simulation.	(3×6=18)
		SECTION – II	
4.	a) b)	Explain concept of robust design with suitable example. What is modelling ? Explain principles of modelling.	9 8
5.	a) b)	What is two factor factorial design ? Explain with suitable examples. Explain writing research paper for publication.	9 8
6.	Wi 1) 2) 3) 4)	rite short note on (any three) : Formats of report writing. Parametric and non-parametric tests. Use of computational tools and software. Concept of design of experiments	(3×6=18)

Max. Marks: 70

No.

M.E. (Mech. - CAD/CAM) (Semester - I) (CBCS/CGPA) Examination, 2018 ADVANCED MATERIALS AND PROCESSING (Elective – I) (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

> Instructions : 1) Attempt any three questions from each Section. 2) Draw neat sketches wherever necessary.

SECTION - I

1.	A)	Classify the engineering materials as per their properties and applications.	6
	B)	What are the important ferrous alloys ? Briefly describe their structure and applications.	6
2.	A)	What are the basic heat treatment processes carried out on steels ? Explain the objectives of any two in brief.	6
	B)	Differentiate clearly between (any two) :	6
		a) Smart materials and shape memory alloys	
		b) Steel and cast iron	
		c) Conventional hardening and precipitation hardening.	
3.	A)	What are the important manufacturing techniques used to fabricate polymer matrix polymers ? Explain in brief.	5
	B)	Explain the properties, processing and applications of Al_2O_3 and diamond.	6
4.	A)	What are composites ? Explain the different types based upon matrix materials with their applications.	6
	B)	Explain in detail the materials selection with reference to cutting tools.	5
			_

SLR-TD – 110

Set

Max. Marks: 70

P.T.O.

SECTION - II

5.	A) What is tribology ? Explain the concept of coatings on the products.	5
	B) What are the advantages, economic and ethical considerations of Rapid prototyping (RP) ?	d 6
6.	A) Explain the process of wire cut machining in detail.	6
	B) Explain the working of Selective Laser Sintering (SLS) with a neat sketc	h. 5
7.	A) Name any four different types of data formats used in rapid prototyping. How does digital prototyping differ from virtual prototyping ?	6
	B) Explain the principle of operation of metal removal in electro discharge machining operation.	6
8.	Write short notes on any three of the following :	12
	a) Electrochemical grinding	
	b) Transducers used in USM machine	
	c) Thermal Metal Spraying	
	d) Sterolithography.	

SLR-TD – 111

Seat	
No.	

Set

M.E. Mechanical (CAD/CAM) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VI : MANUFACTURING SYSTEM DESIGN

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Q. No. 3 and Q. No. 6 are compulsory.

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

SECTION - I

1.	a)	Discuss the characteristics and attributes of a system. How will you define a system on the basis of its attributes.	9
	b)	Discuss the basic system design approaches for large scale system design and total system approach.	8
2.	a)	What is a line balancing ? State the decisions involved and approaches used in line balancing.	9
	b)	Discuss the system for planning a new product. What are the desired features of a product being designed ?	8
3.	W	rite short notes on (any three) : (3×6=	:18)
	1)	Economies of scale and optimum production scale.	
	2)	Process planning, process and operation design.	
	3)	Aspect of product design.	

4) General procedure of MRP.

Total Marks: 70

SECTION - II

4.	a)	What is need of database management system in integrated manufacturing ? Explain modules of conceptual database management system.	9
	b)	Explain the steps in simulation project. How can simulation be useful in design of advanced manufacturing system ?	8
5.	a)	What makes a 'flexible manufacturing system' flexible ? How is the flexibility tested ?	9
	b)	Discuss the four principles of agile manufacturing.	8
6.	Wı	rite short note on (any three) : (3×6=	:18)
	1)	Simulation validity	
	2)	Just in time technique	
	3)	Lean manufacturing	
	4)	Group technology.	

13

Seat No.

M.E.(Mech.) (CAD/CAM) (Semester – II) (CBCS/CGPA) Examination, 2018 PRODUCT LIFE CYCLE MANAGEMENT (Paper VII)

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions :1) Q.No. **1** is **compulsory**. Solve **any two** question out of remaining **three**.

- 2) Solve any three questions from Section II.
- *3)* Make suitable assumptions it necessary.

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

SECTION - I

Question No. 1 :

Consider plastic mould assembly consisting of at least six parts imagine a fresh market demand for the new model of the product, explain in details the overall product data management process, BoM, product structure architecture and product platform.

Question No. 2 :

a)	Explain in brief about elements of economic analysis done during the product development.	6
b)	Explain the concept of digital manufacturing and its various benefits in product design and development.	5
Qı	Jestion No. 3 :	
a)	Explain with the help of neat block diagram the product structure of a kitchen mixer box pack unit.	6
b)	Explain in brief about barriers to successful implementation of PDM.	5
Qı	Jestion No. 4 :	
a)	Explain in brief with block diagram the comparison of PLM with SCM.	6
b)	Explain in brief about concurrent engineering and how it is suitable for PLM ?	5

SLR-TD – 112

Set P

Max. Marks: 70

SECTION - II

Question No. 5 :

a)	Explain in brief about an intelligent information system with a suitable example.	6
b)	Explain with suitable example about Design for Assembly (DFA).	7
Qı	uestion No. 6 :	
a)	Draw and elaborate the HOUSE of quality chart used for quality function deployment.	6
b)	Elaborate on the concept of FMEA with suitable example.	5
Qı	uestion No. 7 :	
a)	What do you know about the concept of design for environment ? Explain with suitable example.	5
b)	Explain the process of estimation of product manufacturing costs and how to decide selling prize of product ?	6
Qı	uestion No. 8 :	
a)	What is concept of product model ? Explain different types of models used for product development.	6
b)	Write short notes on taguchi method for design experiments.	5

Seat

No.

M.E. (Mechanical-CAD/CAM) (Semester – II) (CBCS/CGPA) Examination, 2018

INDUSTRIAL AUTOMATION AND ROBOTICS (Paper – VIII)

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to the **right** indicate **full** marks.
- *3)* **Assume** suitable data **if necessary** and state **it clearly**.
- 4) Answers to **both** the Sections are to be written in a **single answer book**.
- 5) **Draw** neat sketches/figures **wherever** necessary.

SECTION - I

1.	a)	 Discuss the following approaches in applying automation : 1) Understand, simplify and automate. 2) Strategies for automation and process improvement. 3) Automation migration strategy 	6
	b)	Compare the levels of automation in process type and discrete type manufacturing industries. Describe the discrete control system.	6
2.	a)	With the help of a neat sketches, explain various (minimum four) part feeding mechanisms for automated assembly.	6
	b)	Derive the expression for line efficiency of a two stage transfer line with storage buffers.	6
3.	Wi a) b) c)	rite short notes : Automated manufacturing system. Criteria for selection of Robots. Control in transfer lines.	11

Set P

SLR-TD – 113

Total Marks : 70

$\mathsf{SECTION}-\mathsf{II}$

4.	a)	Discuss the dynamic properties of Robots.	6
		i) Stability	
		ii) Control resolution	
		iii) Accuracy	
		iv) Spatial resolution	
		v) Repeatability	
		vi) Compliance.	
	b)	Discuss the desirable feature of sensors used in robots, with the help of a block diagram explain the sensor system with a robotic system.	6
5.	a)	Draw neat sketches and explain the working principles of mechanical, electromagnetic and pneumatic gripper used in robots.	6
	b)	What is robotic compliance ? Explain active and passive compliance.	6
6.	W 1)	rite short notes :) Tactile sensor.	11
	2)	Proximity sensors and their applications.	
	3)) Robotic actuators.	

SLR-TD – 114

Se No	at b.	Set P
	M.E. (Mechanical – CAD/CAM) (Semester – II) (CBCS Examination, 2018 Paper – IX : OPTIMIZATION TECHNIQUES	S/CGPA)
Day Tim	y and Date : Monday, 21-5-2018 ne : 10.00 a.m. to 1.00 p.m.	Total Marks : 70
	Instruction : All questions are compulsory.	
	SECTION – I	
1.	Solve any two : a) Davidon-Fletcher-Powell Method. b) Conjugate Direction Method. c) Evolutionary Optimization Method.	(6×2=12)
2.	Solve any two : a) Dichotomous Search Method. b) Fibonacci Method. c) Quasi-Newton Method.	(6×2=12)
3.	Solve any two : a) Necessary and sufficient conditions. b) Lagrange multipliers method. c) Hessian matrix and saddle point.	11
	SECTION – II	
4.	Solve any two : a) Neural Networks. b) Exterior Penalty Method. c) Interior Penalty Method.	(6×2=12)
5.	Write short notes on : a) Operations in genetic algorithm. b) Simulated annealing.	11
6.	Solve any two : a) Introduction to TOC. b) Nine Principles of OPT. c) Five Focusing Steps.	(6×2=12)

SLR-TD – 120

Set

Ρ

Seat	
No.	

M.E. Mechanical (CAD/CAM) (Sem. – II) (CBCS/CGPA) Examination, 2018 Paper – X : Elective – II : CAD/CAM/CAE PRACTICES IN METAL FORMING

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m. Max. Marks: 70

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

3) Assume suitable data wherever necessary.

SECTION - I

1.	a) Explain solid and hollow formulation in metal forming.b) Differentiate between forming and casting process.	5 5
2.	a) Explain yield criteria.b) Explain rolling of strip and plate.	5
3.	a) Explain hills general method.b) Explain effect of temperature and composition in metal casting.c) Explain drawing bench for wire drawing.	5 5 5
	SECTION - II	
4.	a) Explain element strain matrix in finite element method.b) Explain finite element formulation during plate bending.	5 5
5.	a) Explain pre-form design method in forging.b) Explain multi pass bar drawing.	5 5
6.	a) Explain sheet metal forming of general design.b) Explain pattern design in casting.c) Explain Deep drawing process with example.	5 5 5

Seat No.

M.E. (Mech.) (Semester – I) (CBCS/CGPA) Examination, 2018 COMPUTATIONAL TECHNIQUES IN DESIGN ENGINEERING (Paper – I)

Day and Date : Monday, 7-5-2018 Time : 10. 00 a.m. to 1.00 p.m.

- **N.B.**: 1) Attempt **any two** questions from **each** Section.
 - 2) Use suitable data if necessary and mention it clearly.
 - 3) Figures to right indicates full marks.
 - 4) Use of scientific calculator is **allowed**.

SECTION - I

1. a) Find the relative error if number.

y = 0.004997 is

- i) truncated to three decimal digits
- ii) rounded off to three decimal digits
- b) Explain spline and cubic splines interpolation.
- c) Explain weighted least square method and its applications in curve fitting. 5
- 2. a) Using Runge-Kutta method of 4^{th} order, solve for y at x = 1.2, 1.4 from

$$\frac{dy}{dx} = \frac{2xy + e^x}{x^2 + xe^x}$$
 given

 $x_0 = 1$ and $y_0 = 0$

- b) Explain Gauss-Seidal method used for solution of simultaneous algebraic eq^{ns}.
- 3. a) A solid of revolution is formed by rotating about x-axis. The area between the axis, the lines x = 0 and x = 1 and curve through the points with the following co-ordinates.

X	:	0	0.25	0.50	0.75	1.00
у	:	1	0.9896	0.9589	0.9089	0.8415

Estimate the volume of solid formed using Simpson's 1/3rd rule $\int_{2}^{1} \pi y^2 dx$.

8



Set



Total Marks: 70

6

7

7

SLR-TD – 122

 b) Using Bessel's (Numerical differentiation) formula, Find f' (7.5) from the following table

7.47 7.50 Χ - 1 7.48 7.49 7.51 7.52 7.53 0.193 0.195 0.198 0.201 0.203 0.206 0.208 9 f(x) :

4. a) The deflection of beam is governed by $eq^n \frac{d^4y}{dx^4} + 81 \ y = \phi(x)$ where $\phi(x)$ is given by table **10**

x : 1/3 2/3 1

♦ (x): 81 162 243

and boundary condition y(0) = y'(0) = y''(1) = y'''(1) = 0. Evaluate the deflection at the pivotal points of beam using three sub intervals by finite difference method.

- b) Explain types of shape functions.
- 5. a) Explain importance of mathematical modelling of physical problems in computational techniques.
 - b) Explain with suitable figures diagonal 5 point formula and standard 5 point formula used in Laplace eqⁿ,
 6
 - c) Explain Rayleigh-Ritz method used in finite element method.
- 6. a) Apply Milne's method to find y (4.4) given $5xy' + y^2 2 = 0$ given y (4) = 1, y (4.1) = 1.0049, y (4.2) = 1.0097, y (4.3) = 1.0143, y (4.4) = 1.0187. 9
 - b) Using Picard's process of successive approximations obtain a solⁿ upto fifth approximation of eqⁿ. $\frac{dy}{dx} = y + x$ such that y = 1 when x = 0. 8

7

6

6

Seat

No.

M.E. (Mechanical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – II : INDUSTRIAL INSTRUMENTATION

Day and Date : Tuesday, 8-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to the right indicate full marks.
- 3) Draw neat sketches wherever necessary.

SECTION - I

1.	a)	Describe the functional elements of a measurement system with a block	6
	h)	Explain various dynamic characteristics of the instruments	6
	0)		U
2.	a)	Describe with neat sketches, LVDT for linear and rotary motions.	6
	b)	Explain use of Wheatstone bridge circuit using electrical strain gauges. Derive the expression for the output voltage of the bridge circuit.	5
3.	a)	Explain absorption dynamometer.	6
	b)	Derive the general solution of the governing equation for a first order system subjected to a step input.	5
4.	W	rite short notes on (any three) :	12
	a)	Successive approximation type A-D converter.	
	b)	Digital encoder.	
	c)	LVDT type force transducer.	
	d)	Null and deflection type instruments.	
		SECTION – II	
5.	a)	Explain the working of a electromagnetic flow meter.	6

b) Explain the principle and working of bimetal helix thermometer. 6

P.T.O.

SLR-TD – 123

Set P

Max. Marks : 70

6.	a) Explain a seismic instrument for vibration measurement.b) Explain the system analysis by harmonic testing.	6 5
7.	a) Explain wear behavior monitoring.	6
	b) Describe an atomic absorption spectrometer.	5
8.	Write a short notes on (any three) :	12
	a) Galvanometric recorder.	
	b) Sweeping filter analyser.	
	c) Electret microphone.	
	d) Optical pyrometer.	

SLR-TD – 130

Seat	
No.	

Set

M.E. (Mechanical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 SYNTHESIS AND ANALYSIS OF MECHANISM AND MACHINES (Elective – I) (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Max. Marks: 70

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 function, path, motion generation.	4
	b)	Determine the Chebyshev spacing for a function $y = 2x^2 + \sqrt{x}$, for a range $0 < x < 2$ with 4-accuracy points. Also obtain the correct values of y at accuracy points.	7
2.	a)	Discuss three position synthesis of four bar mechanism.	6
	b)	To determine link of four bar mechanism that will one of its position satisfy the following specifications.	
		$W_1 = 10 \text{ rad/sec} \alpha_1 = 0$	
		$W_2 = 5 \text{ rad/sec}$ $\alpha_2 = 0$	
		$W_3 = -0 \text{ rad/sec} \alpha_3 = 86.6 \text{ rad/sec}^2$	
	Сс	omment on the resulting mechanism.	6
3.	a)	Explain crank follower synthesis of five accuracy point.	6
	b)	Explain in brief branch and order defects.	5
4.	W	rite notes on the following :	11
	a)	Cups and crunodes	
	b)	Relative poles of the four bar linkages.	

SLR-TD – 130

$\mathsf{SECTION}-\mathsf{II}$

5.	a)	Derive the equation of coupler curves for a four bar linkage by Samuel Robert method.	6
	b)	Explain the procedure for construction of circle point.	6
6.	a)	Discuss the application of spatial mechanism.	5
	b)	Explain Eulerian rotation transformation and Eulerian angle for spatial mechanism.	6
7.	a)	Explain the application of spatial mechanism to robotics with suitable examples.	6
	b)	Explain branch and order detects.	5
8.	Wr	rite notes on the following :	11
	a)	Eulerian angles	
	b)	Denavit-Harternberg Parameter.	

Seat No.

M.E. Mechanical Engineering (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VI : DESIGN ENGINEERING

Day and Date : Tuesday, 15-5-2018

Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to the **right** indicate **full** marks.
- 3) Assume necessary data, if necessary.

SECTION - I

1.	a)	What is polynomial design of cam ? Explain importance of SVAJ diagrams in design of high speed cams.	6
	b)	Prove that sine acceleration cam generates into a cycloidal displacement cam.	6
2.	a)	Derive expression for thermal stresses in a nut and bolt assembly.	6
	b)	Explain procedure of finding thermal stresses in a hollow cylinder subjected to thermal loading.	5
3.	a)	Explain importance of combined motions cam with suitable examples.	6
	b)	Explain the procedure for kinematic design of a 4-5-6-7 cam.	5
4.	W	rite short notes on (any three).	12
	a)	Polydyne cam.	
	b)	Important factors in form design.	
	c)	Methods of heat removal.	

d) Dynamic response of a cam follower system to a ramp input.

SLR-TD – 131

Set P

Total Marks : 70

SLR-TD - 131

SECTION - II

5.	a)	a) Explain the significance of bath tub curve in Reliability analysis.			
	b)	With usual notations prove the following relation :			
		$M.T.T.F. = \int_0^\infty R(t) dt.$	6		
6.	a)	Explain the term 'Failure Probability Density Distribution Function'.	6		
	b)	Derive expressions for $R(t)$, $Z(t)$, $F(t)$ and $M.T.T.F.$ for exponential probability distribution.	6		
7.	a)	Derive the governing equation for deflection of beam on elastic foundation.	6		
	b)	Explain the procedure of finding discontinuity stresses in the case of cylindrical pressure vessel with a spherical end.	5		
8.	Wı	rite short notes on (any three).	12		
	a)	Reliability testing.			
	b)	Weibull distribution.			
	c)	Failure data analysis.			
	d)	Spring-back in plastic bending.			

SLR-TD – 132

Seat No.

M.E. Mechanical (Semester – II) (CBCS/CGPA) Examination, 2018 THEORY AND ANALYSIS OF COMPOSITE MATERIAL (Paper – VII)

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 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. 2.	a) Explain b) List ou a) Explain b) What i	n classification and characteristics of composite materials. It the applications of composite materials with suitable example n Stress-Strain relations for anisotropic materials. s stiffness ? Explain comparison of approaches to stiffness.	9 es. 8 9 8
3.	Write sho 1) Basic 1 2) Streng 3) Elastic 4) Maxim	rt notes on (any three) : terminology of fiber-reinforced composite material. oths of an orthotropic lamina. city approach to stiffness. num stress theory.	(3×6=18)
		SECTION – II	
4.	a) Explair b) Discus	n classical lamination theory. as mechanics of materials approach to strength.	9 8
5.	a) What i b) Explair	s bending ? Explain governing equations for bending. n basic principles of fracture mechanics.	9 8
6.	Write sho	rt note on (any three) :	(3×6=18)
	 1) Inter-la 2) Bucklin 3) Effect 	aminar stresses. ng of laminated plates. of discontinuity in laminates.	

4) Design of composite structures.

Max. Marks : 70

Set P

SLR-TD – 133

Seat No.

Set P

Max. Marks: 70

M.E. Mechanical Engg. (Semester – II) (CBCS/CGPA) Examination, 2018 MECHATRONICS SYSTEM DESIGN (Paper – VIII)

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 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 electrical actuation systems.	7
	 b) Describe, in details, any one flow sensor used for measurement of liquid flow. 	7
2.	a) Describe principle and working of tachogenerator used for angular velocity measurement.	7
	b) With ladder diagrams describe logic fucntions AND, OR, NOR, XOR.	7
3.	a) Describe two examples of mechatronic systems used in practice.	7
	b) Briefly describe Instrumentation Amplifier.	7
4.	 Write short notes on the following : i) Filtering ii) Force Sensors iii) Shift Registers in PLC. 	14
5.	Describe any one Condition Monitoring application of PLC giving full details.	14

6.	 a) Draw a block diagram of a basic microcontroller and explain the function each subsystem. 	on of 7
	b) Describe timers in PLC.	7
7.	Write notes on the following : i) Micro-sensors ii) Artificial Neural Networks in Mechatronics iii) Mechatronic control in automated manufacturing.	14
8.	Explain, in details, how real time interfacing can be done for cantilever be force measurement system.	am 14

SLR-TD – 134

Set

Seat No.

M.E. (Mechanical Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 INDUSTRIAL PRODUCT DESIGN (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 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 the design and development process of industrial products.	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)	Explain the importance of balance and proportion in case of consumer product.	7
	b)	Explain the standard and legal requirements of consumer products.	7
4.	a)	Explain the concept of purpose and style with reference to aesthetics.	7
	b)	Explain the influence of line and form in the aesthetics of a product.	7
5.	a)	Explain the maintenance aspects of a product design.	7
	b)	Discuss psychology of seeing.	7
6.	a)	Write a note on 'Drawing office procedure'.	7
	b)	Explain significance and use of creativity in product design.	7
7.	a)	How standardization can be done to reduce the cost of the product ?	7
	b)	Write a note on modeling technique used in product design.	7

Max. Marks : 70

I				
I				

Seat No.

M.E. (Mechanical Engg.) (Semester – II) (CBCS/CGPA) Examination, 2018 MATERIAL HANDLING EQUIPMENT DESIGN (Elective – II) (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Note : 1) Answer any three full questions from each section.

- 2) Make suitable assumptions if required and state them clearly.
- 3) Draw meaningful sketches wherever necessary in pencil only.
- 4) Figures to right indicate full marks.

SECTION - I

1.	a) Discuss the basic principles of material handling.	5
	b) Discuss the characteristics and applications of material handling equipment.	6
2.	Discuss types, design considerations for various types of industrial trucks used in material handling.	12
3.	Discuss construction, working and below mentioned parameters for	
	a) Screw conveyors.	4
	b) Gravity roller conveyor. Parameters to be covered-sizes, power	
	requirement, speed, capacity, advantages and limitations.	8
4.	a) Describe advantages and limitations of electric drive and pneumatic drive	
	for hoisting machinery.	6
	b) Explain the relationship of storage of material with material handling.	5
	P.	т.о.

Set

Total Marks: 70

SLR-TD – 136

SLR-TD - 136

SECTION - II

5.	Give detailed design steps for following elements of belt conveyors. A suitable material and its properties and other parameters.	.ssume (3×4=12)
	a) Driver motor power.	
	b) Belt width	
	c) Reduction ratio of gear box	
	d) Design of belt for strength.	
6.	a) Explain steps for solving material handling problem.	6
	b) Discuss fault finding and failure analysis of material handling systems.	5
7.	a) Describe the relationship between material handling and plant layo	out. 6
	b) Explain the importance of safety in material handling.	5
8.	Write a short note (any three) :	(3×4=12)
	a) EOT cranes.	
	b) Chains and Sheaves	
	c) Sprockets and drums.	
	d) Stability and structural analysis.	

SLR-TD – 138

Seat No.

Set P

M.E. Mechanical Engg. (Semester – II) (CBCS/CGPA) Examination, 2018 (Elective – II) ROBOTICS (Paper – X)

Day and Date : Wednesday, 23-5-2018

Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

		Note :	 Answer any five full questions. Draw meaningful sketches wherever necessary in pencil only. Figures to the right indicate full marks. Make suitable assumptions, if required and state them clearly. 	
1.	a)	What is robo object.	ot vision ? Explain a vision sensor used to take the image of an	7
	b)	Explain vari	ous mechanical design considerations of robots.	7
2.	a) b)	Describe the demerits of Describe the What are the	e working of hydraulic actuator system. Discuss the merits and various types of actuators. e typical configuration and degrees of freedom of wrist assembly e various generations of robots ? Explain.	7 7
3.	a) b)	Give definiti robots. Describe the	on of a robot. Describe the various types of joints used in e magnetic grippers used in robots.	7 7
4.	a) b)	Explain the Describe the Describe the	basic components of a robotic system with neat sketches. e functions of these components. e working of range and proximity sensors.	7 7
5.	a) b)	With proper preferred for Compare with Describe va	justification explain, in which type of production, robots are r loading and unloading function. ith advantages and limitations, different textual robot languages. rious program instructions.	7 7
6.	a) b)	Elaborate on inputs to an Describe the which is to b	the functioning of an inverse kinematic algorithm. Describe various inverse kinematics algorithm. e specifications of degrees of freedom required on a robot wrist be used in painting applications.	7 7
7.	a) b)	Explain, in c Explain the transformati	details, the non-manufacturing area applications of robots. homogenous transformation of coordinates. Write homogenous on matrices for translation followed by rotation.	7 7

Seat No.

M.E. Mechanical (Manufacturing Process) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – I : Advanced Manufacturing Techniques – I

Day and Date : Monday, 7-5-2018

Time : 10.00 a.m. to 1.00 p.m.

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

SECTION - I

1.	a)	With neat diagram explain principle, working, advantages and disadvantages of ECG.	5
	b)	What are the influencing parameters in WJM ? Give significance of each parameter.	5
2.	a)	With neat diagram explain principle, working, advantages and disadvantages of Magnetic Particle Testing.	5
	b)	List NDT methods and enlist merits and demerits of any four NDT methods.	5
3.	Wı	rite short notes on any three :	15
	a)	WJM	
	b)	AFM	
	c)	Thermal Analysis of HAZ	

d) Explosive welding.

P.T.O.

Max. Marks: 70

Set

SECTION - II

4.	a)	With neat diagram explain principle, working, advantages and disadvantages	
		of Sterolithography.	5
	b)	Explain product development cycle and importance of prototyping.	5
5.	a)	Explain PVD coating.	5
	b)	Explain plasma coating of ceramic powders and polymeric powders.	5
6.	W	rite short notes on any three :	15
	a)	LOM	
	b)	Press Break Deep Drawing	
	c)	Coating Tribology	
	d)	Plasma Spraying.	

I				
I				

SLR-TD – 141

Set

Seat No.

M.E. Mechanical (Manufacturing Process) (Semester – I) (CBCS/CGPA) Examination, 2018 ELECTRO PHYSICAL PROCESSES (Paper – II)

Day and Date : Tuesday, 8-5-2018 Time : 10.00 a.m. to 1.00 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.	 Write short notes on (any three) : a) Application of LASER in micromachining. b) Advantages and applications of EBM. c) Wire EDM. d) Process capabilities of EDM. 	14
2.	a) With sketch explain the principle and working of an ECM process.	7
	 b) Describe Electro Chemical Discharge Grinding with its principle and application. 	7
3.	 a) Discuss the effects of the following process parameters on MRR in USM : i) Amplitude and frequency of vibration ii) Grain size iii) Concentration of slurry and 	
	iv) Applied static load.	9
	b) Sketch and explain any two types of tool feed systems used in USM.	5
4.	 a) Discuss various functions, requirements and types of dielectric fluids used in EDM. 	5
	b) Describe basic EDM circuits and explain relaxation pulse generation circuit.	9

Max. Marks: 70

5.	a)	With neat sketch explain EDM process and its principle.	7
	b)	Explain the process capabilities and limitations of LBM.	7
6.	a)	Explain the characteristic features of modern machining processes that distinguish them from conventional machining processes.	7
	b)	Give classification of modern machining process on the basis of application to machine various engineering materials.	7
7.	a)	Derive a theoretical model for MRR in AJM as suggested by Sheldon and Finnie.	10
	b)	Explain why the MRR by AJM when applied to ductile materials is low.	4

SLR-TD – 142

Set

Seat No.

M.E. Mechanical (Manufacturing Process) (Semester – I) (CBCS/CGPA) Examination, 2018

COMPUTER AIDED MANUFACTURING (Paper – III)

Day	Day and Date : Friday, 11-5-2018 Max. Mark		
Tim	e :	10.00 a.m. to 1.00 p.m.	
	In	structions : 1) Attempt any five questions.	
		2) Assume suitable data wherever necessary and state it clear	ly.
		3) Draw appropriate sketches wherever required.	
		4) Figures to the right indicate full marks.	
1.	a)	Give detailed comparison of MRP and ERP.	7
	b)	What is Shop Floor Control ? Explain.	7
2.	a)	What are various aspects of e-manufacturing ?	7
	b)	Explain why Production Flow Analysis is important in competitive	7
2	2)	Explain the importance of Group Technology in CAPP	. 7
З.	a) b)	What are the objectives of Collular Manufacturing 2 Explain the composite	1
	D)	part concept.	7
4.	a)	Give detailed comparison of NC and CNC machines.	7
	b)	Why canned cycles are required ? Explain any two drilling canned cycles	_
		with their syntax.	1
5.	a)	Discuss the differences between GT cell and Process Layout.	7
	b)	Describe FMS types and FMS flexibilities.	7
6.	a)	Discuss various parts, classification and coding system.	7
	b)	What is the role of AS/RS and AGV for automated manufacturing system ?	7
7.	a)	Explain Process Capability Index with suitable example.	7
	b)	What is Concurrent Engineering approach ? Explain.	7



Ρ

SLR-TD – 143

Seat	
No.	

Set P

M.E. (Mech. – Manufacturing Process) (Semester – I) (CBCS/CGPA) Examination, 2018 RELIABILITY AND TEROTECHNOLOGY (Paper – IV)

Day and Date : Saturday, 12-5-2018Max. Marks : 70Time : 10.00 a.m. to 1.00 p.m.Note : 1) Answer any five full questions.

2) Figures to right indicate full marks.
3) Make suitable assumptions, if required and state them clearly.

1.	What is reliability and terotechnology ? Explain the life cycle cost significance.	14
2.	Explain different type of maintenance in brief.	14
3.	Discuss condition based maintenance and its Simulation.	14
4.	Write a note on availability and maintainability. How do you calculate system reliability.	14
5.	Discuss in brief MRP approach for maintenance resource planning and control.	14
6.	Explain FMEA FMECA RPN and AHP.	14
7.	By taking a suitable example draw fault tree diagram and discuss.	14

SLR-TD – 144

Set

Seat	
No.	

M.E. Mechanical (Manufacturing Process) (Semester – I) (CBCS/CGPA) Examination, 2018 COMPOSITE MATERIALS (Elective – I) (Paper – V)

Day and Date : Monday, 14-5-2018 Total Mark Time : 10.00 a.m. to 1.00 p.m.		70	
		 Notes : 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)	How are composites classified ? Enlist applications of composites.	7
	b)	Give the advantages and drawbacks of metal matrix composites over polymer matrix composites. Enlist the applications of composite.	7
2.	a)	What is the difference between the thermosets and thermoplastics ? Give some examples of both.	6
	b)	Enumerate six primary material selection parameters that are used in evaluating the use of a particular composite material.	8
3.	a)	Explain pultrusion and pulforming process for composites.	8
	b)	Explain with a schematic diagram the Filament winding process for manufacturing a polymer matrix composite.	6
4.	a)	Write the number of independent elastic constants for three-dimensional orthotropic and isotropic materials.	4
	b)	For a graphite/epoxy unidirectional lamina, find the following : i) Compliance matrix	

- ii) Minor Poisson's ratio
- iii) Reduced stiffness matrix

SLR-TD – 144

iv) Strains in the 1-2 coordinate system if the applied stresses (Figure) are $\sigma_1 = 2MPa$, $\sigma_2 = -3MPa$, $\tau_{12} = 4MPa$.

Engineering elastic constants of the unidirectional graphite/epoxy lamina are

$$E_1 = 181 \text{ GPa}, E_2 = 10.3 \text{ GPa}, v_{12} = 0.28, G_{12} = 7.17 \text{ GPa}.$$
 10



- 5. a) Evaluate the four elastic moduli of a unidirectional lamina by strength of materials approach
 10
 - i) Longitudinal Young's modulus, E1
 - ii) Transverse Young's modulus, E2
 - iii) Major Poisson's ratio, V12
 - iv) In plane shear modulus, G12.

	b) Write Stress-Strain Relations for Anisotropic Materials.	4
6.	Derive the resultant forces and moments in terms of the mid-plane strains and curvatures for laminate.	14
7.	Short note on following basic composite testing :	14

- i) Tensile test
- ii) Compression test
- iii) Inter-laminar Shear Testing
- iv) Vibration test.
SLR-TD – 145

Max. Marks: 70

Seat No.

Set P

M.E. Mechanical (Mfg. Process Engg.) (Semester – I) (CBCS/CGPA) Examination, 2018 Elective – I DESIGN FOR MANUFACTURING (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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. Explain in detail importance of product design process. 14 2. Explain in detail technology development cycle. 14 3. With neat sketches explain the design for forging. 14 14 4. Discuss FMEA. 5. Explain the design process. And explain the steps involved in problem solving 14 methodology. 6. Write short notes on any two : (2×7=14) a) Product life cycle. b) AHP.

- c) Morphology of design.
- 7. Discuss process selection and factors influencing the process selection. 14

SLR-TD – 146

Seat No.

M.E. Mechanical (Manufacturing Process) (Semester – I) (CBCS/CGPA) Examination, 2018

Elective – I : MANAGEMENT OF TECHNOLOGY (Paper – V)

Day and Date : Monday, 14-5-2018 Time :10.00 a.m. to 1.00 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.	What is Technology Life Cycle ? Explain with example.	14
2.	What is the process of Technology Change ? Explain.	14
3.	Explain how innovation management can help in a competitive market scenario.	14
4.	Explain High, Low and Medium Technology.	14
5.	Explain how the eleven commandments related to Technology forecasting can help the Organization.	14
6.	Describe the utility of Actor-Network theory related to Technology Management.	14

Max. Marks : 70

Set P

SLR-TD – 148

Seat No.

M.E. Mechanical (Manufacturing Process) (Semester – II) (CBCS/CGPA) Examination, 2018

ADVANCED MANUFACTURING TECHNIQUES – II (Paper – VI)

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 p.m. Max. Marks: 70

Instructions : 1) Figures to right indicate full marks.
2) All questions are compulsory.
3) Assume suitable data wherever required.

1.	a) With neat diagram explain principle, working, advantages and disadvantages of Investment Casting.	6
	b) With neat diagram explain casting defects with its causes and remedies.	6
2.	a) What is lapping ? Write capabilities of lapping process.b) What are ingredient of finishing tool in lapping and honing and write about	6
	tools of these process ?	6
3.	a) Explain HERF process.	6
	b) Explain magnetic forming process.	6
4.	a) Classify plastic and explain polymerization in plastic.	6
	b) With neat diagram explain injection moulding process.	6
5.	a) What are the different characteristics and methods of powder production ?	6
	b) What do you mean by sintering in powder metallurgy.	6
6.	Write short notes on any two :	10
	1) Isostatic moulding.	
	2) Hydroforming.	
	3) Super finishing.	
	4) Directional solidification.	

Set

SLR-TD – 149

Seat	
No.	

M.E. Mechanical (Manufacturing Process) (Semester – II) (CBCS/CGPA) Examination, 2018 ROBOTICS AND ROBOT APPLICATIONS (Paper – VII)

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 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 various features of precision of movement. 7 b) Explain Spatial resolution. 7 2. 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 3. a) Explain which work characteristics promote application of robots. Explain 7 robot application for assembly and inspection. b) Discuss common software elements of a robot. Explain motion programming of a robot. 7 4. a) Describe hydraulic drives used in robots. 7 b) Explain working of magnetic grippers. 7 5. Describe elaborately various force control methods in robot manipulators. 14 7 6. a) Explain the important design considerations for a Gripper. b) Describe the working of gear operated grippers used in industrial robots. 7 7. Explain in details, a mechanical gripper. Describe two ways of constraining the part in a gripper. 14

Max. Marks : 70

SLR-TD – 150

Seat No.

Set P

M.E. (Mechanical) (Mfg Process Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VIII : MANUFACTURING PROCESS MODELLING

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 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. Explain high volume production plant configuration by taking a suitable example.
- By taking Dijkstra's algorithm on connected weighted graph shown below and find length of shortest paths from the vertex "a" to each of other vertices.



3. What is regression ? Explain the different types of regression.
4. What is neural network ? Explain it by taking a suitable example.
5. What is stochastic simulation model ? Differentiate between discrete and stochastic simulation.
6. What is algorithm ? Explain different components of generic algorithm.
7. Explain in brief correlation.

Max. Marks: 70

SLR-TD – 151

Seat	
No.	

Set P

Total Marks: 70

M.E. Mechanical (Manufacturing Process Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 MACHINE TOOL ENGINEERING (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Attempt any five full questions. 2) Assume suitable data wherever necessary and state it clearly.

1.	a)	Develop a generalized empirical relationship for forces acting on milling cutter and determined the power consumption of the machine.	7
	b)	Explain in brief about graphical representation of speed and structure diagram and its importance in design of machine tools.	7
2.	a)	Give at least three types of beds used in machine tools and explain in brief about their construction and design features.	7
	b)	Explain in brief about various steps in selecting lubrication oil in machine tools and its effect on working condition of machine tools.	7
3.	a)	Give brief classification of controlling system in a machine tools and its importance.	7
	b)	With neat sketch explain in brief about thermal relay in machine tools.	7
4.	a)	What do you know about stick-slip vibration in machine tools ? Explain in brief about minimization of stick-slip vibration.	7
	b)	Explain the methods of obtaining micro displacement in machine tools with the help of magneto strictive materials.	7

5.	a)	Show with a neat sketch how FMS could be linked with cellular manufacturing. Discuss the methods of cell formation.	7
	b)	What are types of hydrostatic slides ? Explain in brief any one.	7
6.	a) b)	State AHP approach in analyzing the criticality of metal cutting parameters. Derive an expression for economic tool life.	7 7
7.	W	rite short notes on (any two) :	
	a)	Tribological considerations in machine tools.	7
	b)	Machining of fine, hard alloy steel.	7
	c)	Design of transmission system.	7
	d)	Acceptance test in machine tools.	7

SLR-TD – 151

SLR-TD – 152

Seat	
No.	

Set P

M.E. (Mech. – Manufacturing Process) (Sem. – II) (CBCS/CGPA) Examination, 2018 TOTAL QUALITY CONTROL (Paper – X) (Elective – II)

Day and Date : Weo Time : 10.00 a.m. to	dnesday, 23-5-2018 9 1.00 p.m.	Max. Marks : 70
Note :	 Answer any five full questions. Figures to the right indicate full Make suitable assumptions, if reclearly. 	marks. equired and state them
1. What are the dir	mensions of quality ?	14
2. Explain TQM ca	ase study by taking a suitable exampl	e. 14
3. Classify cost of	quality and explain.	14
4. Write a note on	advanced control charts.	14
5. Discuss accepta	ance control chart and acceptance sa	impling. 14
6. Explain QFD an	id its matrix.	14
7. Explain Tauguc	hi's offline quality control.	14

Seat

No.

M.E. Mech. (Mfg. Process) (Semester – II) (CBCS/CGPA) Examination, 2018 COMPUTATIONAL TECHNIQUES (Paper – X) (Elective – II)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Attempt any two guestions from each Section.

- 2) Use of scientific calculator is allowed.
- 3) Assume suitable data if necessary.

SECTION - I

1. a) Find the positive root of $x = \cos x$ using N.R. method. 9 b) Explain linear least square regression for curve fitting. 8 2. a) Solve the following system of equations by using GS method. (correct to 3 decimal places). 9 8x - 3y + 2z = 204x + 11y - z = 336x + 3y + 12z = 35b) Find the positive root of $x^3 = 2x + 5$ by false position method. (correct upto 4 decimal places). 9 3. a) Compute y(0.3) given $\frac{dy}{dx} + y + xy^2 = 0$, y(0) = 1 by taking h = 0.1 using R.K. method (correct to 4 places). 9 b) Find the root of equation $xe^{x} = \cos x$ using secant method correct to 4 decimal places. 8

SLR-TD – 155



Max. Marks: 70

SLR-TD - 155

SECTION - II

4.	. a) Explain quadratic surfaces.	8
	b) Explain parabolic blending.	9
5.	. a) Explain scaling and rotation about given pivot point by suitable fig	j. 9
	b) Explain axonometric projections.	8
6.	. Write short note on :	18
	i) Parametric representation of hyperbola.	
	ii) Bezier curves.	
	iii) B-spline surface.	

SLR-TD – 156

Seat No.

M.E. (Mech./Thermal Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 ADVANCED FLUID MECHANICS AND CFD (Paper – I)

Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 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

- a) Find the thickness of the boundary layer at end of the flat plate and the drag force on one side of a plate 0.9 m long and 0.6 m wide when placed in water flowing with a velocity of 0.12 m/s. Find also the value of coefficient of drag. For the following velocity profile u/U = (y/δ).
 - b) Explain Prandtl's mixing length theory.
- 2. a) Explain the difference between wall turbulence and free turbulence shear flow.
 - b) Define displacement, momentum and energy boundary layer thickness and derive an expression for displacement boundary layer thickness.
 - c) A crude oil of viscosity 0.97 poise and relative density 0.9 is flowing through a horizontal circular pipe of diameter 100 mm and of length 10 m. Calculate the difference of pressure at two ends of the pipe, if 100 kg of the oil is collected in a tank in 30 seconds.
- 3. Write note on the following :
 - a) Prandtl's mixing length theory.
 - b) Separation of boundary layer.
 - c) Reynolds theory for turbulent shear stress.

9

5

5

7

17

et P

Total Marks: 70

Set

SLR-TD - 156

$\mathsf{SECTION}-\mathsf{II}$

a)	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
	$R = 287.14 \text{ N-M/KgK and atmospheric pressure} = 10 \text{ N/CM}^2.$ 9
b)	What is computational fluid dynamics ? Explain how it can be used as a research tool. 9
a)	State the physical principle of momentum equation and derive theNavierstokes equations in non-conservation forms space.9
b)	Explain different plots of computer graphics. 8
Wr	ite short note on : (3×6=18)
a)	Substantial derivative of moving fluid element.
b)	Characteristics of Elliptic equations.
c)	Relaxation Technique.
	a) b) b) Wr a) b) c)

Seat

Seat No.

M.E. (Mech./Thermal Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – II : MEASUREMENT IN THERMAL SYSTEMS

Day and Date : Tuesday, 8-5-2018

Time : 10.00 a.m. to 1.00 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) An experiment gave the following values :

v(ft /min)	350	400	500	600
t(min)	61	26	7	26

If v and t are connected by the relation $v = at^b$, find the value of a and b.

- b) Define the following :
 - i) Random error
 - ii) Systematic error
 - iii) Accuracy
 - iv) Precision.
- c) With one example of thermal engineering, explain the method of uncertainty analysis.
- 2. a) What are the sources of errors in measurement using thermocouple ? How they can be reduced ?
 - b) Compare limitations and advantage of :
 - i) Optical pyrometer and radiation pyrometer
 - ii) Thermocouple and resistance thermometer.

SLR-TD – 157

L____

Set

Total Marks: 70

7

4

6

6

SLR-TD – 157

 c) Explain fixed points used for calibration of temperature measuring instruments with reference of International Practical Temperature Scale (IPTS).

3.	a)	Explain Temperature measurement using schilieren apparatus.	8
	b)	Explain Temperature measurement using Shadowgraph apparatus.	
		What are the sources of error and how to rectify them.	10

SECTION - II

4.	a)	Explain Thermocouple gauge for pressure measurement.	8
	b)	How heat transfer coefficient is estimated ?	9
5.	a)	Explain Electromagnetic flowmeter.	6
	b)	Explain different types of accelerometers.	5
	c)	Derive the relation to determine volume flow rate of fluid flowing through orificemeter.	6
6.	a)	Explain photoelectric tachometer.	6
	b)	Explain methods of level measurement.	6
	c)	Draw neat sketch of generalized measurement system.	6

Seat

No.

8

9

8

M.E. (Mech./Thermal Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Paper – III : ADVANCED HEAT AND MASS TRANSFER

Day and Date : Friday, 11-5-2018 Time : 10.00 a.m. to 1.00 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

- a) Derive three dimensional heat conduction equation in spherical co-ordinates and reduce it to Laplace equation. State significance of heat capacity.
 10
 - b) Give one practical example in which heat transfer takes place by all the modes.

A horizontal steel pipe having a diameter of 5 cm is maintained at a temperature of 50°C in a large room where air temperature is at 20°C. The surface emissivity of steel may be taken as 0.8. considering $h = 6.5 \text{ W.m}^2\text{K}$. Calculate total heat lost by pipe per unit length.

2. a) Define Biot number and Fourier number pertaining to unsteady state heat transfer. Solve the following :

A thermocouple junction which may be approximated as a sphere of diameter 0.706 mm is to be used for temperature measurement in gas stream. Assume $h = 20 \text{ W/m}^2\text{K}$, K=20 W/mK, Cp = 400J.kgK and density = 8500 kg/m³. How long will it take for the junction to reach 199°C ?

b) Consider tapered shaft protruded from base. Form the set of simultaneous equations for temperature distribution using finite difference method.

ach Section.

SLR-TD – 158

Set

Total Marks: 70

7 3. a) Write a note on transient conduction and use of temperature charts. b) Derive the relation for temperature distribution for a peripheral fin around a automobile cylinder having rectangular cross section assuming the tip of the fin insulated. 10 SECTION - II 4. a) With reference of forced convection, explain thermal, hydrodynamic, concentration boundary layer alongwith fully developed flow. 9 b) Derive the dimensionless correlation for natural convection using Buckingham' 9 Pi theorem. 5. a) A large vertical plate 4 m high is maintained 60°C and exposed to atmospheric air at 10°C. Calculate heat transfer coefficient if plate is 10 m wide. 9 b) With reference to Nusselt's curve explain pool boiling phenomenon applied to heat transfer from glue gases of Bagasse to the water in the boiler drum. 8 6. a) 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 80W/m²K respectively. Fouling factor on water and oil side are 0.00018 m²K/W and 0.0018 m² °C. Calculate the tube length required. 9 b) Compare Heat and mass transfer with reference to different laws of heat and mass transfer. 8

SLR-TD – 158

Seat No.

M.E. (Mechanical – Thermal Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018

DESIGN OF EXPERIMENTS AND RESEARCH METHODOLOGY (Paper – IV)

Day and Date : Saturday, 12-5-2018 Time : 10. 00 a.m. to 1.00 p.m.

1) Answer any two questions from each Section. **N.B.** :

- 2) Figures to right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat sketches flow diagrams wherever necessary.

SECTION - I

1.	a)	What is descriptive research conceptual Research, Theoretical Research, Applied Experimental Research ?	8
	b)	Explain importance of literature review and methods.	9
2.	a)	Classify mathematical models.	8
	b)	Explain process formulation of models based on simulation ?	9
3.	a)	Explain single factor experiment blocking and nusance factors.	9
	b)	Explain general model of process.	9
		SECTION – II	
4.	a)	Explain parametric analysis of results.	8
	b)	What is significance of error analysis ?	9
5.	a)	What are the types of Reports and explain layout of Research Report ?	9
	b)	What is significance of conclusion and Appendices in report writing ?	9
6.	a)	Compare convergent v/s divergent thinking in landscape and creativity.	8
	b)	Compare creativity v/s intelligence in landscape and creativity.	9

SLR-TD – 159



Total Marks: 70

Seat

No.

M.E. Mechanical (Thermal Egineering) (Semester – I) (CBCS/CGPA) Examination, 2018 Elective – I (Paper – V) ADVANCED THERMODYNAMICS

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 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)	Discuss the importance of third law of thermodynamics and also state the corollaries of third law ?	6
	b)	Derive $du = C_v dT + [\beta T / \alpha - p]dv$ where β is the coefficient of volume expansion, α is the isothermal compressibility and the other symbol have their usual meaning.	8
	c)	Explain thermal death of universe.	4
2.	a)	What is an ideal gas ? How does it differ from a perfect gas ? What is an equation of state ?	9
	b)	Write a note on an entropy and disorder ?	8
3.	a)	What is entropy and concept of lost work ? Also explain thermal death of universe ?	9
	b)	Write detail note about p-v-T surfaces of real substances ?	8
		SECTION – II	
4.	a)	What is meant by Joule Thomson coefficient ? Why there is no temperature change when an ideal gas is throttled ?	8
	b)	What is quantum consideration and degeneracy ?	6
	c)	Explain in detail Van't Hoff equilibrium box.	4
			P.T.O.

SLR-TD - 160

Set P

Total Marks: 70

SLF	R-TD – 160	
5.	a) Discuss adiabatic flame temperature and its improtance ?	9 9
	b) What is gravimetric and volumetric analysis ?	8
6.	a) Percentage composition by weight of sample of fuel as C $H_2 = 15.2\%$, S = 1%. Find the composition of exhaust gas excess air is supplied (Use volumetric analysis) ?	= 84.8%, ses if 15% 9
	b) What is law of equipartition of energy ?	8

7

SLR-TD – 164

Seat No.

M.E. (Mech./Thermal Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VI : DESIGN OF THERMAL SYSTEMS

Day and Date : Tuesday, 15-5-2018

Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Question 1 is compulsory.

- 2) Solve **any one** question from **2** and **3**.
- 3) Solve any two questions from 4, 5 and 6.
- 4) Figures to the **right** indicate **full** marks.
- 5) Assume suitable data if **necessary**.
- 6) Use of non-programmable calculator is allowed solution.

SECTION - I

- Design a refrigeration system for cooling water from 25° C to 15° C. Assume suitable data and enlist the design parameter such as TOR of cooling system, fan specifications, compressor specification and condenser, evaporator specifications. Justify the selection of appropriate refrigerant.
- 2. a) A condenser having a UA value 480 kW/K condenses steam at a temperature of 40° C. The cooling water enters at 20° C with a flow rate of 160 kg/s. What is the outlet temperature of the cooling water ? Cp of water is 4.19 kJ/kg.K.
 - b) What is role of regression analysis in curve fitting ?
- 3. a) An equation of the form y = ax + b/y has been chosen to fit the following (x, y) pair of points : (1, 10.5), (3, 8) and (8, 18). Choose a and b to give the best fit to the points in the sense of least sum of the deviations squared.
 10
 - b) Select any two thermal elements and model it and explain the method of modeling.

Set P

Max. Marks: 70

SLR-TD – 164

SECTION - II

4. a) Power required by a certain automobile is a function of its speed,

 $P = 4.2 + 0.45 V + 0.0025V^{2.8}$ Where P = Power, kW V = Speed of auto, m/s The power delivered by a direct drive engine at speeds above 12 m/s is P = 60 + 8V - 0.16V².

By means of successive substitution, determine the speed of which the auto is capable and the power delivered by the engine at that speed. **10**

- b) Explain the method of dynamic programming.
- 5. a) A minimum cost pipeline is to be constructed between points A and E, passing successively through one node of each B, C and D as shown in fig. The costs from A to B and from D to E are shown in fig. and the costs between B and C and C and D are given in table. Mark the shortest path of pipeline. Write all the steps of solving this problem.

10

8



- b) Explain linear programming method of optimization.
- 6. a) Derive relation for the overall heat transfer coefficient of counter flow heat exchanger using NTU approach.
 10
 - b) Explain dynamic programming method of optimization with one example. **7**

Seat

No.

M.E. (Mech./Thermal Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – VII : COMPUTATIONAL TECHNIQUES IN THERMAL ENGINEERING

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to **right** indicate **full** marks.
- 3) **Use** of non programmable calculator is **allowed**.
- 4) **Assume** suitable data if necessary and mention it **clearly**.

SECTION - I

- 1. a) Using the Newton Rapson method, find a root of the function near 2, f(x) = x⁴ 11x + 8 to an accuracy of 5 digits. Also write the algorithm of this method.
 9
 - b) Solve the following equations by Gauss elimination method.

2x + 4y - 6z = -4x + 5y + 3z = 10 x + 3y + 2z = 5.

2. a) Explain Lin Bairstow method in detail.

b) Evaluate the integral $\int_{0}^{1.2} e^{x} dx$ taking n = 6 using Simpson's 1/3 rule. **9**

3. a) Use Runge-Kutta method of order two to integrate $\frac{dy}{dx} = \sin y$ with y(0) = 1

from x = 0 to 0.5 in steps of h = 0.1. Keep four decimal places in the calculations.

b) Determine the equation to the best fitting exponential curve of the form $y = a * e^{x}$ for the data given in Table.

Х	1	3	5	7	9
Y	115	105	95	85	80

SLR-TD – 165

Set P

Total Marks: 70

8

8

8

SLR-TD – 165

SECTION - II

- 4. Answer any two of the following :
 - 1) Derive the generalized 1D finite element equation for heat transfer problem.
 - 2) I) How is an insulated boundary handled in the finite difference formulation of a problem ? How does a symmetry line differ from an insulated boundary in the finite difference formulation ?
 - II) Explain how the finite difference form of a heat conduction problem is obtained by the energy balance method.
 - 3) A composite wall, made up of two materials, is shown in figure. The temperature on the left side of the wall is specified as 800C while convection takes place on the right side of the wall. Find the temperature distribution in the wall using two linear elements.



- 5. a) Write a short note on stability criteria for explicit FDM.
 - b) Consider a large uranium plate of thickness L = 4 cm and thermal conductivity $k = 28 \text{ W/m. }^{\circ}\text{C}$ in which heat is generated uniformly at a constant rate of $e = 5^{*} 10^{6} \text{ W/m}^{3}$. One side of the plate is maintained at 0°C by iced water while the other side is subjected to convection to an environment at $T = 30^{\circ}\text{C}$ with a heat transfer coefficient of $h = 45 \text{ W/m}^{2}$. °C, as shown in Figure. Considering a total of three equally spaced nodes in the medium, two at the boundaries and one at the middle, estimate the exposed surface temperature of the plate under steady conditions using the finite difference approach.



6. a) Explain central difference method in detail with tables.
b) Explain backward difference method in detail with tables.
9

13

Seat No.

M.E. Mechanical (Thermal Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018

Paper – VIII : THEORY AND DESIGN OF I.C. ENGINE

Day and Date : Saturday, 19-5-2018

Time : 10.00 a.m. to 1.00 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) Compare internal combustion engine and external combustion engine.
 - b) A single cylinder four stroke cast iron diesel engine has following data :

Cylinder bore = 200 mm Length of stroke = 250 mm Speed = 600 rpm Brake mean effective pressure = 0.60 Mpa Maximum gas pressure = 4 MPa Fuel consumption = 0.25 kg per BP per hr (*I/d*) ratio for bush in small end of connecting rod = 1.5 Higher calorific value of fuel = 44000 kJ/kg Permissible tensile stress = 40 N/mm² Mechanical Efficiency = 80% Ratio of heat absorbed by piston to the total heat developed = 0.05 Temperature difference $T_c-T_e = 220^{\circ}C$ Thermal conductivity factor k for cast iron = 46.6 W/m/°C Number of radial ribs = 4

SLR-TD – 166

Total Marks: 70

SLR-TD - 166

-2-

8

Determine :

- i) thickness of piston head by strength and thermal consideration,
- ii) thickness of rib,
- iii) state whether cup is required, if yes determine cup radius. 9
- 2. a) Explain Atkinson engine with figure.
 - 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 = 125 mm,

L/r ratio = 4.5,

maximum gas pressure = 2.5 Mpa,

Length of stroke = 150 mm,

Weight of flywheel cum belt pulley = 1 KN,

Total belt pull = 2 KN,

Width of hub for flywheel cum belt pulley = 200 mm

Allowable bending stress = 75 N/mm^2

Allowable compressive stress = 75 N/mm^2

Allowable shear stress = 40 N/mm²

Allowable bearing pressure = 10 N/mm^2

The torque on the crank is maximum when the crank turns through 25° from the top dead center and this position the gas pressure inside the cylinder is 2 MPa. The center to center distance between the main bearings 1 and 2 is twice of piston diameter. The Belts are in horizontal direction, assume l/d ratio = 1 for crank pin.

8

3. a) Classify lubrication system used for IC engine and explain with figure pressure lubrication system.

-3-

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 ($S_{ut} = 260 \text{ N/mm}^2 \text{ and } \mu = 0.25$). The studs are made of plain carbon steel 40C8 ($S_{vt} = 380 \text{ N/mm}^2$). 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.

- 4. a) Compare Thermo-syphon cooling with pressure cooling system. 8
 - 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.

SLR-TD – 166

-4-

5. a) Explain need of cooling system in IC Engine. What are various coolant used in IC engine. Explain "Splash lubrication with oil pump". 9 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 MPaSeat angle = 45° Mean velocity of gas through port = 50 m/s Allowable bending stress for valve = 50 N/mm^2 K for steel value = 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 9 v) Maximum lift of valve. 6. a) Why balancing of IC engine is important? Explain procedure adopted for balancing of IC Engine. 8 b) What are the recent methods of controlling pollution of I C Engine, explain any one in detail. 9

Data for solving problems

• Reboring allowance for I.C. Engine cylinder

D	75	100	150	200	250	300	350	400	450	500
С	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 (v_p)

Types of Engine	Mean velocity of gas (m/s)				
Types of Engine	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			

Seat

No.

M.E. (Mech./Thermal Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Paper – IX : DESIGN OF REFRIGERATION AND AIR CONDITIONING **SYSTEM**

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 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.

SECTION - I

- 1. a) A vapour compression system using R-12 refrigerant works on simple saturated cycle with dry compression between temperature (- 15°C) and (30°C) calculate
 - 1) Work of compression
 - 2) Heat rejected in the condenser
 - 3) Net refrigerant effect
 - 4) Mass of refrigerant to be circulated per ton of refrigeration.

 $C_{pq} - 0.62 \text{ kJ/kgk}$

Т°С	V _g (m ³ /kg)	h _f (kJ/kg)	h _g (kJ/kg)	S _f (kJ/kgk)	S _g (kJ/kg k)
- 15	0.0912	22.33	180.98	0.0906	0.7052
30	0.0235	64.59	199.62	0.2400	0.6853

b) Classify different types of refrigerant and explain natural refrigerant.

- 2. a) Explain the centrifugal compressor and evaporative condenser.
 - b) Explain dynamics of capillary tube.

Set

6

12

5

Total Marks: 70

SLR-TD – 167

3.	a)	Explain Lithium bromide absorption refrigeration system.	10
	b)	Without using psychrometric chart calculate Humidity ratio, relative humidity and enthalpy of moist air sample having DBT 38°C and DPT 15°C take total pressure of the sample is 1 bar.	7
		SECTION – II	
4.	a)	Outside design condition are 40° C DBT and 30° RH. Room design conditions are 25°C and 50% RH. Room sensible heat is 50 kW and room latent heat is 10 kW. If outside air quantity is $50m^3$ /min and assuming by pass factor of cooling coil is 0.1 find GSHF and ESHF.	10
	b)	Explain diffused radiation and view factor.	8
5.	a)	Explain thermoelectric refrigeration system.	7
	b)	What is static regain factor and explain the static regain method of duct design.	10
6.	a)	Explain air water based refrigeration system.	6
	b)	Explain characteristics of cooling tower with the help of range and approach terms.	6
	c)	Explain application of air conditioning system.	6

SLR-TD - 167

Seat No.

M.E. (Mech./Thermal Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018

Paper – X : POWER PLANT ENGINEERING (Elective – II)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 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 steam power plant operates on theoretical reheat cycle. Steam at boiler at 150 bar, 550°C expands through the high pressure turbine. It is reheated at a constant pressure at 40 bar and to 550°C and expands through the low pressure turbine to a condenser at 0.1 bar. Draw T-S and P-H diagram and find.
 - 1) Quality of steam at turbine exhaust
 - 2) Cycle efficiency
 - 3) Steam rate in kg/kWh.
 - b) What are electrical and non electrical equipment 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

Set

Total Marks: 70

SLR-TD – 168

SLR-TD - 168

	b)	Explain mechanical dust collection system also explain working of electrostatic precipitator.	5
	c)	Explain different types of nuclear fuels.	4
3.	a)	Explain working of Schmidt-Hartman boiler with neat sketch.	6
	b)	Explain working of cyclone burner with neat sketch.	6
	c)	Explain with neat sketch working of spreader stocker.	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 electromagnetic transducer with neat sketch.	6
5.	a)	The cost of water softener used in Rs. 1,20,000, when newly installed. The life of plant is considered as 12 years. The salvage value of plant will be 8% of its cost when newly installed. The repair maintenance and labour cost of plant per year are Rs. 8,000. The cost of chemical used per year is Rs. 5,000. Taking interest on sinking fund as 8%. Find annual cost of plant.	7
	b)	Write a short note on general tariff system and explain Hopkinson demand rate.	6
	c)	Explain protection system used in power plant.	4
6.	a)	Write a short on radioactive pollution.	6
	b)	Write a short note on Gas analyze.	6
	c)	Write a short note on gaseous emission.	5

SLR-TD – 172

Seat No.

M.E. (Electronics & Telecommunication) – Digital Electronics and Communication System (Semester – I) (CBCS) Examination, 2018 RESEARCH METHODOLOGY (Paper – I)

Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 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) B)	What do you mean by research ? Explain its significance in modern times. Explain difference between experiment and research.	6 6
2.	A)	How do you define a research problem ? Give one example to illustrate your answer.	6
	B)	Write short note on components of research problem.	6
3.	A)	Explain the meaning and significance of a research design.	6
	B)	What is the meaning of sample design ? Which are the characteristics of good sample design ?	5
		SECTION – II	
4.	A)	Describe in brief the layout of a research report, covering all relevant point.	6
	B)	Write short note on semantic differential scale.	6
5.	A)	Explain the difference between collection of data through questionnaires and schedules.	6
	B)	Which are the guidelines for successful interviewing ?	6
6.	A)	What is meaning of processing of data ? Explain all the processing operations.	6
	B)	Why tabulation is considered essential in a research study ? Narrate the characteristics of a good table.	5

Max. Marks: 70

Set P

SLR-TD – 173 Seat Set No. M.E. (E and TC – Digital Electronics and Communication Systems) (Semester - I) (CBCS) Examination, 2018 Paper – II: COMMUNICATION NETWORKS (New CBCS Syllabus) Day and Date : Tuesday, 8-5-2018 Total Marks: 70 Time : 10.00 a.m. to 1.00 p.m. *Instructions* : 1) Figures to the *right* indicate *full* marks. 2) All questions are compulsory. SECTION - I 10 1. a) What is IPV6 ? Explain it in brief. b) Draw and explain ICMP. 10 OR b) Write a note on B-ISDN. 15 2. Attempt any two : a) Explain RARP datagram format. b) Explain UDP in detail. c) Explain TCP state machine diagram. SECTION – II 3. a) Explain Gigabit Ethernet architecture. 10 b) Draw and explain domain names used in internet. 10 OR b) Explain principle of FTP. 4. Attempt any two : 15 a) Explain Name address resolution. b) Explain primary and secondary servers defined by DNS. c) Draw block and transfer modes format for FTP.

Seat No.

M.E. (E&TC) (Digital Electronics and Communication System) (Semester – I) (CBCS) Examination, 2018 CMOS VLSI DESIGN (Paper – III)

Day and Date : Friday, 11-5-2018

Time : 10.00 a.m. to 1.00 p.m.

N. B. : 1) Attempt any three questions from each Section.
2) Figures to right indicate full marks.

SECTION - I

1.	a)	Explain second order effects for MOS transistor.	6
	b)	Draw and explain accumulation, depletion and inversion modes of operation	
		of MOS transistor.	5
2.	a)	Explain dynamic power dissipation in CMOS inverter.	6
	b)	Explain analytically when and why the output transition in region C of	
		the inverter characteristics is steep.	5
3.	a)	Design full adder using CMOS logic.	6
	b)	Explain signal integrity issues in dynamic design.	5
4.	Wı	rite notes on any three of the following : (4×3=1	2)
	a)	Technology scaling	
	b)	Power and energy delay	
	c)	Issues in dynamic design	
	d)	Cascading dynamic gates.	

Set P

Max. Marks: 70

SLR-TD – 174

SLR-TD - 174

SECTION - II

5.	a)	Explain with neat schematic True Single Phase Clocked Register (TSPCR) and write transistor sizing issues in TSPCR.	6
	b)	Draw and explain NOR based and NAND based SR flip-flop and ratioed CMOS SR latch.	5
6.	a)	Explain clock synthesis and synchronization using a phase locked loop.	6
	b)	Explain the sources of skew and jitter.	5
7.	a)	Explain designing of DRAMS in detail.	6
	b)	How PLL can be used for clock synchronization ?	5
8.	Write notes on any three of the following : (4×3=1		2)
	a)	Clock distribution	
	b)	Static latches and bistable principle	
	c)	Latch based clocking	
	d)	Arbiters.	
7

P.T.O.

Seat No.

M.E. (E &TC DECS) (Semester – I) (CBCS) Examination, 2018 MODERN DIGITAL SIGNAL PROCESSING (Paper – IV)

Day and Date : Saturday, 12-5-2018 Time : 10.00 a.m. to 1.00 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. a) Design an ideal high pass filter with a frequency response

$$\begin{split} \mathsf{H}_{\mathsf{d}}(e^{j\omega}) &= 1 \quad \text{for} \quad -\frac{\pi}{4} \leq \omega \leq \pi \\ &= 0 \quad \text{for} \quad \mid \omega \mid \leq \frac{\pi}{4}. \end{split}$$

Find the values of h(n) for N = 11. Find H(z).

- b) What is differentiator ? Explain by using frequency response of ideal differentiator.
- 2. a) Write short note on Schur algorithm.
 - b) Consider a signal x(n) = s(n) + w(n), where s(n) is an AR(1) process that satisfies the difference equation s(n) = 0.6 s(n 1) + v(n) where $\{v(n)\}$ is a white noise sequence with variance $\sigma_v^2 = 0.64$ and $\{w(n)\}$ is a white noise sequence with variance $\sigma_w^2 = 1$. Design a winner filter of length M = 2 to estimate $\{s(n)\}$.
- 3. a) Derive fundamental equations for the discrete time implementation of sampling rate conversion. Draw the diagram for timing relations for sampling rate conversion.
 - b) Explain with diagram analysis and synthesis filter banks.

Set P

Max. Marks : 70

4

5

SLR-TD – 175

6

6

6

6

SECTION - II

4. a) Derive equation of bilinear transformation for mapping from s-plane to z-plane.

b) For the analog transfer function $H(s) = \frac{2}{(s+1)(s+2)}$ determine H(z) using impulse invariance method. Assume T = 1 sec.

5. a) Explain with diagram, multiplier adder unit of DSP processor TMS320C54X.

b) Explain with diagram ALU of TMS320C54X.

- 6. a) Explain the method of periodogram for the estimation of power density spectrum. 6 5
 - b) Explain Burg method for the AR model parameter.

Seat No.

M.E. (E&TC) Digital Electronics and Communication Systems (Semester – I) (CBCS) Examination, 2018 Elective – I : COLOR IMAGE AND VIDEO PROCESSING (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Note : 1) All questions are compulsory.

- 2) Figures to the **right** indicates **full** marks.
- 3) Assume the data whenever necessary.

SECTION - I

1.	 Attempt any three : a) Explain neighbourhood pixels. b) Explain Terminologies used in Color Images. c) Explain with diagram CCD Cameras. d) What are the different Color Edge Operators ? Explain any one. 	(3×5=15)
2.	 Attempt any two : a) Explain different image sensors used to acquire the image. b) Define Histogram. Explain Image Histogram in detail. c) Explain different image Sharpening Filters. 	(2×10=20)
	SECTION – II	
3.	 Attempt any three : a) Explain Area based segmentation. b) Explain Analog video. c) Explain Optical flow segmentation. d) Explain Time varying image formation technique. 	(3×5=15)
4.	 Attempt any two : a) Explain edge based segmentation method. b) How discontinuities are detected ? c) Explain MAP Detection. 	(2×10=20)



Set P

Max. Marks: 70

- v)

Seat No.

M.E. (E & TC) Digital Electronics and Communication Systems (Semester – I) Examination, 2018 (CBCS Pattern) Elective – I : FUZZY LOGIC (Paper – V)

Day and Date : Monday, 14-5-2018

Time : 10. 00 a.m. to 1.00 p.m.

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

- 2) Figure to the right indicates maximum marks.
- *3)* Assume the data **whenever** necessary.

SECTION - I

1. Attempt any three :

- a) Explain features of membership function.
- b) Explain fuzzification.
- c) Explain logical connectives for fuzzy logic.
- d) Explain Fuzzy Ranking with example.

2. Attempt any two :

- a) Explain Crisp relation in brief.
- b) 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.
- c) Explain membership value assignment techniques.

(3×5=15)

(2×10=20)

Total Marks : 70

Set P

SLR-TD – 177

SLR-TD - 177

SECTION - II

3.	Attempt any three :	(3×5=15)
	a) Explain image processing.	
	b) Draw and explain simple fuzzy logic system.	
	c) Explain Fuzzy logic in aeroplane landing system.	
	d) Explain genetic algorithm.	
4.	Attempt any two :	(2×10=20)
	a) What is clustering ? Explain HCM and FCM.	
	b) Explain Fuzzy logic application in liquid level control.	
	c) Explain Fuzz Cognitive map.	

Seat No.

M.E. (E&TC) (Digital Electronics and Communication Systems) (Semester – I) (CBCS Patterns) Examination, 2018 Elective – I : SPEECH PROCESSING (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Note: 1) All questions are compulsory.

- 2) Figures to the **right** indicates **maximum** marks.
- *3)* Consider the data **whenever** necessary.

SECTION - I

1. Attempt any three :

- a) Explain speech processing model.
- b) What is the effect of noise on speech signals ?
- c) Explain poles of Vocal tract.
- d) Explain noise characteristics.

2. Attempt any two :

- a) What are different speech enhancement methods ? Explain any one.
- b) Explain refined model of speech processing.
- c) Explain the terms Linear predictive coefficients, reflection coefficients and log area ratio.

SECTION - II

3. Attempt any three :

- a) Explain sampling of speech signal.
- b) Explain digital representation of speech signal.
- c) Explain word method.
- d) Explain any one dimensionality reduction technique.
- 4. Attempt any two :a) Explain text to speech morphological analysis.
 - b) Explain speech recognition using ANN.
 - c) Explain frequency domain coders.

(3×5=15)

(3×5=15)

 $(2 \times 10 = 20)$

(2×10=20)

SLR-TD – 178

Set P

Max. Marks: 70

P.T.O.

SLR-TD – 179

M.E. (E&TC) Digital Electronics and Communication Systems (Semester – I) (Old CGPA) Examination, 2018 PROBABILITY AND RANDOM PROCESS (Paper – IV)

Day and Date : Monday, 7-5-2018 Time : 2.30 p.m. to 5.30 p.m.

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

- 2) Figures to the **right** indicate maximum marks.
- 3) Assume the data whenever necessary.

SECTION - I

1. Attempt any three :

- a) Six dice are tossed. Using the generating function, to find the probability that the sum of the faces of the dice add to 24.
- b) Explain Bay's theorem.
- c) Explain Laplace distribution in details.
- d) Explain moment generation function.

2. Attempt any two :

- a) 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 ?
- b) 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 ?
- c) Explain Gaussian distribution function with examples.

Seat No. Set P

Max. Marks: 70

(3×5=15)

(2×10=20)

Set P

SECTION - II

3. Attempt **any three** :

SLR-TD – 179

- a) Explain Ergodic processes.
- b) Give properties of ACF.
- c) Define Random process. Also give its interpretations.
- d) Explain application of random variable in computer network.

4. Attempt any two :

- a) Explain Markov processes in details with two examples.
- b) A die is tossed, and corresponding to the dots S ¼f1, 2, 3, 4, 5, 6g, a random process X(t) is formed with the following time functions as shown in Fig. below :

Check whether X(t) is stationary ?



c) Explain joint CDF and joint PDF of random variable with two examples of each distribution.

$$(3 \times 5 = 15)$$

(2×10=20)

SLR-TD – 180

Seat No.

Set

M.E. (E&TC) Digital Electronics & Communication Systems (Semester – I) (Old CGPA) Examination, 2018 EI – I : OPTICAL COMMUNICATION & NETWORKS

Day and Date : Tuesday, 8-5-2018 Time : 2.30 p.m. to 5.30 p.m.

Note : 1) All questions are compulsory.

- 2) Figure to the **right** indicates maximum marks.
- 3) Assume the data whenever necessary.

SECTION - I

1. Attempt any three :

- a) Give the advantages of Optical communication.
- b) Draw and explain receiver for optical communication system.
- c) Explain channel multiplexing in detail.
- d) Explain basic concept of optical amplifier.

2. Attempt any two :

- a) Draw and explain Optical communication system.
- b) Explain Raman amplifier.
- c) Explain wavelength division multiplexing.

SECTION - II

3. Attempt any three :

- a) Write a note on SDH.
- b) Explain FDDI networks.
- c) Explain Dispersion measurement technique in optical fiber.
- d) Write a note on next generation networks.

4. Attempt any two :

- a) Explain optical fiber attenuation measurement technique.
- b) Explain refractive index profile measurement.
- c) Explain Operational principle of WDM.

Max. Marks : 70

(3×5=15)

(2×10=20)

 $(2 \times 10 = 20)$

(3×5=15)

 $(2 \times 10 = 20)$

Seat No.

M.E. (E&TC) (Digital Electronics & Communication Systems) (Semester – II) (CBCS Patterns) Examination, 2018 **MICROWAVE DEVICES & CIRCUITS (Paper – VI)**

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

- 2) Figures to the **right** indicate maximum marks.
- 3) Assume the data whenever necessary.

SECTION - I

1. Attempt any three :

- a) Explain Maxwell's Equation for conductor.
- b) Explain hybrid ring with its S parameter.
- c) Why vacuum tubes are not used at microwave frequency?
- d) Explain rectangular to circular waveguide transition.

2. Attempt any two :

- a) Explain EM equation for conductor.
- b) Explain time harmonic field. Also explain Maxwell's equations for time harmonic field.
- c) Why slow wave structure is used ? Explain Helical TWT in detail.

SECTION - II

3. Attempt any three :

- a) Explain PIN diode as limiter.
- b) Explain MMIC formation.
- c) Explain MESFET in detail.
- d) Explain TRAPATT diode in detail.

4. Attempt any two :

- a) Explain tunnel diode in detail. Also draw its V-I characteristics.
- b) Explain parametric amplifier.
- c) Explain Monley-Rowe power relation.

Max. Marks: 70

$(3 \times 5 = 15)$

$(2 \times 10 = 20)$

$(3 \times 5 = 15)$

$(2 \times 10 = 20)$

SLR-TD – 181

Set

SLR-TD – 182

Seat No.



Max. Marks: 70

M.E. (E&TC) Digital Electronics and Communication System (Semester – II) (CBCS) Examination, 2018 Paper – VII : HIGH SPEED DIGITAL DESIGN

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) Attempt any three questions from each Section.2) Figures to the right indicate full marks.

SECTION - I

1.	a) What is transmission line, what are the types of transmission line, explain lossless LC transmission lines in detail.	6
	b) Explain different noise sources in digital system.	5
2.	a) Explain high speed properties of logic gates.	6
	b) Explain Geometry and electrical properties of wires.	5
3.	a) Explain signalling modes of transmission lines.	6
	b) Explain frequency, time, distance related to high speed digital design.	6
4.	Write short notes on any three of the following : (4×3=	12)
	a) Lossy transmission lines.	
	b) Signalling over transmission media.	
	c) On dip bypass capacitor.	
	d) Cross talk.	

SECTION - II

5. a) Explain power supply noise reduction and filtering in detail.	6
b) Explain Harmonic sampling and band pass sampling.	5
	P.T.O.

SLR-TD – 182

6.	a) Explain grounding in high speed system.	6
	b) Explain base band antialiasing filters.	5
7.	a) Explain distortion and noise in ideal N bit ADC.	6
	b) Explain high speed ADC AD 9066.	6
8.	Write notes on any three of the following :	(4×3=12)
	a) A prototyping circuits in high speed electronics.	
	b) EMI/RFI considaration related to power supply.	
	c) Latency in ADC's.	
	d) Power supply conditioning related to power supply.	

SLR-TD - 183

Seat No.

M.E. (Electronics & Telecommunication) Digital Electronics and Communication System (Semester – II) (CBCS) Examination, 2018 Paper – VIII : ADVANCED EMBEDDED SYSTEM

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 p.m.

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

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

3) Assume suitable data if necessary.

SECTION - I

1.	A)	Explain interfacing of SRAM with microcontroller in detail.	6
	В)	Explain with examples various data types used in embedded software in "C" language.	6
2.	A)	Explain bitwise operators used in C.	6
	B)	What are the different specifications of D-A converter ?	6
3.	A)	What is the meaning of reactive in real time ? Cite an example.	5
	B)	Explain with block diagram basic architecture of 8051.	6
		SECTION – II	
4.	A)	What is priority inversion problem ? How it can be solved ?	6
	B)	Define real time system. Explain basic model of real time system.	6
5.	A)	What is real time task scheduling ? Explain terms task instance, response time, task precedence.	6
	B)	Which are the key features of ARM 9 processor ?	6
6.	A)	Explain debug and test feature of embedded system.	5
	B)	Write short note on arm instruction set.	6



Max. Marks : 70

SLR-TD – 184

Seat No.

M.E. (E&TC) Digital Electronics and Communication Systems (Semester - II) (CBCS Pattern) Examination, 2018

CRYPTOGRAPHY AND NETWORK SECURITY (Paper – IX)

Day and Date : Monday, 21-5-2018

Time : 10.00 a.m. to 1.00 p.m.

- *Note* : 1) *All* questions are *compulsory*.
 - 2) Figure to the **right** indicates **maximum** marks.
 - 3) Assume the data **whenever** necessary.

SECTION - I

- 1. Attempt any three : a) Explain principle of ciphers. b) Explain principle of public key. c) Explain any one of ciphers. d) Explain encryption technique. 2. Attempt any two : a) Explain distribution of public key. b) What are the types of distribution of public key ? Explain any two. c) Explain RAS algorithm. SECTION - II 3. Attempt any three : $(3 \times 5 = 15)$ a) Why authentication is required ? b) Explain authentication function. c) Explain birthday attack. d) Explain IP security. 4. Attempt any two : $(2 \times 10 = 20)$ a) Explain message authentication code. b) What is public key infrastructure ? Explain it.
 - c) Explain approaches for Digital Signature Technique.

Max. Marks: 70

Set

 $(3 \times 5 = 15)$

 $(2 \times 10 = 20)$

Seat	
No.	

M.E. (E and TC) Digital Electronics and Communication Systems (Semester – II) (CBCS Pattern) Examination, 2018 Elective – II : (Artificial Neural Network) (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instructions : 1) All questions are compulsory.

- 2) Figures to the right indicates maximum marks.
- 3) Assume data whenever necessary.

SECTION - I

1. Attempt any three :

- a) Define Perceptron. Explain the structure of perceptron.
- b) What are the requirements of learning laws ?
- c) Explain learning of Artificial Neural Network Model.
- d) Explain back propagation algorithm.

2. Attempt any two :

- a) What are the types of activation functions in Neural Network ? Explain.
- b) Explain Habbian learning method for Artificial Neural Network Model.
- c) Explain Delta learning Law for Artificial Neural Network Model. (PN-31-32).

SECTION - II

3.	Attempt any three :	(3×5=15)
	a) Explain Hamming Net.	
	 b) Explain ANN application in medical field. 	
	c) Explain MAXNET.	
	d) Explain Radial basis function.	
4.	Attempt any two :	(2×10=20)
	 a) Explain characteristics recognition using ANN. 	
	 b) Explain principle component analysis. 	
	c) Explain Hopfield network algorithm.	

SLR-TD – 185

Set



Total Marks: 70

(3×5=15)

(2×10=20)

ain.

Seat

No.

M.E. E&TC - (Digital Electronics & Communication System) (Semester – II) (CBCS) Examination, 2018

Paper – X : WAVELET TRANSFORM AND APPLICATIONS (Elective – II)

Day and Date : Wednesday, 23-5-2018

Time : 10.00 a.m. to 1.00 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 :
 - a) Explain the limitation Fourier Transform and Discrete Fourier Transform and resolution of the limitation by Wavelet transform.
 - b) Explain time and frequency time resolution in wavelet transform.
- 2. Attempt **any two** of the following questions : (5×2=10)
 - a) Explain Wavelet decomposition and reconstruction of functions in $L^{2}(R)$.
 - b) Discuss about Multi Resolution Analysis.
 - c) Explain Wavelet basis function.
- 3. Write a short note on (any three) :
 - a) Necessary and sufficient condition for orthonormality.
 - b) Continuous Wavelet Transform with necessary conditions.
 - c) Biorthonogality and biorthogonal basis for construction of wavelets.
 - d) Criteria for wavelet selections with example.



SLR-TD – 186

(7×1=7)

Total Marks : 70

(6×3=18)

SLR-TD - 186

SECTION - II

4.	Attempt any one of the following :	(7×1=7)
	a) Explain Video Compression using Multi resolution technique.	
	b) Discuss about audio compression using DWT.	
5.	Attempt any two of the following :	(5×2=10)
	a) Explain image fusion using wavelet transform.	
	b) Explain the use of discrete wavelet sub-band in face recognition.	
	c) Describe edge detection using Wavelet transform.	
6.	Write a short note on (any three) :	(6×3=18)
	a) Object Isolation	
	b) Transform coding	
	c) Digital mammography	
	d) Wireless digital communication based on DWT.	

SLR-TD – 187



c) Explain system power management scheme.

SLR-TD – 188

Seat No.

Set P

M.E. (E&TC-Digital Electronics and Communication Systems) (Semester – II) (Old-CGPA) Examination, 2018 Paper – X : IMAGE AND VIDEO PROCESSING AND BROADCASTING (Elective – II)

Day Tim	and Date : Tuesday, 15-5-2018 e : 2.30 p.m. to 5.30 p.m.	Total Marks :	70
	<i>Instructions</i> : 1) Figure to <i>right</i> indicates <i>full</i> marks. 2) <i>All</i> questions are <i>compulsory</i> .		
	SECTION - I		
1.	Attempt any two :	:	20
	a) Explain image histogram equalization.		
	b) Explain KLT transformation in details.		
	c) Explain different filters used in color image processing.		
2.	Attempt any two :		15
	a) Explain image sampling and quantization in detail.		
	b) Explain least square filter.		
	c) Explain Harries operator in detail.		
	SECTION – II		
3.	Attempt any two :	:	20
	a) Explain edge linking segmentation.		
	b) Explain MPEG.		
	c) Explain Boundary extraction method.		
4.	Attempt any two :		15
	a) Explain edge based segmentation.		
	b) Explain edge detection operators.		
	c) Explain moment representations.		

Seat No.

SLR-TD – 191



- b) Draw and explain Wireless Communication system.
- c) Define fading. Explain types of fading in details.

SECTION – II

3.	 Attempt any three : a) Explain session mobility. b) Explain advoc routing. c) Explain hidden terminals in mobile networks. d) Explain the near far effect in mobile communication. 	(3×5=15)
4.	 Attempt any two : a) Explain mobile IP in details. b) Explain DHCP for mobile networks in details. c) Explain wireless TCP protocol. 	(2×10=20)

sketches.

Seat No.

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 POWER ELECTRONICS (Paper – I)

Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 p.m.

Instruction : Attempt all the questions.

1. Explain the following applications of power electronics.

SECTION - I

i) Speed control of motor in traction and industrial process.
ii) High voltage DC power transmission.
2. Draw the input and output characteristics of four of the following devices : 10

i) GTO
ii) MOSFET.

OR
State and explain turn methods of silicon controlled rectifier with relevant

 Compare the performance parameters of a single phase full wave diode rectifier with mid-point and bridge configurations.

OR

A single phase full bridge diode rectifier is supplied from 230 V, 50 Hz source. The load consists of R = 10 ohm and a large inductance so as to render the load current constant. Determine : 15

- a) Average values of output voltage and output current
- b) Average and r.m.s. values of diode currents
- c) r.m.s. values of output and input currents and supply power factor.

SLR-TD – 195

Total Marks: 70

10

10



SLR-TD – 195

SECTION - II

- 4. Explain with the help of neat power diagram and associated waveforms, the operation of single phase half controlled converters with :
 - i) Resistive load
 - ii) Inductive load.

10

10

5. Describe the working of single phase fully controlled bridge converter in the two modes. Also, sketch the waveforms for $\alpha = 30^{\circ}$ and $\alpha = 120^{\circ}$. **15**

OR

Write limitations linear power supplies and discuss the operation of buck-boost converter with help of neat circuit diagram, waveforms and equations. **15**

With the help of circuit diagram and waveforms explain the working of bidirectional AC voltage regulator with R and R-L load.

OR

Explain with neat circuit diagram of three phase 180° mode inverter circuit with resistive load. Draw line and phase voltage waveforms. **10**

SLR-TD - 196

Seat	
No.	

Set P

Max. Marks: 70

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 POWER SYSTEM DYNAMICS AND CONTROL (Paper – II)

Day and Date : Tuesday, 8-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1.	a)	Explain the various types of power quality disturbances and their impacts on power quality.	9
	b)	Using Euler's method find an approximate value of 'y' corresponding to	
		$x = 1$, given that $\frac{dy}{dx} = x + y$ and $y = 1$ where $x = 0$.	9
2.	a)	Analyse power system stability using eigen value approach. OR	8
		Explain the concept of equilibrium related to power system in detail.	
	b)	Explain the dynamics of a synchronous generator when connected to an infinite bus.	9
		SECTION – II	
3.	Gi tra	ve the assumption for synchronous machine modelling and derive Park's insformation.	18
4.	a)	Explain the modelling of induction machine.	9
	b)	Explain the effect of the excitation system on transient stability. OR	8
	b)	Draw the block diagram of the power system stabilizer and explain each module.	

Seat No.

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018 DC DRIVES (Paper – III)

Day and Date : Friday, 11-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

- 1. Attempt all :
 - a) Why speed torgue characteristics of motor are consider for speed control? 8 9
 - b) Explain various braking method for separately exited dc shunt motor.

OR

Compare the performance of single phase converter fed dc drive with 3-phase converter fed dc drive.

- 2. Solve **any two** questions from the following :
 - a) A drive has following equation for motor and load torque

 $T = (1 + 2\omega_m)$ and $T_1 = 3\sqrt{\omega_m}$

Obtain the equilibrium point and determine their steady state stability.

- b) Draw the waveform of armature voltage and armature current for 1 phase full wave half controlled converter in continues conduction mode discontinues conduction mode.
- c) Draw the source current waveform of three phase six pulse converter fed dc drive with continuous conduction for following firing angle $\alpha = 30^{\circ}$ and $\alpha = 120^{\circ}$.

3. Attempt all :

- a) How braking torgue is controlled in 4 guadrant dc drive ?
- b) Explain with neat circuit diagram operation of four guadrant chopper fed dc drive.

OR

Explain with block diagram how starting current of motor is controlled in closed loop speed control drive.

- 4. Solve **any two** questions from the following :
 - a) Compare the chopper fed dc drive with converter fed dc drive in following point
 - i) Supply power factor
 - ii) Ripple current frequency
 - iii) Motor torgue and Armature cu loss.
 - 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.





Max. Marks: 70

 $(2 \times 9 = 18)$

9

8

(2×9=18)

P.T.O.

Seat No.

M.E. Electrical (Semester – I) (CBCS/CGPA) Examination, 2018 CONTROL ENGINEERING (Paper – IV)

Day and Date : Saturday, 12-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1. Attempt any four :

- a) What are the control objectives of feedback control system ?
- b) Explain the effect of feedback on system sensitivity in control systems.
- c) Obtain the transfer functions for the following mechanical translational system.

- d) Describe briefly using appropriate diagrams, an application of LVDT in motion control systems.
- e) What are the different kinds of control systems ? Explain in detail.

2. Attempt any one :

- a) In the thermal system shown, heater coil is used to heat the liquid entering the insulated tank at temperature θ to hot liquid at temperature θ . The liquid is thoroughly mixed to maintain uniform temperature of the liquid in the tank. If M is the mass of the liquid in the tank in Kg, C is the specific heat of liquid in J/Kg/°K, W is the steady state liquid flow rate in kg/sec and h, is the heat input rate in J/sec, obtain the transfer function of the system when,
 - i) Heat input rate is changed, with inlet temperature of liquid kept constant and



$$\mathsf{T}(\mathsf{s}) = \frac{\mathsf{Y}(\mathsf{s})}{\mathsf{X}(\mathsf{s})}$$



Total Marks : 70

(4×6=24)

 $(1 \times 11 = 11)$

SLR-TD – 198

Set

SLR-TD – 198

ii) Inlet temperature is changed with heat input rate held constant. Also write the differential equation when heat input rate and inlet liquid temperatures are changed.



b) Describe the construction and working of a two-phase motor for use in ac servo systems. Give the torque-speed characteristics of the motor and derive the transfer function model based on the linearized characteristics.

3. Attempt any four :

(4×6=24)

a) The state space representation of a second order system is

 $\dot{x}_1 = -x_1 + u$

 $\dot{x}_2 = x_1 - 2x_2 + u$

State whether the system is controllable or not.

b) A feedback system has a transfer function

$$\frac{\mathbf{Y}(\mathbf{s})}{\mathbf{R}(\mathbf{s})} = \mathbf{M}(\mathbf{s}) = \frac{\omega_n^2}{\mathbf{s}^2 + 2\zeta\omega_n \mathbf{s} + \omega_n^2}, \ \zeta < 1.$$

Derive the expression for peak overshoot $\rm M_{p}$ and peak time $\rm t_{p}$ of the time response of the given system.

c) Sketch the Bode plot for the following system and determine the value of K for which the magnitude plot crosses the 0 db line at $\omega = 15$ rad/sec.

$$G(s) = \frac{k(s+2)}{s(s+4) \ (s+10)}$$

d) Find the state transition matrix for the following systems.

i)
$$\dot{\mathbf{X}} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \mathbf{X}$$

ii) $\dot{\mathbf{X}} = \begin{bmatrix} 1 & 0 \\ -1 & -2 \end{bmatrix} \mathbf{X}$

- e) Explain the performance specifications in frequency domain.
- 4. Attempt any one :

 $(1 \times 11 = 11)$

a) The controlled plant of unity feedback system is $G(s) = \frac{K}{s(s+10)^2}$. It is

specified that velocity error constant of the system to be equal to 20. While the damping ratio of the dominant roots be $\xi = 0.707$. Design a suitable cascade compensation scheme to the specifications.

b) Obtain the transfer functions of the following systems.

i)
$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -3 & -4 \end{bmatrix} X + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U \& Y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} X$$

ii) $\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -4 & -6 & -8 \end{bmatrix} X + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U \& Y = \begin{bmatrix} -2 & 4 & 0 \end{bmatrix} X + 2U$

Seat

No.

M.E. (Electrical Engineering) (Semester – I) (CBCS/CGPA) Examination, 2018

Elective – I : EXTRA HIGH VOLTAGE TRANSMISSION SYSTEM (Paper – V)

Day and Date : Monday, 14-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1. Attempt all :

a) Explain about basic engineering aspects in EHV AC transmission. 8

b) Explain the need of Bundled conductors for EHV AC lines. 9

OR

Derive Maximum Surface Voltage Gradients for $N \ge 3$.

- 2. Solve any two questions from the following : (2×9=18)
 - a) A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 400 kv, 750 kv, 1000 kv and 1200 kv determine.
 - i) Possible no. of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference.
 - ii) The currents transmitted and
 - iii) The total line losses.
 - b) Explain the relation between the temperature rise and current carrying capacity of EHV-AC line.
 - c) Derive an expression for maximum charge condition on a 3-Phase line.

SLR-TD – 199

Set P

Max. Marks: 70

SLR-TD - 199

SECTION - II

- 3. Attempt all :
 - a) Explain if the transmission line is open-ended and is excited when double-exponential wave response.
 - b) Explain the lightning stroke mechanism.

OR

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.

4. Solve any two questions from the following :

 $(2 \times 9 = 18)$

8

- a) Obtain the time function of open end voltage equation using step response considering :
 - i) Omit losses
 - ii) Omit only g.
- b) Explain different type of lightning arresters and protective characteristics.
- c) Derive the generalized constants of a distributed parameter transmission line.

Seat	
No.	

M.E. (Electrical Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018

POWER ELECTRONICS APPLICATIONS TO POWER SYSTEM (Paper – VI)

Day and Date : Tuesday, 15-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

- 1. Attempt all :
 - a) Write notes on voltage profile at the Point of Common Coupling (PCC). 8
 - b) Derive the expression for active as well as reactive power flow in a uncompensated lossless transmission line. Draw necessary phasor diagram.

OR

- b) Explain how to balance three phase unbalanced system by using passive elements with relevant diagrams and equations.
- 2. Attempt any two :
 - a) Write applications of multi-level inverters and explain principle of operation of 3-level diode clamped multi-level inverters.
 - b) Explain following strategies, with reference to current controlled SLCVC.
 9

 i) Sensing the compensator current ii) Sensing the source current.
 - c) State and explain various techniques for harmonic elimination.

SECTION - II

- 3. Attempt all.
 - a) Explain principle of working and characteristics of STATCOM.
 - 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.

OR

b) What are the components used in basic HVDC transmission system ? Explain in detail.

4. Attempt any two.

- a) Draw equivalent circuit representation and explain with effect source inductance of 6-pulse converter.
- b) Explain principle of turn-off delay angle control of basic GTO thyristor-controlled series capacitor with relevant compensating voltage waveforms.
- c) Explain operation of 12 pulse converter with suitable diagram and waveforms.
 9



SLR-TD – 202

Max. Marks: 70

9

9

9

9

9

9

9

9

Seat No.

M.E. (Electrical Engineering) (Semester - II) (CBCS/CGPA) Examination, 2018 Paper – VII: POWER QUALITY

Day and Date : Thursday, 17-5-2018 Time : 10.00 a.m. to 1.00 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 :	8

- i) Voltage imbalance
- ii) Under voltage
- iii) Over voltage
- iv) Frequency variation.
- b) What is harmonics ? Explain harmonic distortion with relevant waveforms.

SECTION - II

1.	a)	Explain briefly about the phenomena of how current distortion affects the voltage distortion under the presence of harmonics.	9
	b)	How will you find the harmonic sources from point of common coupling ?	9
2.	a)	List the advantages of Active Harmonic Filter ? List some dynamic correction of Power quality events ?	9
	b)	What is the advantage of three phase converter ? What is the disadvantage of 12 pulse drive ?	8
		OR	
		Explain schematic and working of unified power conditioner.	8

SLR-TD – 203

Set

Max. Marks: 70



Seat	
No.	

M.E. (Electrical Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 AC DRIVES (Paper – VIII)

Day and Date : Saturday, 19-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1. Attempt all :

- a) Derive torque expression for a three phase Induction motor and draw its torque-slip characteristic.
- b) Compare stator voltage control and E/f control strategies for speed control of a three phase induction motor.

OR

Explain effect of voltage drop across stator impedance on E/f control strategy for speed control of a three phase induction motor.

- 2. Solve any two questions from the following : (2×9=18)
 - 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.
 - b) Show that under variable frequency control (E/f control), torque produced by a three phase induction motor depends on "s.k." where s = slip and k = fraction of frequency.
 - c) 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.

Max. Marks: 70

8

9

Set

SLR-TD – 204

SECTION - II

3. Attempt all :

- With a neat block diagram, explain closed loop V/f control scheme for three phase induction motor.
- b) With neat circuit schematic explain static Scherbius drive. State basic philosophy used for operating induction motor in variable speed mode in this drive.

OR

State advantages of three phase synchronous motor over three phase induction motor. With simple equivalent circuit and phasor diagrams explain its operation in variable power factor mode. Derive its torque equation.

- 4. Solve **any two** questions from the following :
 - a) Draw and explain typical power circuit configuration used for three phase induction motor speed control. Explain need of dynamic braking resistance in this configuration.
 - b) Draw a neat equivalent circuit diagram for current fed induction motor drive. How do we decide the magnitude of current to be fed from source to such a drive ? Why starting torque is much lower in case of current fed drives than that for voltage fed drives ?
 - c) With neat block diagram explain true synchronous mode of speed control in synchronous motor.

8

P.T.O.

SLR-TD – 205

Set

Max. Marks: 70

M.E. Electrical (Semester – II) (CBCS/CGPA) Examination, 2018 ADVANCED CONTROL ENGINEERING (Paper – IX)

Day and Date : Monday, 21-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

- 1. Attempt any two :
 - a) Series compensation scheme with $G(s) = \frac{4e^{-2s}}{2s+1}$ and $G_c(s) = \frac{0.131(2s+1)}{2s}$.

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 $G(s) = \frac{Ke^{-2s}}{(8s+1)^2} \text{ and the controller } G_c(s) = K_p \left(1 + \frac{1}{T_i s}\right) (1 + T_d s). \text{Estimate the series}$ PID controller parameters by choosing G.M.(Am) = 3 and P.M.(ϕ_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 $G_c 1(s) = K_p \left(1 + \frac{1}{T_i s}\right)$ and $G_c 2(s) = K_b + T_d s$. Given model parameters : k = 2; $\alpha_1 = 0$ and $\alpha_0 = -4$. Using the plot for the optimized 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



(2×9=18)

3. Series -feedback compensation scheme with $G(s) = \frac{4e^{-2s}}{4s-1}$ and the controllers

 $G_c 1(s) = \frac{0.262s + 0.131}{2s}$ and $G_c 2(s) = 0.5(s + 1)$. 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 :

SLR-TD – 205

- a) Derive the analytical expressions for the parameters of the tranfer 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. $(1 \times 9 = 9)$

OR

6. How to identify the FOPDT model by using state-space analysis?

 $(2 \times 9 = 18)$

SLR-TD – 208

Seat No.

M.E. (Electrical Engineering) (Semester – II) (CBCS/CGPA) Examination, 2018 Elective – II : HVDC TRANSMISSION (Paper – X)

Day and Date : Wednesday, 23-5-2018 Time : 10.00 a.m. to 1.00 p.m.

SECTION - I

1. Attempt all :

- a) What are the equipment used in hvdc transmission system explain in detail ?8
- b) Explain in detail the converter control characteristics of HVDC systems. 9

OR

With the help of neat sketches, analyze a six pulse rectifier bridge circuit with an overlap angle greater than 60°. Deduce the relevant equations and draw the necessary graphs.

- 2. Solve **any two** questions from the following :
 - a) Explain firing angle control in detail.
 - b) With the help of a neat diagram, explain converter operation in 3 and 4 conduction mode.
 - c) With block diagram, discuss the principle of operation of a basic power controller.

SECTION - II

3. Attempt all :

- a) Discuss the various faults exist in converter station.
- b) What are the various types of filters that are employed in HVDC converter station ? Discuss them in detail.9

OR

Write a short notes on :

- i) Modelling of H.V.D.C. links.
- ii) P.U. system for d.c. quantities.

4. Solve **any two** questions from the following :

- a) Explain protection against over voltages.
- b) What are the types of MTDC systems and explain each in detail ?
- c) Give in detail the different sources of reactive power.

Max. Marks: 70

(2×9=18)

Set P

er

8

(2×9=18)