SLR-GE-1

Seat No.	

Set P

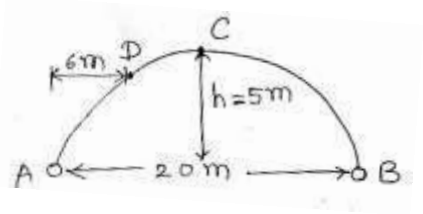
F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Advanced structural analysis (MTCE0101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

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

Section – I

Q.1 Draw ILD for BM, horizontal thrust and normal thrust and radial shear at D for two hinged parabolic arch. Derive the ordinates at quarter span. **12**



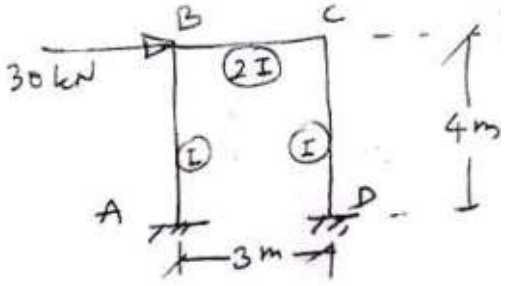
Q.2 Draw BMD & TMD for a semi- circular beam AB curved in plan having radius 'R'. It is loaded with downward load 'W' at the centre C. **12**

Q.3 An infinitely long beam supported on elastic foundation is subjected to a concentrated load P per unit width of Long Beam. Draw SFD, BMD, deflection and foundation pressure diagram. **11**

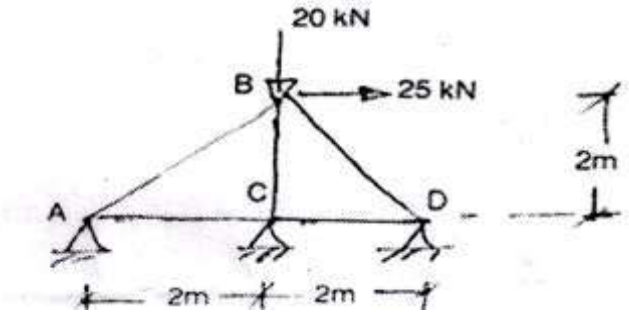
Section – II

Q.4 A simply supported beam column is subjected to an axial compressive force 'P' at both the ends and carries udl of 'w' throughout the span. Calculate central deflection and slope at ends. **12**

Q.5 Analyze frame shown in figure by stiffness method. **12**



Q.6 Find the forces in all members of the truss shown in fig.by using member oriented stiffness method. Assume axial rigidity of all members is constant. **11**



SLR-GE-2

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL - (STRUCTURES ENGINEERING)
Advanced solid Mechanics (MTCE0102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory
2) Use of a non-programable calculator is allowed.
3) Figures to the right indicate full marks.
4) Assume suitable data if required and mention it clearly.

Section – I

Q.1 **a)** Derive differential equations of equilibrium for 3-D problems of elasticity in Rectangular Coordinate System. **10**
b) Write generalized Hook' Law **05**

Q.2 **a)** State the assumption made in theory of elasticity and Obtain the Strain compatibility equations for three dimensional problems of elasticity. **10**

Q.3 **a)** Explain Plane stress condition. **04**
b) Examine whether following functions are Airy's stress functions: **06**
i) $\phi = Ax^2 - By^2$
ii) $\phi = A(x^4 - 3x^2y^2)$

Section – II

Q.4 **a)** Explain Saint Venant's Method **04**
b) Write short note on Prandtl's Membrane Analogy **06**

Q.5 **a)** Explain Idealized Stress- Strain curve **07**
b) Write short note on Strain Hardening, **06**

Q.6 **a)** Explain Tresca Yield Criterion and Von Mises Yield Criterion **06**
b) Write short note on Principle of Normality and Plastic Potential **06**

SLR-GE-3

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Dynamics & Earthquake Engineering (MTCE0103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

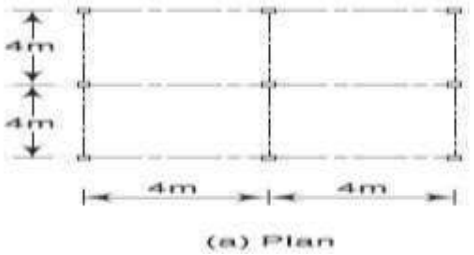
Instructions: 1) Solve any 5 questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and assume it clearly.
4) Use IS 1893.

Q.1 From the first principle derive the governing differential equation for free vibration of undamped SDOF system. Obtain general solution of this differential equation. **14**

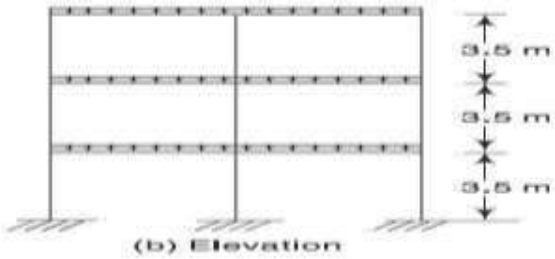
Q.2 A single degree of freedom system consists of a man with weight of 1800 N and spring of stiffness 14 KN/mm. By testing the system, it was found that a force of 450 N produced relative velocity of 0.3 m/sec. Find, **14**
a) Damping ratio
b) Damped frequency of vibration
c) Logarithmic decrement
d) The ratio of two successive peak amplitudes

Q.3 **Solve any Two.** **14**
a) Rayleigh method
b) Orthogonality conditions
c) Mode superposition Method

Q.4 The plan and elevation of a three storey RCC School building is shown in figure. The building is located in seismic zone V. The type of soil encountered is medium stiff and it is proposed to design the building with a special moment-resisting frame. The intensity of DL is 10KN/m^2 and the floors, are to cater to an IL of 3kN/m^2. Determine the design seismic loads on the structure by static analysis. **14**



(a) Plan



(b) Elevation

Q.5 **a)** Explain ductility of structure importance how will you make RCC structures, and steel structures ductile? **07**
b) Explain the different methods of measurement of Ductility in structure. **07**

Q.6 **a)** Explain Use of response spectrum in earthquake-resistant design. **07**
b) Write note on tripartite (D-V-A) response spectrum. **07**

Q.7 **a)** Explain the working principle of seismometer with neat sketch. **07**
b) What do you understand by soil liquefaction? Explain various remedial measures to control soil liquefaction. **07**

SLR-GE-4

Seat No.		Set	P

F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – STRUCTURES ENGINEERING
Structural Audits (MTCE0106)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

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

Section – I

Q.1 Solve following **10**

a) Enlist various NDT Methods for assessing strength of distressed materials, and explain any Three in details.

b) Define Structural health monitoring & Explain Importance. **05**

Q.2 Solve any Two from following

a) Enlist Factors affecting durability of concrete, Corrosion in structures and explain them shortly. **10**

b) Write a detailed note on Quality control & assurance of materials of structure. **10**

c) Explain the Principle, application and disadvantages of Ultrasonic Testing Technique? **10**

Section - II

Q.3 Solve following

a) Enlist different methods of retrofitting techniques, and explain any one in detail. **10**

b) Elaborate briefly about Recycling of demolished materials. **05**

Q.4 Solve any Two from following.

a) Enlist different construction chemicals used during restoration and explain parameters for its selection in details. **10**

b) Explain parameters of Structural aspects for formwork in buildings & bridges. **10**

c) Describe various demolition methods and their evaluation. **10**

SLR-GE-5

Seat No.		Set	P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Design of Prestressed Concrete Structures (MTCE0107)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 and 4 are compulsory, solve any one from remaining questions from each section.
2) Use of original is 1343, and non-programmable calculator are allowed.
3) Draw neat sketches wherever necessary.
4) Figure on right indicates full marks.
5) Assume suitable data if required.

Section – I

Q.1 Pretensioned concrete beam section of size 350 mm × 450 mm and is provided with 30 wires of 3 mm diameter distributed uniformly over the section. Wires are tensioned initially in the prestressing beds with a total force of 400 kN. Determine the stress in concrete and the percentage loss of stress in wires. Consider $E_s = 2.08 \times 10^5$ N/mm^2, $E_c = 32 \times 10^5$ N/mm^2, Ultimate creep strain = 32×10^{-6} mm/mm per N/mm^2, Shrinkage of concrete = 200×10^{-6}, Relaxation of steel stress= 4 % of the initial stress. **18**

Q.2 A Prestressed Concrete beam of size 300 mm × 600 mm is subjected to an axial prestressing force of 1600kN. Design the anchor block by Guyon's method **17**

Q.3 Design a prestressed concrete beam for following requirements, span=14 m, superimposed load= 32 kN/m and M 35 concrete is used. Safe stress in concrete at transfer of prestress = 0.5fck, safe stress in concrete due to final prestress fc = 0.4 fck, total loss of prestress is 18%, allowable tensile stress in concrete = 0.129 √fck, ultimate stress in steel = 1500 N/mm^2, safe stress in steel is 60% of ultimate stress. **17**

Section – II

Q.4 A composite pre stressed concrete beam section consisting of a prefabricated stem 300mm × 800 mm and a cast-in- Situ slab of 800 mm × 175 mm. if the differential shrinkage is 1.2×10^{-4} mm/mm, find the shrinkage stress at the extreme edges of the slab and the stem. Take $E_c = 2.75 \times 10^{-4}$ N/mm^2. **18**

Q.5 A post tensioned continuous beam consist of two spans each of 15 m long. The external loading other than the dead load of the beam is 25 kN /m. Design the beam. **17**

Q.6 Design a non - cylinder prestressed concrete pipe of 500 mm internal diameter to withstand a working hydrostatic pressure of 1.0 N/mm^2, using a 2 mm dia. high tensile wire stressed to 1200 N/mm^2 at transfer. Permissible maximum and minimum stresses in concrete at transfer and service loads are 13.5 and 0.8 N/ mm^2. The loss ratio is 0.8. Calculate if Es = 210 kN/mm^{2}and Ec = 35 kN/mm^2, **17**

a) Minimum thickness of concrete for pipe

b) Number of turns of wire per meter length of pipe

c) The test pressure required to produce a tensile stress of 0.7 N/ mm^2 in concrete when applied immediately after tensioning

d) The winding stress in steel

SLR-GE-6

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL - (STRUCTURAL ENGINEERING)
Advanced Design of Foundation (MTCE0108)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

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

Section – I

Q.1 **a)** Distinguish between General shear failure and Local shear failure. **04**

b) Write a note on dynamic bearing capacity. **04**

c) Determine the allowable gross load and the net allowable load for a square footing of 2m side and with a depth of foundation 1.0 m. Use Terzaghi's theory and assume local shear failure. Take a factor of safety of 3.0.The soil at the site has $\gamma = 18kN/m^3$ $C' = 15kN/m^2$ and $\varphi' = 25^0$. Take $N_c' = 14.8$ $N_q' = 5.6$ $N_\gamma' = 3.2$. **05**

Q.2 **a)** With neat sketch explain **06**
1) Strap footing
2) combined footing. In what circumstances they are adopted.

b) A trapezoidal footing is to be produced to support two square columns of 30cm and 50cm sides respectively. Columns are 6m apart and safe bearing capacity of the soil is $400\ kN/m^2$. The bigger column carries $5000\ kN$ and the smaller $3000\ kN$. Design a suitable size of the footing so that it does not extend beyond the faces of the column. **06**

Q.3 **a)** Enlist the different methods of design of raft foundation. **03**

b) Explain conventional method of design of raft foundation. **07**

Section – II

Q.4 **a)** Write a note on negative skin friction. **04**

b) In a 16 pile group, the pile diameter is 450 mm and centre to centre spacing of the square group is 1.5 m. If $C = 50\ KN/m^2$, determine whether the failure would occur with the pile acting individually or as a group? Neglect bearing at the tip of the pile. All piles are 10 m long. Takea = 0.7 and factor of safety 2.5. Also find safe allowable load. **08**

Q.5 **a)** What is the basic difference between the drilled pier and caisson? What are the conditions in which a drilled pier is more suitable than caisson. **06**

b) What are the various components of well foundation? What are their uses? **05**

Q.6 **a)** Explain the terms **06**

1) natural frequency
2) period
3) resonance
4) magnification

b) A foundation block of weight $30\ kN$ rests on a soil for which the stiffness may be assumed as $25{,}000\ kN/m$. The machine is vibrated vertically by an exciting force of $3.0\sin(30\ t)\ kN$. Find the natural frequency, natural period, natural circular frequency and amplitude of vertical displacement. The damping factor is 0.5. **06**

SLR-GE-8

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL - (STRUCTURAL ENGINEERING)
Research Methodology and IPR© (MTCE0104)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q. No. 3 and 6 are compulsory, solve any one from remaining questions from both sections.
2) Make suitable assumption if required.
3) Figures to the right indicate full marks.

Section – I

Q.1 **a)** Explain different types of research with suitable examples. **09**
b) Describe steps involved in research process using flow chart. **08**

Q.2 **a)** Explain importance of literature review in research work. **09**
b) Explain research design process. **08**

Q.3 **Write shorts on the following. (Any Three)** **18**
a) Error in Research
b) Problem Solving and its types
c) Creative problem-solving method
d) Development of Creativity

Section – II

Q.4 **a)** Explain in detail the procedure for grants of patents. **08**
b) Explain patenting under PCT. **09**

Q.5 **a)** Explain Geographical Indicators. **09**
b) Explain in details scope of patent rights. **08**

Q.6 **Write short note on the following (Any Three)** **18**
a) IPR of Biological Systems.
b) Patent information and databases.
c) Significance of New developments in IPR.
d) Traditional knowledge case study

SLR-GE-10

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Advanced Structural Analysis (70710101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q. No.1 and Q. No 5 are compulsory.
2) Solve any two remaining questions from each section
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary

Section – I

Q.1 Draw ILD for. RA, RB, MC, sfc **11**
Find ordinate at 1m interval.

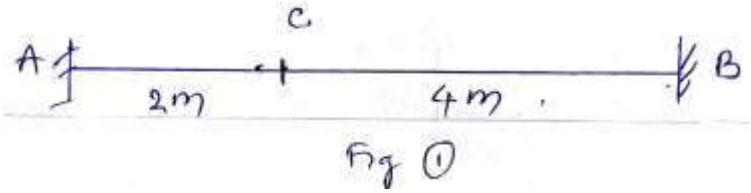


Fig ①

OR

Q.2 Draw ILD for MA, R_A and Mc for following frame. **12**

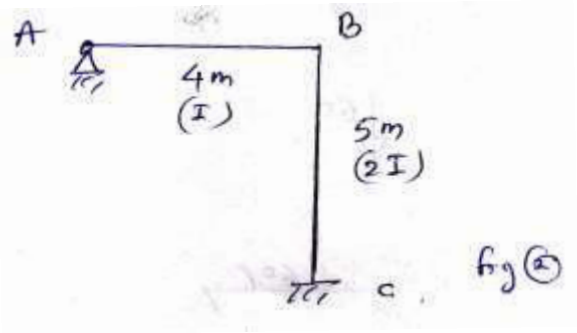


fig ②

Q.3 Determine support reaction of Beam Curved in plan shown in fig. (3) **12**

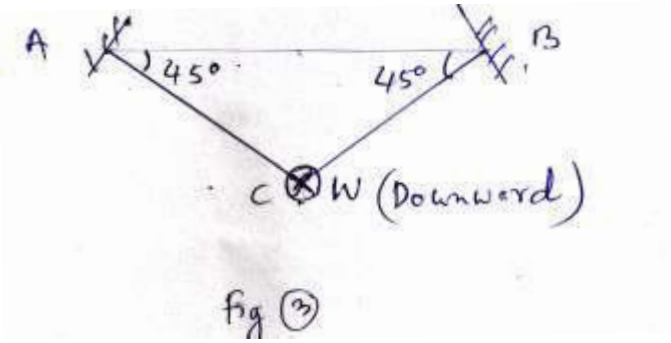
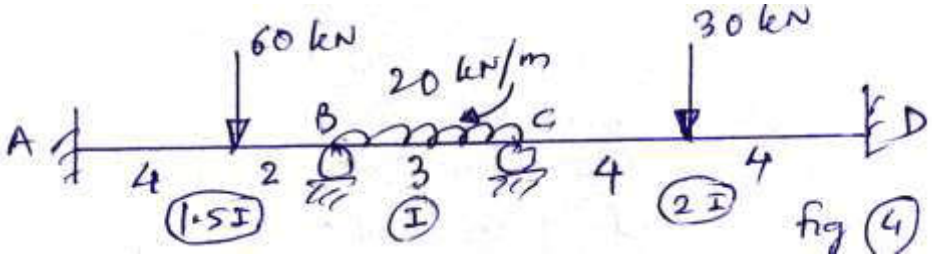


fig ③

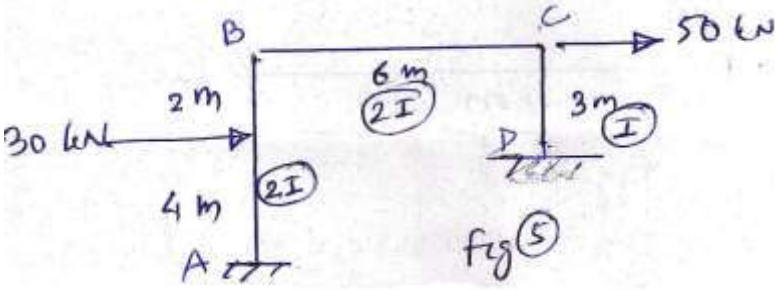
Q.4 Draw SFD, BMD, deflection and foundation pressure diagram for a semi infinite beam on elastic foundation hinged at one end and subjected to uniformly distributed load ‘w’ throughout the length. **12**

Section – II

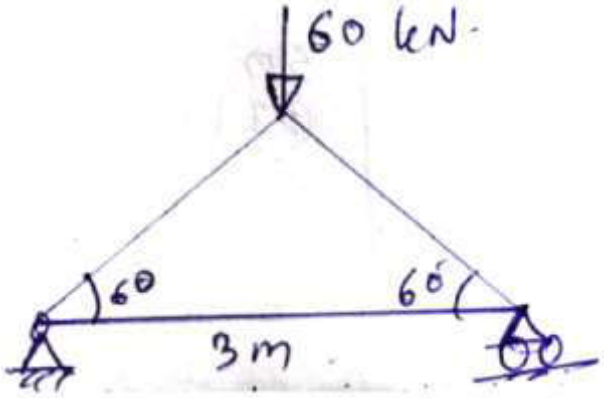
Q.5 Analyze the beam shown in fig (4) by stiffness method. **11**



Q.6 Analyze the frame shown in fig (5) by stiffness method **12**



Q.7 Analyze the truss shown in fig (6) by member oriented stiffness method. **12**
Assume area of all the member as 100 cm^2 and E= 200 GPa



Q.8 A propped cantilever beam column is subjected to an anticlockwise moment 'M_o' at it's propped end and axial compressive force P at both the ends. Derive expression for slope at the propped end and the fixed end moment at other end. **12**

SLR-GE-11

Seat No.		Set	P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
CIVIL - (STRUCTURES ENGINEERING)
Advanced Solid Mechanics (70710102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Question no. 2 is compulsory in section I, and solve any one question from the remaining.
2) Question no.5 is compulsory in section II, and solve any one question from the remaining.
3) Use of non-programmable calculator is allowed.
4) Numbers to right hand indicate full marks.
5) Use suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)**	Derive the differential equations of equilibrium for 3D problems of elasticity in rectangular co-ordinate system.	**06**
	b)	Write six compability equations in Cartesian co-ordinates for 3D problem of elasticity.	**05**
	c)	Write assumptions made in theory of elasticity.	**06**
Q.2	**a)**	Examine whether $\emptyset = A(x^4 - 3x^2y^2)$ is Airys stress function.	**07**
	b)	Using Airy's stress function, obtain fourth degree bi-harmonic equation representing stress flow in structures.	**07**
	c)	Explain plane stress condition.	**04**
Q.3	**a)**	Obtain differential equations of equilibrium for 2-D problems in Polar coordinate system.	**08**
	b)	Prove that the stress function $\emptyset_1$ represents the same stress distribution as given by $\emptyset$ in polar system when $\emptyset_1 = \emptyset + (A\cos\theta + B\sin\theta)r + C$ where A, B and C are arbitrary constants.	**09**

Section – II

Q.4	**a)**	Differentiate between Elasticity and Plasticity.	**04**
	b)	Explain torsion of rectangular bar.	**07**
	c)	Write a short note on membrane analogy.	**06**
Q.5	**Explain following terms.**		**18**
	a)	Plastic stress strain relations.	
	b)	Von Mises Criteria.	
	c)	Idealized Stress strain curve.	
Q.6	**a)**	Tresca's Yield Criteria.	**06**
	b)	Explain Principle of Normality and Plastic Potential.	**05**
	c)	Strain hardening.	**06**

SLR-GE-12

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Structural dynamics (70710103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Solve any 5 questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and assume it clearly.

Q.1 From the first principle derive the governing differential equation for undamped free vibration. Obtain the solution if SDOF is given an initial displacement xo and initial velocity Vo. **14**

Q.2 An SDOF system consists of a mass of 400kg and a spring stiffness of 300KN/m. By testing it was found that a force of 100N produces a relative velocity of 12cm/s. Find. **14**

a) Damping ratio
b) Damped frequency
c) Logarithmic Decrement
d) The ratio of two consecutive amplitudes.

Q.3 An SDOF system is subjected to a transient force as shown in the following figure 1. Derive the expression for the Magnification factor for the force as well as free vibration phases. **14**

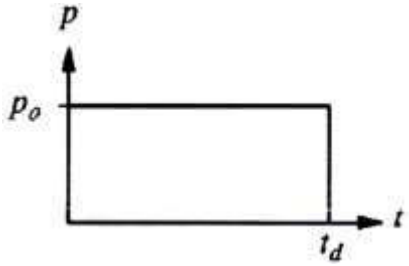


Figure 1

Q.4 **Write note on.** **14**

a) Dunkerly's Method
b) Mode superposition Method
c) Duhamal's Integral.

Q.5 Determine the fundamental Frequency of Vibrations using the Rayleigh method for the system shown in Figure 2. Take $m_1 = 1000Kg, m_2 = 1500Kg\ m_3 = 1000Kg$ and $k_1 = 2000kN/m$, $k_2 = 1500kN/m$ and $k_3 = 900kN/m$ Assume Fundamental Mode as $\{1\ \ 2.2\ \ 3.1\}$. **14**

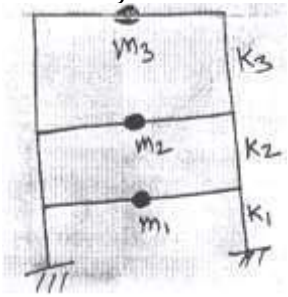


Figure 2

Q.6 **Write Notes of.** **14**

a) Static condensation.
b) orthogonality conditions.
c) Eigen Value problem.

Q.7 Perform free vibration analysis of a simply supported beam and determine its first three natural frequencies and mode shapes. **14**

SLR-GE-13

Seat No.	

Set P

F.Y. (M. Tech) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
CIVIL – STRUCTURES ENGINEERING
Research Methodology and IPR© (70710104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Question 1 and Question 5 are compulsory.
2) Any Two Question can be solved Q2, Q3 and Q4. (In Section – I)
3) Any Two Question can be solved Q6, Q7 and Q8. (In Section – II)

Section – I

Q.1 Answer the Following Questions. **11**
Explain in detail 'Research Design Process'.

Q.2 Answer the Following Questions. **12**
a) Explain 'Literature Review' in detail.
b) Explain various types of research in detail.

Q.3 Answer the Following Questions. **12**
a) What are the various problem solving Techniques.
b) Write Short note on 'Development of Creativity'.

Q.4 Answer the Following Questions. **12**
a) Write short note on the ***'Hypothesis'*** and ***'Scientific Method'***
b) Write down the definition of the research by using various terminologies.

Section - II

Q.5 Answer the Following Questions. **11**
Explain the process of Patent development in India.

Q.6 Answer the following question. **12**
a) Write short note on the ***'Technology Licensing'*** in detail.
b) Write short note on ***'Patent Information and databases'.***

Q.7 Answer the following question. **12**
a) What is Administration of Patent System?
b) Explain in detail ***'IPR of Biological System and Computer software'***

Q.8 Answer the following question. **12**
a) What are various International scenarios on 'Intellectual Property Rights'.
b) Explain Trademark Concept in detail.

SLR-GE-14

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Advanced Design of Concrete Structures (70710106)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 and 4 are compulsory, solve any one from remaining questions from both sections.
2) Use of IS 456 and IS 3370 part IV are allowed.
3) Draw neat sketches wherever necessary.
4) Figure on right indicates full marks.
5) Assume suitable data if necessary.

Section – I

Q.1 Design an interior panel of a flat slab of size 4.8 m × 4.8 m without providing drop and column head. Size of columns is 450 mm × 450 mm and live load on the panel is 5 kN/m^2 including floor finishing. Use M_{20} grade of concrete and Fe $_{500}$ steel. **18**

Q.2 Design a corbel to carry an ultimate load of 850 kN at a distance of 240 mm from the face of a column of size 400 mm × 400 mm. Use M_{30} grade of concrete and Fe $_{500}$ steel. **17**

Q.3 Design a combined footing to support two columns of 400 mm × 400 mm and 500 mm × 500 mm spaced 4.2 m apart, carrying axial loads of 950 kN and 1050 kN respectively. The SBC of the soil is 180 kN/m^2. Adopt M_{20} grade of concrete and Fe $_{415}$ steel. **17**

Section – II

Q.4 Design a circular ESR by assuming top slab simply supported at edges, vertical walls top free and bottom fixed. The bottom slab is supported by beams resting on four peripheral columns. The capacity of ESR is 50,000 litres. Use IS code method for design. The depth of water may be kept as 3.2 m with free board 0.3m. Use M_{25} grade of concrete and Fe_{500} Steel. **18**

Q.5 **a)** Design a circular cylindrical bunker of capacity 300 kN to store coal using Use M_{25} grade of concrete and Fe_{500} Steel. Unit weight of coal 8 kN/m^3, angle of repose 25°. **14**
b) Draw a sketch of silo and show its components. **03**

Q.6 Design a chimney of height 70 m and check the stresses in bars. Use following data, External Diameter = 4 m at top and 4.5m at base, Shell thickness = 200 mm at top and 400 mm at base, Wind intensity = 1.6 kN/m^2 throughout, thickness of fire brick lining = 100 mm and air gap is 100 mm, Temperature difference = 70° C and coefficient of thermal expansion is 11 × 10^{-6} /C°, Es = 210 × 10^3 N/mm^2, Unit weight of brick lined = 20 kN/m^3. Use M_{25} grade of concrete and Fe_{500} Steel. **17**

SLR-GE-16

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
CIVIL - (STRUCTURAL ENGINEERING)
Advanced Design of Foundation (70710108)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

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

Section – I

Q.1 **a)** Write the assumptions and limitations of Terzaghi's analysis. **04**
b) Discuss the effect of ground water table on bearing capacity of soil. **04**
c) A square footing fails by general shear in a cohesionless soil under an ultimate load of $3000\ KN$. The footing is placed at a depth of $3m$ below ground level Take $\emptyset$=35°, $Nq = 41.4, N\gamma = 42.4\ and\ \gamma = 19\ KN/m^3$. Determine the size of the footing if the water table is at great depth. **05**

Q.2 **a)** Explain the procedure for the design rectangular combined footing. **05**
b) A trapezoidal footing is to be produced to support two square columns of $30cm$ and $50cm$ sides respectively. Columns are $6m$ apart and safe bearing capacity of the soil is $400\ KN/m^2$. The bigger column carries $5000\ KN$ and the smaller $3000\ KN$. Design a suitable size of the footing so that it does not extend beyond the faces of the column. **07**

Q.3 **a)** Explain under what circumstances raft foundation is adopted. **03**
b) Explain different design methods foe raft foundation. **07**

Section – II

Q.4 **a)** Write a note on negative skin friction. **04**
b) In a 16 pile group, the pile diameter is $450\ mm$ and centre to centre spacing of the Square group is $1.5\ m$. If $C = 50\ KN/m^2$, determine whethere the failure would occur with the pile acting individually or as a group? Neglect bearing at the trip of the pile. All piles are $10\ m$ long. Take $\propto = 0.7$ and factor of safety 2.5. Also find safe allowable load. **08**

Q.5 **a)** Explain pneumatic caission with neat sketch. Also explain the procedure for sinking. **06**
b) What do you understand by scour depth and grip length? What is its importance in well foundation? **05**

Q.6 **a)** Discuss the criteria for satisfactory performance of machine foundation. **05**
b) Explain design of simple machine foundations using IS code method. **07**

SLR-GE-18

Seat No.		Set	P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
FEM in Structural Engineering (70710201)

Day & Date: Thursday, 18-01-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) Solve any 5 questions from below.
2) Use of non-programable calculator is allowed.
3) Figures to the right indicate full marks.
4) Assume suitable data if required and mention clearly

Q.1 **a)** Explain the triangular elements Constant strain triangle (CST), Linear strain triangle (LST), Quadrilateral strain triangle (QST). **06**

b) Using Natural coordinate system, find the shape functions for 4 noded rectangular elements. **08**

Q.2 **a)** Using Lagrange polynomial find shape functions for **10**
1) Two noded bar element
2) Three noded bar element
3) Five noded bar element
Plot the variation of shape functions.

b) Explain serendipity family elements. **04**

Q.3 For the element shown in Figure 1, assemble Jacobian matrix and strain displacement matrix for the Gaussian point (0.57735, 0.57735). **14**

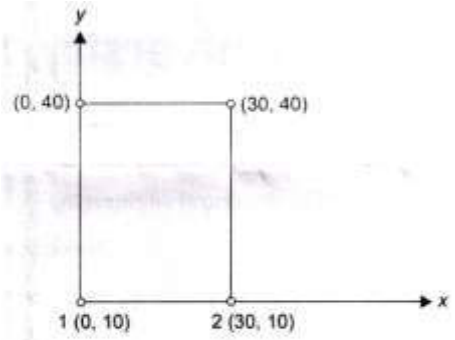


Figure 1

Q.4 Determine the nodal displacement, element stresses and support reactions of the axially loaded bar as shown in Figure 2 **14**
Take E = 200 GPa and P = 30 kN

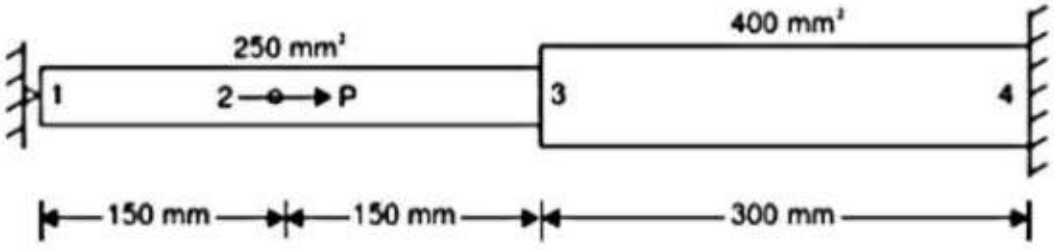


Figure 2

Q.5 Write short notes on. **14**

a) Uniqueness of mapping of iso parametric elements.
b) Jacobian matrix
c) Gaussian quadrature integration technique
d) Super parametric

Q.6 Explain the procedure to arrive stiffness matrix of rectangular plate bending element with 12 degrees of freedom. **14**

Q.7 **a)** What is axis symmetric problem, explain with various examples? **06**

b) Write short notes on the following shell elements. **08**

1) Facet elements
2) Curved elements
3) Solid elements
4) Degenerated elements

SLR-GE-19

Seat No.		Set	P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Theory of plates and shells (70710202)

Day & Date: Saturday, 06-01-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) Section-I Q.1 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Assume suitable data, if required and mention it clearly.

Section – I

Q.1 **a)** Write a note on following types of theories of plates. **07**
1) Thin plates with small deflections.
2) Thin plates with large deflections.
3) Thick plates.

b) Derive differential equation for the deflection surface of laterally loaded rectangular plates. **11**

Q.2 **a)** Write a note on different boundary conditions for rectangular plates. **05**

b) Using Nevier's solution obtain expression for deflection of a simply supported plate subjected to UDL. **12**

Q.3 **a)** Describe Rayleigh-Ritz approach for analysis of plates. **05**

b) Analyse a circular plate of radius 'a' supported throughout along its outer edge and subject to uniform moment M. **12**

Section – II

Q.4 **a)** Draw a neat sketch of cylindrical shell roof and mention its parts. **07**

b) Obtain equations of equilibrium for cylindrical shells using membrane theory. **11**

Q.5 **a)** Describe beam theory of bending of shells. **07**

b) Write notes on: **10**
1) Finsterwalder's theory
2) D. K. J. theory

Q.6 **a)** Explain Pucher's function and its use. **07**

b) Describe thermal stresses in plates and shells. **10**

SLR-GE-20

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Seismic Design of Multistoried Buildings (70710203)

Day & Date: Monday, 08-01-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory.
2) Solve any one question from each Section.
3) Figures to the right indicates full marks.
4) Assume suitable data if necessary and state it clearly.
5) Use of IS 1893 is permitted.

Section – I

Q.1 **a)** Write a note on Earthquake Terminology. **05**
b) What do you understand by Intensity and Magnitude of Earthquake? **06**
c) Explain the concept of soil liquefaction. **06**

Q.2 **a)** State and explain the concept of response spectrum & various types of Response Spectra. **10**
b) What is combined spectrum? What are its characteristics? **07**

Q.3 Explain in detail principles of earthquake resistant building. Also explain strong column and weak beam concept in details. **18**

Section – II

Q.4 What do you understand by a soft storey? How will you reduce failure in soft storey? What are the general code provisions for design of soft storey? **17**

Q.5 Explain Seismic response control concepts in details with all types. **17**

Q.6 It is proposed to construct a R.C.C. four storied commercial building having plan dimensions as shown in Fig. 1 in zone III with following data. Determine the lateral forces and base shear. The all-column sizes are 250 x 450 mm and beams sizes are 250 x 450 mm. The slab thickness is 140 mm and thickness of walls is 230 mm. The height of floor is 3.2 m and live load is 3.0 kN/m^2. IS 13920 will be used. The strata is hard. **18**

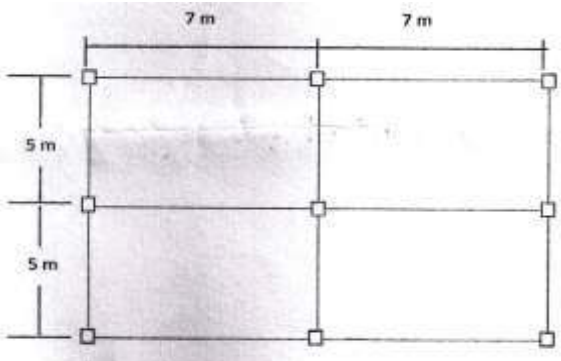


Figure 1 Q.6

SLR-GE-23

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Concrete Composites (70710208)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

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

Section – I

Q.1	**a)**	What is the different workability tests used for Fibre Reinforced Concrete? Explain any one in detail.	**09**
	b)	What are the mechanical properties of materials used in Ferro cement concrete?	**09**
Q.2	**a)**	What are the applications of Ferro cement concrete?	**06**
	b)	What are the differences between Fibre Reinforced Concrete and Ferro cement concrete?	**06**
	c)	Explain applications of Fibre reinforced concrete.	**06**
Q.3	**a)**	Explains the Mix proportion of FRC? Explains the properties of freshly mixed concrete of FRC.	**06**
	b)	Explains the Advantages and Disadvantages of Ferro cement?	**06**
	c)	Enlist different methods of construction of Ferro cement concrete. Explain any one in detail.	**06**

Section – II

Q.4	**a)**	State the applications of Silica Fume Concrete.	**09**
	b)	Explain the comparison of important properties of normal concrete with those of polymer concrete.	**08**
Q.5	**a)**	Write on Classification of polymer concrete.	**06**
	b)	Explain properties of constituent materials of Polymer Concrete.	**05**
	c)	Write a note on Application of Polymer concrete.	**06**
Q.6	What is Silica Fume Concrete and explain in detail its properties with respect to		
	a)	Physical properties.	**06**
	b)	Properties of fresh concrete.	**06**
	c)	Durability of concrete.	**05**

SLR-GE-26

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Design of RCC Bridges (70710211)

Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) Section – I Q.2 is compulsory attempt any two questions from the remaining and section – II Q.5 is compulsory attempt any two from the remaining.
2) Figure to the right indicate full Marks.
3) Assume suitable data is necessary and mention it clearly.

Section – I

Q.1 Answer the following: (Any 3) **12**
- **a)** Write a note on Courbon's theory. And discuss its limitations.
- **b)** What is economic span? How it is calculated? Derive equation for the same.
- **c)** Explain IRC Class AA loading with neat sketch.
- **d)** Discuss the importance of bridges.

Q.2 Design a deck slab for following details: **11**
- **a)** Clear span – 8m
- **b)** Kerb 600×250 mm
- **c)** Wearing coat – 80 mm thick
- **d)** Loading – IRC Class A
- **e)** Material – M25 concrete, Fe 415 steel
- **f)** α 2.60

Q.3 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. Determine the Design bending moment for all the longitudinal girders. Use following additional data, **12**
- **a)** Carriage way width -9 m
- **b)** Span of bridge -18 m
- **c)** Live Load - IRC class A Two Lane
- **d)** Kerb - 600 mm wide, 400 mm deep
- **e)** Web thickness for Longitudinal and cross girder- 300 mm
- **f)** Longitudinal Girder spacing -3m
- **g)** Use M-30 concrete and Fe -415 steel

Q.4 Write the following. **12**
- **a)** Write a note on Components of bridges.
- **b)** Describe the effective width method of analysis of deck slab.
- **c)** Write a note on breaking forces on bridge.

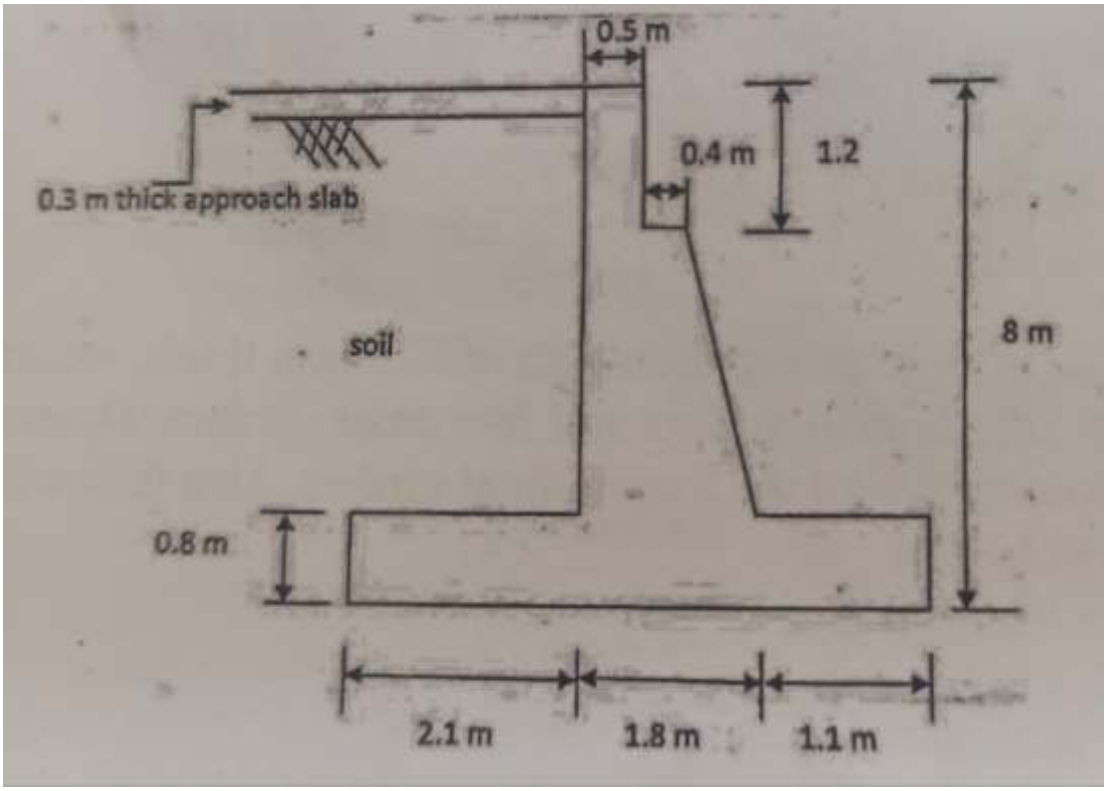
Section – II

Q.5 Verify the adequacy of pier for following data: **11**
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 structure - 200 KN/m, Maximum mean velocity of current - 3.6 m/sec, Material for pier: M20 grade concrete, Live load: IRC Class AA tracked.

Q.6 **Write a note on following. (Any three)** **12**

a) Importance of bridge expansion.
b) Reinforced earth abutment.
c) Types of Expansion joints.
d) Forces on pier.

Q.7 **Verify the stability of abutment shown in fig. Use the following data.** **12**
Material of abutment - Concrete M20
Density of the soil - 17 KN/m^3
Coefficient of friction - 0.6
Angle of friction (Φ) - 30°
Live load - IRC Class AA (Tracked)
Span of bridge -18m
Angle of friction between soil & concrete δ18°



Q.8 **a)** Design a elastomeric unreinforced bearing pad for following data. **07**
Vertical load (sustained) 178 KN
Vertical load (dynamic) 58 KN
Horizontal force (H) 90 KN
Modulus of rigidity of elastomer (G) 1.1 N/mm^2
Friction coefficient 0.4

b) Write about Erection methods for Bridges. **05**

SLR-GE-29

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Business Analytics (70710305)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining. Question no. 6 is compulsory in section II, and solve any one question from the remaining.
2) Figures to the right indicate full marks.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section I

Q.1 Attempt any two of the following.

a) What do you mean by Business Analytics? Explain the relation of Business Analytics process and Organization decision making process. **09**

b) Describe any three approaches for visualizing data. **08**

Q.2 a) What is Dimension Reduction. Elaborate the process of converting a Categorical Variable to a Numerical Variable. **09**

b) Explain in detail classification and prediction in data mining. **08**

Q.3 Write short notes on (any three) **18**

a) Business Analytics Process
b) Recommendation system using association rule mining
c) Manipulations in data visualization.
d) Curse of dimensionality

Section II

Q.4 a) Explain the method for Evaluating Predictive Performance in detail. **09**

b) Describe the Regression Equation and Prediction. **08**

Q.5 a) Explain in detail the Tree Structure and how to evaluate the Performance of a Classification Tree. **09**

b) Explain feature selection for clustering in detail. **08**

Q.6 Write short notes on (any three) **18**

a) Advantages and Weaknesses of a Tree
b) Reducing the Number of Predictors
c) Confusion Matrix
d) K-means algorithm

SLR-GE-30

Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Operation Research (70710306)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining.
2) Question no. 5 is compulsory in section II, and solve any one question from the remaining.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Briefly discuss 'duality' in linear programming. **05**

b) Max $Z = 3x + 5y$ **12**
Subject to
i) $3x + 2y \leq 18$
ii) $x \leq 4$
iii) $y \leq 6$
and $x, y \geq 0$

Q.2 **a)** Explain the term artificial variables and its use in linear programming. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
$Z = 40x_1 + 25x_2 + 50x_3$
Subject to
i) $x_1 + x_2 + x_3 \leq 36$
ii) $2x_1 + x_2 + 4x_3 \leq 60$
iii) $2x_1 + 5x_2 + 4x_3 \leq 45$
and $x_1, x_2, x_3 \geq 0$

Q.3 **a)** What are the characteristics of the Queuing System? **05**

b) Discuss the fields of application for queuing theory. Explain queue discipline and its various forms. **05**

c) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find out: **08**
i) Average queue length
ii) Average time spent in the system
iii) Probability that there would be two customers in the queue

Section – II

Q.4 **a)** Explain Selective Inventory management techniques. **05**

b) Explain the various costs associated with Inventory. **04**

c) The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 36 and the cost of carrying inventory is 25 per cent of the investment in the inventories. The price is Rs 10 per kg. Help the purchase manager to determine an ordering policy for raw material. **08**

Q.5 **a)** What are situations that make the replacement of items necessary? **04**

b) Write a note on Group Replacement Policy. **04**

c) A truck owner finds, from his past records, that the maintenance costs per year of a truck whose purchase price is Rs 8,000 are as given below: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	1000	1300	1700	2000	2900	3800	4800	6000
Resale Price	4000	2000	1200	600	500	400	400	400

Determine what time would it be profitable to replace the truck.

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. **12**

Activity (i-j)	Estimated Duration (weeks)	Immediate predecessor
A	5	-
B	7	A
C	2	B
D	3	B
E	1	C
F	2	D
G	1	C
H	3	E, F
I	10	G, H

i) Draw the network, find the critical path, the expected project completion time.

ii) What is the minimum completion time for the project?

b) What are situations that make the replacement of items necessary? **05**

SLR-GE-31

Seat No.		Set	P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Cost Management of Engineering Projects (70710307)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 & 5 are compulsory.
2) Solve any two questions out of remaining 3 questions from each section.
2) Figure to the right Indicate full marks.
3) Assume necessary suitable data if required.

Section – I

Q.1	**a)**	What is Cost Estimating? State the objective of cost estimating.	**06**
	b)	Differentiate between costing and cost estimating and value analysis.	**05**
Q.2	**a)**	Explain in brief various elements of cost with one example.	**06**
	b)	Differentiate between fixed and variable cost.	**06**
Q.3	**a)**	Progress measurement and earned value	**06**
	b)	Two third technique of duration estimate of proposed project.	**06**
Q.4	**a)**	List various items which constitute the overhead expenses.	**06**
	b)	Explain in brief difference between cost, value and price with one example.	**06**

Section – II

Q.5	**a)**	What is the relation between Phases of project, life cycle and cost escalation?	**06**
	b)	Explain in brief feed forward techniques used in cost management.	**05**
Q.6	**a)**	What do you understand about integrated cost management programme? Explains with one example.	**06**
	b)	Explain with one example value engineering concept. Why there is need of value analysis?	**06**
Q.7	**Write detailed notes on.**		**12**
	a)	Earned Value Management	
	b)	Relationship between project. Cost, Value and Risk	
Q.8	**a)**	Why there is need for value management in project? Explain with one example.	**06**
	b)	Write detail note on - causes of changes in project	**06**

SLR-GE-32

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
CIVIL – (STRUCTURES ENGINEERING)
Non conventional Energy (70710308)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

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

Section I

Q.1 Attempt any two of the following. **14**
- **a)** Explain Conventional energy, sources with their advantages and disadvantages?
- **b)** Explain the Indian Power scenario for hydroelectric power potential?
- **c)** Explain the necessity of energy storage. What are the methods of energy Storage?

Q.2 What is Solar Collector? Compare concentrating and Non-Concentrating type Solar Collectors. **07**

Q.3 Attempt any two of the following. **14**
- **a)** Explain the hot air industrial process solar heating system with a neat sketch.
- **b)** What are the emerging new technologies for energy conservation and efficiency?
- **c)** Explain thermal energy storage with sensible heat storage and latent heat storage?

Section II

Q.4 Attempt any two of the following. **14**
- **a)** Describe the classification of Solar Cells based on the type of active material used?
- **b)** Explain the Solar PV array and how Solar PV output is maximized?
- **c)** What are the different modes of wind power generation? Explain stand-alone Mode of wind power generation?

Q.5 Attempt any one of the following. **07**
- **a)** What are the desirable features of the wind turbine siting?
- **b)** Explain the advantages of Biomass energy in detail?

Q.6 Attempt any two of the following. **14**
- **a)** Giving classification of fuel cells, explain its potential applications.
- **b)** Explain the Municipal Solid Waste (MSW) incineration plant?
- **c)** Explain with neat sketch Fuel Cell Power Plant.

SLR-GE-33

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Advanced stress analysis (MTDE101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Question no. 1 is compulsory in section I, and solve any one questions.
2) from the remaining Figures to the right indicate full marks.
3) Make suitable assumptions if necessary and state them clearly.
4) Use of non-programmable calculators is allowed.

Section-I

Q.1 Solve the following questions.

a) Describe the necessity of plane stress and plane strain. Explain with suitable examples. **04**

b) Derive the differential equations of equilibrium in case of plane stress conditions in the Cartesian coordinate system. **07**

c) Investigate that problem-can be solved by the stress function $'\phi'$ applied to the region included by $y = \pm C, x = 0$ to $x = l$. Evaluate the stress values. **07**

$$\Phi = \frac{3F}{4C}\left[xy - \frac{xy^3}{3C^2}\right] + \frac{P}{2}y^2$$

Q.2 Solve the following questions.

a) Derive the stresses in a rotating disk of uniform thickness having a central circular hole. **09**

b) Develop equilibrium equation in polar coordinates for plane stress problem. **08**

Q.3 Solve the following questions.

a) Derive the relation between elastic modulus and poisson's ratio. **04**

b) Discuss with usual notations, the strain components in the polar coordinate system. **05**

c) Discuss the polynomial equation and its significance in solving the problems in elasticity. **04**

d) Explain the role of Saint Venant's Principle in theory of elasticity with suitable examples. **04**

Seat No.	

Set **P**

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Advanced stress analysis (MTDE101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Question no. 4 is compulsory in section II, and solve any one questions from the remaining.
2) Make necessary assumptions if required.
3) Figures to the right indicate full marks.

Section-II

Q.4 **a)** Explain the procedure used to locate the shear center. **06**
b) Determine position of the shear center of the section of a beam shown in Fig.I. **12**

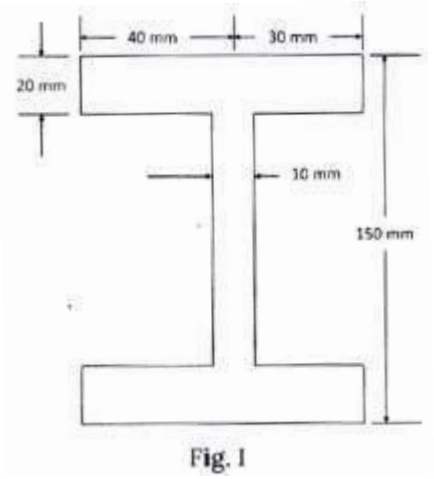


Fig. I

Q.5 **a)** Explain the soap film analogy. **05**
b) Derive the expression for torque and angle of twist for a prismatic bar having an elliptical cross section. **12**

Q.6 **a)** Explain contact stresses and its significance. **05**
b) Derive the expression for pressure and area of contact in case of two cylinders with parallel axes. **12**

SLR-GE-34

Seat No.	

Set P

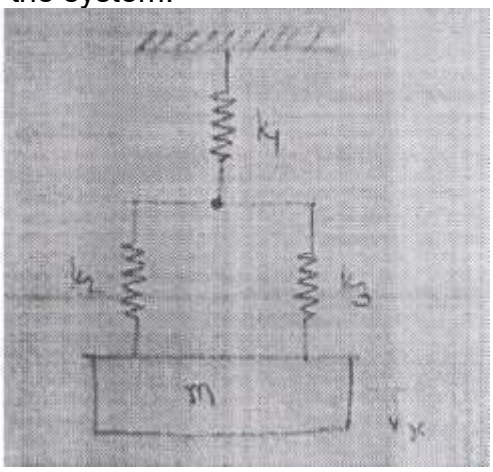
F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL - (DESIGN ENGINEERING)
Advanced Vibrations and Acoustics (MTDE102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Solve any five questions.
2) Figures to the right indicate full marks.
3) Assume necessary suitable data, if required.

Q.1 **a)** Explain forced vibrations with constant harmonic excitation for a single degree of system with damper. What are steady state vibrations and transient vibrations? **07**

b) A mass is suspended from a spring system as shown in figure. Determine natural frequency of the system. **07**



K1= 6000N/m, K2=K3= 7000 N/m, m= 25 Kg

Q.2 **a)** Derive equation of motion transverse vibration of a string. **07**

b) Derive an equation for the response of a damped system subjected to an impulsive input. **07**

Q.3 **a)** Explain principal of dynamic vibration absorber & also explain demerits of it. **07**

b) Write a note on forced vibrations with nonlinear spring forces. **07**

Q.4 **a)** What is Co-ordinate coupling? Explain only dynamic Coupling. **07**

b) Write note on longitudinal Vibrations of a bar (a continuous system). **07**

Q.5 **a)** Explain power spectrum & power. **07**

b) Explain time and frequency domain analysis with suitable example. **07**

Q.6 **a)** Explain the construction and working of Frahm's reed tachometer. **07**

b) Write note on Sound Fields. **07**

SLR-GE-35

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Industrial Instrumentation (MTDE103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Section-I Q.1 and Q.4 are compulsory. Attempt any one question from the remaining.
2) Section-II Q.5 and Q.8 are compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Draw neat sketches wherever necessary.

Section – I

Q.1 **a)** Explain typical applications of instrument systems. **06**
b) Define Resolution, Dead band, Repeatability, back lash, drift and linearity characteristics of the measuring instruments. **06**

Q.2 **a)** Explain use of filters in the instruments. **05**
b) Explain Electromagnetic and Eddy current transducer with neat sketch. **06**

Q.3 **a)** Explain with neat sketch Mc Leod Gauge. **05**
b) Explain with neat sketch absorption Dynamometer. **06**

Q.4 **Write short notes on (Any Three)** **12**
a) Hydraulic Load Cell
b) Zoionisation gauge
c) Magnetostrictive transducer
d) Strain gauge torque transducer

Section – II

Q.5 **a)** Explain principle and working of bimetal helix thermometer. **06**
b) Explain a seismic instrument for vibration measurement. **06**

Q.6 **a)** Explain system analysis by transient testing. **06**
b) Explain wear behavior monitoring. **05**

Q.7 **a)** Explain Frequency system analysis by harmonic testing. **06**
b) Explain Hot wire anemometer with neat sketch. **05**

Q.8 **Write short notes on. (Any Three)** **12**
a) Capacitor Microphone
b) Data display and Storage
c) Thermistors
d) Dead weight pressure gauge

SLR-GE-36

Seat No.		Set	P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL - (DESIGN ENGINEERING)
Computational Techniques in Design Engineering (MTDE106)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 and Q. No. 4 are compulsory.
2) Solve any one question from remaining questions of each section.
3) Figures to the right indicates full marks.
4) Assume suitable data, if required and mention it clearly.
5) Use of non-programmable calculator is allowed.

Section – I

Q.1 **a)** The following table gives the relation between steam pressure and temperature. Find the pressure at temperature 375 Degree: **06**

Temp:	361°	367°	378°	387°	399°
Pressure:	154.9	167.9	191	212.5	244.2

b) Explain use of mathematical modeling in engineering research. **06**

c) Apply the Gauss-Seidal iteration method to solve the equations: **06**

$5x_1 - x_2 + x_3 = 10$
$2x_1 + 8x_2 - x_3 = 11$
$-x_1 + x_2 + 4x_3 = 3$

Q.2 **a)** Find the distance moved by a particle and its acceleration at the end of 4 seconds, if the time verses velocity data is as follows: **09**

t:	0	1	3	4
v:	21	15	12	10

b) The pressure and volume of a gas are related by the equation $pV^{\gamma} = k$, γ and k being constants. Fit this equation to the following set of observations: **08**

$p(\text{kg/cm}^2)$:	0.5	1.0	1.5	2.0	2.5	3.0
$V(\text{liters})$:	1.62	1.00	0.75	0.62	0.52	0.46

Q.3 **a)** Find the Absolute error if the number. **05**
X = 0.00545828 is
1) Truncated to three decimal digits
2) Rounded off to three decimal digits

b) Obtain by the power method, the numerically dominant eigenvalue and eigenvector of the matrix. **06**

$$A = \begin{pmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$

c) The weight of a calf taken at end of every month is given below. Fit a straight line using the method of least squares. Also compute monthly growth rate. **06**

x	1	2	3	4	5	6	7	8	9	10
y	52.5	58.7	65.0	70.2	75.4	81.1	87.2	95.5	102.2	108.4

Section – II

Q.4 **a)** The velocity $v(\text{km/min})$ of a moped which starts from rest, is given at fixed intervals of time $t(\text{min})$ as follows: **06**

t:	2	4	6	8	10	12	14	16	18	20
v:	10	18	25	29	32	20	11	5	2	0

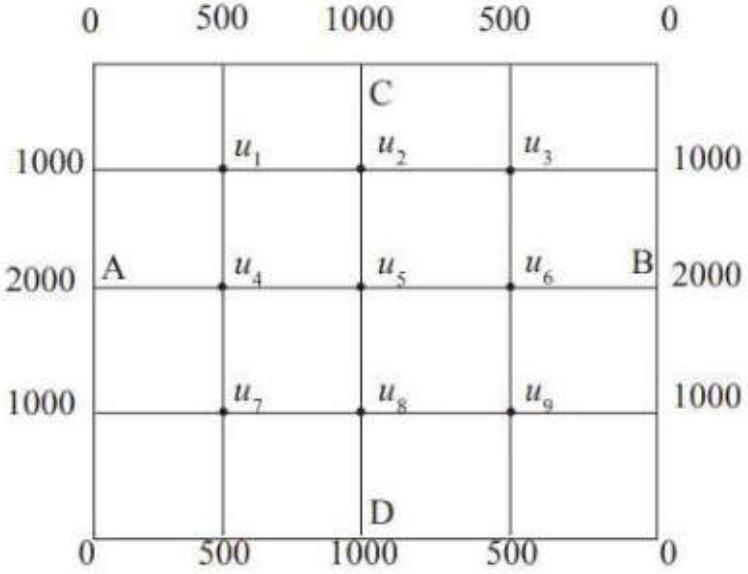
Estimate approximately the distance covered in 20 minutes

b) Using Modified Euler's method, find $y(0.2)$ for given **06**

$$y' = y + e^x, y(0) = 0$$

c) Find the value of $u(x,t)$ satisfying the parabolic equation $\frac{\partial u}{\partial t} = 4\frac{\partial^2 u}{\partial x^2}$ and the boundary conditions $u\,(0,t) = 0 = u(8,t)$ and $u(x,0) = 4x - (1/2)x^2$ at the points $x = i: i = 0,1,2,\ldots,7$ and $t = 1/8\, j: j = 0,1,2,\ldots,5$ **06**

Q.5 **a)** Solve the elliptic equation $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary values as shown in Figure 11.6. **09**



b) Use Romberg's method to compute $\int_0^1 \frac{dx}{1+x^2}$ correct to 4 decimal places. **08**

Q.6 **a)** Evaluate $\int_{0.2}^{1.5} e^{-x^2}\, dx$ using the 3-point Gaussian quadrature. **05**

b) Using the Runge-Kutta method of fourth order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2, 0.4$ **06**

c) Using Milne's method find $y(4.5)$ given $5xy' + y^2 - 2 = 0$ given $y(4) = 1$, $y(4.1) = 1.0049$, $y(4.2) = 1.0097$, $y(4.3) = 1.0143$; $y(4.4) = 1.0187$. **06**

SLR-GE-38

Seat No.		Set	P

F.Y (M. Tech.) (Sem- I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Mechanical System Design (MTDE108)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Section-I Q.1 and Q. 4 are compulsory. Attempt any one question from the remaining questions.
2) Section-II Q.5 and Q. 8 are compulsory. Attempt any one questions from the remaining questions.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if necessary.

Section – I

Q.1 **a)** Explain briefly compound ray diagram of multi speed machine tool gear box. **06**
b) Explain the general guidelines in developing kinematic or gearing diagram for the multispeed gear box. **06**

Q.2 **a)** Explain concept of frequency distribution. **05**
b) Explain concept of normal distribution. **06**

Q.3 **a)** Explain basic principles of material handling. **05**
b) Explain analysis of power requirement of belt conveyor. **06**

Q.4 **Write short note on.** **12**
a) Difference between structural diagram and speed diagram.
b) Design for natural tolerances.
c) Relationship of material handling with other departments.

Section – II

Q.5 **a)** Explain concept of cylinder liner with neat sketch. Also, write advantages and materials used for cylinder liner. **06**
b) Explain design procedure for piston rings. **06**

Q.6 **a)** Derive Lame's equation to determine thickness of pressure vessel. **05**
b) Explain with neat sketch pressure vessel supports **06**

Q.7 **a)** Explain Johnson's method of optimum design. **05**
b) Explain design considerations for castings. **06**

Q.8 **Write short note on.** **12**
a) Modes of failure in pressure vessels
b) Design of piston
c) Design for machining

SLR-GE-40

Seat No.		Set	P

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Research Methodology and IPR (MTDE104)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Question No. 3 is compulsory in section I, and solve any one question from the remaining. Question No. 6 is compulsory in section II, and solve any one question from the remaining.
2) Figures to the right indicate full marks.
3) Make suitable assumptions if required.

Section-I

Q.1	**a)**	What is research? Explain in detail the steps involved in research with flow chart.	**09**
	b)	What are different types of research? Explain any two with suitable examples.	**08**
Q.2	**a)**	What is literature review in research? Explain its importance and methods.	**09**
	b)	What is research design? Explain research design process.	**08**
Q.3		**Write short notes on (any three)**	**18**
	a)	Error in research	
	b)	selection of samples	
	c)	Creative problem solving method	
	d)	Types of data	

Section-II

Q.4	**a)**	Explain Process of Patenting & Development.	**08**
	b)	Explain Procedure for grants of patents	**09**
Q.5	**a)**	What is Geographical Indications? Explain with suitable examples.	**09**
	b)	Explain IPR of Biological Systems	**08**
Q.6		**Write short notes on (any three)**	**18**
	a)	Trade and Copyright.	
	b)	International Scenario on Intellectual Property.	
	c)	Scope of Patent Rights.	
	d)	Administration of Patent System.	

SLR-GE-41

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL DESIGN ENGINEERING
Advanced Stress Analysis (7072101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Section-I Q.2 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.4 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Make suitable assumptions if necessary and state it clearly.
5) Use of non-programmable calculator is allowed.

Section – I

Q.1 Solve the following questions.

a) Explain plane stress and plane strain with suitable examples. **03**

b) Derive the differential equations of equilibrium in case of plane stress condition in Cartesian coordinate system. **07**

c) Investigate what problem-can be solved by the stress function 'ϕ' applied to the region included by $y = \pm C, x = 0 \; to \; x = 1$ **07**

$$\phi = \frac{3F}{4C}\left[xy - \frac{xy^3}{3C^2}\right] + \frac{P}{2}y^2$$

Q.2 Solve the following questions.

a) Discuss with usual notations, the strain components in polar coordinate system. **05**

b) Derive the stresses in rotating disk of uniform thickness having central circular hole. **07**

c) Develop equilibrium equation in polar coordinates for plane stress problem. **06**

Q.3 Write short notes on.

a) Saint Venant's principle and its use in stress analysis. **04**

b) Relation between elastic modulus and poisons ration. **05**

c) Bending of a Cantilever beam loaded at the end. **08**

Section – II

Q.4 **a)** Explain principles used in finding the shear center. **06**

b) A channel section has flanges 14 cm and web 20 cm × 1 cm. Determine the shear center of the channel. **12**

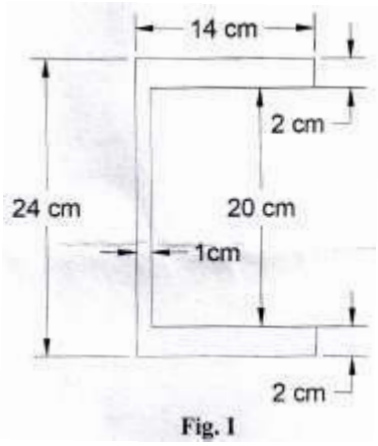


Fig. I

Q.5 **a)** Explain the soap film analogy. **05**

b) Derive the expression for torque and angle of twist for a prismatic bar having an elliptical cross section. **12**

Q.6 **a)** Explain in detail the basic assumptions made in theory of contact stresses and its significance. **05**

b) Derive the expression for area of contact and pressure distribution in case of contact between two spheres. **12**

SLR-GE-42

Seat No.	

Set P

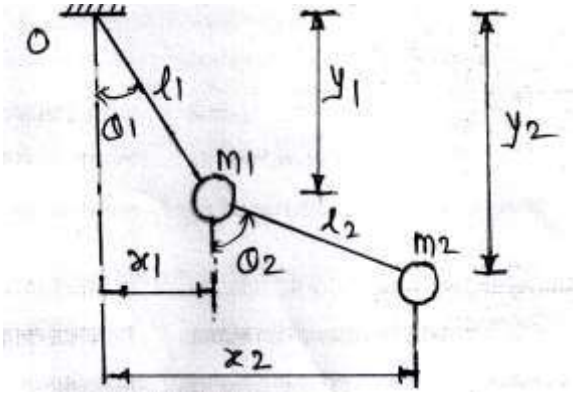
F.Y. (M. Tech) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL - (DESIGN ENGINEERING)
Advanced Vibrations and Acoustics (7072102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Solve any five questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and state it clearly.

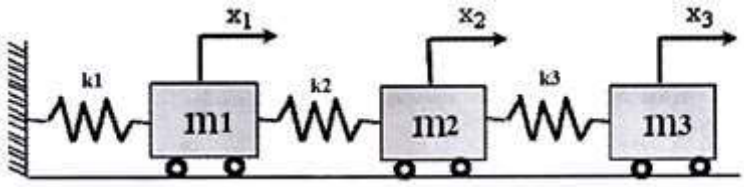
Q.1 **a)** Explain in brief vibration of damped system and Why damping is considered in neighborhood of resonance in most of cases? **07**

b) Figure shows a double pendulum. Assuming small amplitudes and $m1 = m2 = m, l1 = l2 = l$ and using the coordinates $x1$ and $x2$. Obtain: **07**
1) Different equation of motion
2) Natural frequencies
3) Mode shapes



Q.2 **a)** Explain principal of dynamic vibration absorber & Also explain demerits of it. **07**

b) Three rail bogies are connected by two springs of stiffness $k2$ and $k3\ N/m$ each. The mass of each bogey is $m1 = m, m2 = 2m, m3 = 3m.$ Determine the frequencies of vibration. Neglect friction between the wheels and rails. Take $k1 = k, k2 = 2k, k3 = 3k.$ **07**



Q.3 **a)** Explain Lagrange's method for deriving the differential equations for two degree of freedom conservative system. **07**

b) Explain Holzer method to find natural frequency of multi degree freedom system with suitable example. **07**

Q.4	**a)**	Discuss the Rayleigh's method, to obtain fundamental natural frequency of vibration of a multi-degree of freedom system, with suitable example.	**07**
	b)	Derive the governing differential equation of transverse vibrations of beam in a continuous system.	**07**
Q.5	**a)**	Explain principal of superposition in Nonlinear vibration and brief about nature of nonlinearity for simple pendulum.	**07**
	b)	Explain in brief various acceleration, frequency and velocity measurement devices.	**07**
Q.6	**a)**	Explain Duffing equation to obtain the solution of forced vibration with nonlinear spring.	**07**
	b)	Explain in brief experimental model analysis with suitable example.	**07**
Q.7	**a)**	What do you mean by 'dB scale'? Explain it in detail with examples.	**07**
	b)	Explain the term random vibration and state the terms time averaging and expected value in random vibrations.	**07**

SLR-GE-43

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Industrial Instrumentation (7072103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q.no.1 & Q.no.4 are compulsory. Attempt any one question from remaining in section-I.
2) Q.no.5 & Q.no.8 are compulsory. Attempt any one question from remaining in section-II.
4) Figures to the right indicate full marks.
5) Draw neat sketches Wherever necessary.

Section – I

Q.1 **a)** Describe various types of standards of calibration of the instruments. **06**
b) Explain fidelity, dead time, dead zone and measurement lag of the instruments. **06**

Q.2 **a)** Explain with neat sketch successive approximation type A-D converter. **06**
b) Explain with neat sketch Mechano-electronic transducer. **05**

Q.3 **a)** Explain Pneumatic Load Cell with neat sketch. **05**
b) Explain with neat sketch Electromagnetic flow meter. **06**

Q.4 **Write short notes on (Any Three)** **12**
a) Photo emissive and photo conductive transducer.
b) Vibrating string transducer.
c) Counting type A-D converter.
d) Strain gauge torque transducer.

Section – II

Q.5 **a)** Explain LVDT type pressure transducer. **06**
b) Explain with neat sketch Ultrasonic flow meter. **06**

Q.6 **a)** Explain Fourier Transform Analyser with neat sketch. **05**
b) Explain selective radiation pyrometer with neat sketch. **06**

Q.7 **a)** Explain with neat sketch Resistance Temperature Detectors. **06**
b) Explain with neat sketch sound level meter. **05**

Q.8 **Write short notes on. (Any Three)** **12**
a) Data Acquisition System.
b) Frequency response characteristics by Transient Testing.
c) Atomic Emission spectrometer.
d) Electrodynamic micro-phone.

SLR-GE-44

Seat No.		Set	P

F.Y. (M.Tech.) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Research Methodology and IPR © (7072104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. No.3 and Q. No. 6 are compulsory. Solve any one question remaining from each section
2) Figures to the right indicate full marks.
3) make suitable assumptions id required.

Section – I

Q.1 **a)** What is research? Explain in detail the steps involved in research process with flow chart. **09**
b) What are different types of research? Explain any one with suitable examples. **08**

Q.2 **a)** What is literature review in research? Explain its importance and methods. **09**
b) What is research design? Explain research design process. **08**

Q.3 **Write Short note (any three)** **18**
a) Brain storming
b) Problem Solving – Types
c) Creative problem solving method.
d) Development of Creativity.

Section – II

Q.4 **a)** Explain Procedure for grants of patents. **08**
b) Explain Patents, Designs, Trade and Copyright. **09**

Q.5 **a)** What is Licensing and transfer of technology? **09**
b) Give the significance of Geographical Indications. **08**

Q.6 **Write Short note (any three)** **18**
a) New developments in IPR.
b) IPR of Biological Systems.
c) Patent information and databases.
d) International Scenario International cooperation on Intellectual Property.

SLR-GE-45

Seat No.		Set	P

F.Y. (M.Tech) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Computational Techniques in Design Engineering (7072106)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Section - I Q.1 is compulsory. Attempt any one question from the remaining.
2) Section - II Q.4 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Use to calculator is allowed.
5) Assume suitable data if necessary.

Section – I

Q.1 **a)** Find the absolute error if the number X = 0.00545828 is **06**
i) Truncated to three decimal digits
ii) Rounded off to three decimal digits

b) The pressure and volume of a gas are related by the equation $pV^Y = k, Y$ and k being constants, Fit this equation to the following set of observations: **06**

P (Kg/cm^2	0.5	1.0	1.5	2.0	2.5	3,0
V (Liters):	1.62	1.00	0.75	0.62	0.52	0.46

c) Using Gauss-Elimination method, solve the system: **06**
3.15x -1.96y +3.85z= 12.95
2.13x +5.12y -2.89z = -8.61
5.92x +3.05y +2.15z = 6.88

Q.2 **a)** Fit a curve of the form $y = ae^{bx}$ for the following data **05**

X:	0	1	2	3
Y:	1.05	2.10	3.85	8.30

b) A slider in a machine moves along a fixed straight rod. Its distance x cm. along the rod is given below for various value of the time t seconds. Find the velocity of the slider and its acceleration when t = 0.3 second. **07**

t=	0	0.1	0.2	0.3	0.4	0.5	0.6
X=	30.13	31.62	32.87	33.64	33.95	33.81	33.24

c) Find the largest eigen value and the corresponding eigen vector of the matrix. **05**

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

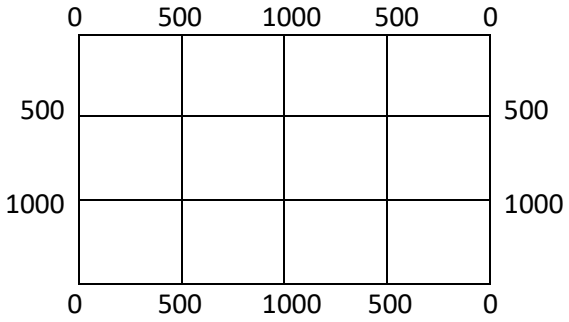
Q.3 **a)** Find the missing term in the following table using interpolation: **08**

x	0	1	2	3	4
y	1	3	9	--	81

b) Solve the following equations by factorization method. **09**
3x+2y+7z=4
2x+3y+z=5
3x+4y+z+7

Section – II

Q.4 **a)** Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary values as shown in the figure below. **12**



b) Using Picard's Method, obtain a solution upto fifth approximation of the equation $\frac{dy}{dx} = y + x$, such that $y = 1$ when $x = 0$. **06**

Q.5 **a)** Using Romberg's method, compute $\int_0^1 \frac{dx}{1+x^2}$ correct to 4 decimal places. **05**

b) Using the finite difference method find $y(0.25), y(0.5)$ and $y(0.75)$ satisfying the differential equation $\frac{d^2y}{dx^2} + y = x,$ subject to the boundary conditions $y(0) = 0, y(1) = 2$. **07**

c) Explain standard form of hyperbolic equation. **05**

Q.6 **a)** Given $\frac{dy}{dx} = \frac{y-x}{y+x}$ with initial condition $y = 1$ at $x = 0$, find y for$x = 0.1$ by Euler's method. Divide into five steps. **06**

b) Apply Runge-Kutta fourth order method to find the approximate value of y for $x = 0.2$, given that $\frac{dy}{dx} = x + y$ and $y = 1$ where $x = 0$. **05**

c) Given $\frac{dy}{dx} = x^2(1 + y)$ and $y(1), y(1.1) = 1.233, y(1.2) = 1.548,$ $y(1.3) = 1.979$, evaluate $y(1.4)$ by the Admas-Bashforth method. **06**

SLR-GE-47

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Mechanical System Design (7072108)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Section-I Q.1 and Q.4 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.5 and Q.8 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Draw neat sketches wherever necessary.
5) Use of non-programmable calculator is allowed.

Section – I

Q.1	**a)**	Explain different types of systems based on characteristics in mechanical system design.	**06**
	b)	Explain the terms Need statement and Nature of Engineering Problem.	**06**
Q.2	**a)**	Explain Black Box Approach for system analysis and design.	**05**
	b)	Explain different types of models for mechanical system design.	**06**
Q.3	**a)**	Explain graph modelling and analysis process.	**05**
	b)	Explain the role of models in engineering design.	**06**
Q.4	**a)**	Explain different applications of systems concepts in engineering.	**06**
	b)	Explain system analysis view point and techniques in system analysis.	**06**

Section – II

Q.5	**a)**	Explain model with one decision variable optimization.	**06**
	b)	Explain advantages and limitations of decision tree approach.	**06**
Q.6	**a)**	Explain time value of money.	**06**
	b)	Distinguish between goal, objectives and criteria.	**05**
Q.7	**a)**	Explain what is meant by simulation concept.	**06**
	b)	There are 4 machines. The probability that a machine is in operation at an arbitary time “t” is equal to 0.9. Find the probability that at a time “t” at least one machine is working.	**05**
Q.8	**a)**	Find the dimensions of a cylindrical tin with top and bottom made up of sheet metal to maximize its volume such that the total surface area is equal to $A_0 = 24\pi$.	**06**
	b)	What are the desirable features of simulation software.	**06**

SLR-GE-48

Seat No.		Set	P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
MECHANICAL - (DESIGN ENGINEERING)
Computer Aided Design (7072109)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. No. 3 and 6 are compulsory, solve any one from remaining questions from both sections.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1 **a)** Explain Types of systems and system considerations. **09**
b) Explain CAD Hardware and Software. **08**

Q.2 **a)** Explain geometric models (any 4). **09**
b) Explain Projections of geometric models. **08**

Q.3 **Write short notes on. (Any three)** **18**
a) Software's modules
b) Compare translational mapping and rotational mapping
c) curve manipulations
d) Surface representation

Section – II

Q.4 **a)** Explain Principle of networking, classification networks. **09**
b) Discuss Fundamentals of solid modelling. **08**

Q.5 **a)** What is Finite Element Analysis? Explain steps in FEA. **09**
b) Explain types of simulation approaches. **08**

Q.6 **Write short note on (Any Three)** **18**
a) Transmission media and interfaces.
b) Network operating systems.
c) Mass properties calculations.
d) Discrete and continuous systems.

SLR-GE-49

Seat No.		Set	P

F.Y. (M. Tech) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Finite Element Method (7072201)

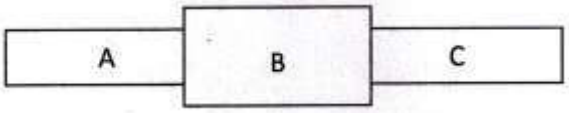
Day & Date: Thursday, 18-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Solve any five questions.
2) Figures to the right indicate full marks.
3) Make suitable assumptions if necessary and state them clearly.

Q.1 **a)** Explain the weighted residual method. **07**
b) What are different factors affecting the accuracy of finite element analysis. Briefly explain. **07**

Q.2 **a)** Write a note on software's in FEA and their applications. **07**
b) Explain the general procedure for finite element analysis. **07**

Q.3 **a)** Derive the element stiffness matrix for the following part loaded along the length with the configuration as described below. **07**



Bar A, B and C have the diameters d_1 d_2, d_1, respectively and the lengths as 1_1, 1_2, 1_1 respectively. Consider the Young's moduli E_1 E_2, E_1 having same values for bars A and C.

b) Obtain solution of differential equation by using the Least Square method. **07**

$$\frac{d^2f}{dx^2} + 2x = 0$$

Boundary condition are $f(0) = 0, f(1) = 1$

Q.4 **a)** **Write short note on.** **07**
i) Discretization
ii) Convergence requirement of polynomials

b) Write note on elements used in FEA analysis. With an example describe application of 1D, 2Dand 3D elements. **07**

Q.5 **a)** Find the shape function of four nodded rectangle using the Lagrange's polynomial. **07**
b) Explain the submodelling and substructuring in FEA. **07**

Q.6 **a)** What are the considerations in mesh refinement? Explain different mesh validity checks. **07**
b) Derive FEM formulation for one dimensional heat conduction problem with three elements of equal lengths. **07**

Q.7 **a)** Explain modal analysis using the finite element method. **07**
b) Write note on transient analysis using FEM with an example. **07**

SLR-GE-50

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Advanced Design Engineering (7072202)

Day & Date: Saturday, 06-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.6 is compulsory. Attempt any two questions from the remaining.
3) Figures to the right indicates full marks.
4) Assume necessary data if required and state it clearly.

Section-I

Q.1 **a)** Derive an expression for the response "x" of the follower in case of analysis of an elastic cam system. **10**

b) Explain standard motion cams and standard contour cams. **07**

Q.2 **a)** Derive from basic principles the two dimensional Reynold's equation for hydrodynamic lubrication. **10**

b) The following data refers to a short hydrodynamic journal bearing: **07**
Radial Load = 1000 N

Journal speed = 2100 rpm

(l/d) ratio = 0.5

Eccentricity ratio = 0.65

Radial clearance = 0.002 x Journal radius

Flow rate of lubricant = 3.45 litre per hour
Calculate:
i) Diameter of journal
ii) Radial Clearance
iii) Dimensions of Bearings
iv) Minimum oil-film thickness
v) Absolute viscosity of lubricant

Q.3 **Write short notes on the following:** **18**
a) Hydrostatic and Elasto-hydrodynamic bearing.
b) Kinematic Design of 3-4-5 and 4-5-6-7 cam
c) Types of cam with neat sketches.

Section-II

Q.4 **a)** Derive the expression for thermal stresses for long hollow cylinder. **10**

b) Explain the methods of reducing thermal stresses. **07**

Q.5 **a)** Explain Regimes of hydrodynamic lubrication **09**
b) Compare between long and short hydrodynamic journal bearing **08**

Q.6 **Write short notes on:** **18**
a) Thermal stresses in flat walls.
b) Rayleigh Distribution.
c) Design for manufacturing and assembly.

SLR-GE-51

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Industrial Product Design (7072203)

Day & Date: Monday, 08-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** Explain the steps in design and development process of industrial products **09**
b) Explain ergonomic aspects in design of tractors. **08**

Q.2 **a)** Explain the market requirements and manufacturing aspects of industrial designs. **09**
b) Explain the methodology for adopting anthropometric data for various product design. **08**

Q.3 **Write short notes on (any Three)** **18**
1) Prototype designs and rapid prototyping.
2) Comparison of industrial products with consumer products.
3) Influence of line and form on aesthetics of consumer products.
4) Psychology of seeing and its effect on the product design.

Section – II

Q.4 **a)** Discuss the various phases of new product development. **09**
b) What is meant by life cycle assessment? Explain with a block diagram of life cycle assessment of product. **08**

Q.5 **a)** Explain the Design for Production (DFP) in detail and discuss the impact of DFP on other factors. **09**
b) What is quality function deployment? What are different steps of quality function deployment? **08**

Q.6 **Write short notes on (any Three)** **18**
a) Creative thinking
b) Value analysis and cost reduction.
c) Design for environment.
d) Computer Aided Industrial Design.

SLR-GE-52

Seat No.		Set	P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Theory and Analysis of Composite Materials (7072206)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory. Solve any one questions from remaining in both Section.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)**	Explain Classification and Characteristics of Composite Materials.	**09**
	b)	List out the applications of Composite Materials with suitable examples.	**08**
Q.2	**a)**	Explain Stress-Strain Relations for Anisotropic Materials.	**09**
	b)	What is stiffness? Explain Comparison of Approaches to Stiffness.	**08**
Q.3	**Write short notes on. (any three)**		**18**
	a)	Basic Terminology of fiber-reinforced composite material	
	b)	Strengths of an Orthotropic Lamina	
	c)	Elasticity Approach to Stiffness	
	d)	Maximum Stress theory	

Section – II

Q.4	**a)**	Explain Classical Lamination Theory.	**09**
	b)	Discuss Mechanics of Materials Approach to Strength.	**08**
Q.5	**a)**	What is Bending? Explain Governing Equations for Bending.	**09**
	b)	Explain Basic Principles of fracture mechanics.	**08**
Q.6	**Write short note on (any three)**		**18**
	a)	Inter-laminar stresses.	
	b)	Buckling of laminated plates.	
	c)	Effect of discontinuity in laminates.	
	d)	Design of composite structures.	

SLR-GE-53

Seat No.		Set	P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Engineering Design Optimization (7072207)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory. Solve any one questions from remaining in both Section.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)**	Explain Classification of optimization problems.	**09**
	b)	Explain optimization techniques with or without constraints.	**08**
Q.2	**a)**	Explain geometry of linear programming.	**09**
	b)	Explain elimination methods.	**08**
Q.3		**Write short notes on. (Any three)**	**18**
	a)	Formulation and statement of optimization problems	
	b)	Single and multivariable	
	c)	Standard form of linear programming	
	d)	Golden section method	

Section – II

Q.4	**a)**	Explain Direct search method.	**09**
	b)	Explain Random search method.	**08**
Q.5	**a)**	What is Genetic algorithms? Explain Concepts and methods.	**09**
	b)	Explain characteristics of mechanical systems.	**08**
Q.6		**Write short note on (Any three)**	**18**
	a)	Grid search method.	
	b)	Sequential linear programming.	
	c)	Effect of manufacturing errors.	
	d)	Weighted sum method.	

SLR-GE-55

Seat No.		Set	P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Advanced Engineering Materials (7072209)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory. Solve any one questions from remaining in both Section.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1	**a)**	Explain Types of cast irons, composition, properties, and applications.	**09**
	b)	Explain Hardening & tempering.	**08**
Q.2	**a)**	Explain Sintering theory and mechanism	**09**
	b)	Explain Effect of particle size on Mechanical properties	**08**
Q.3		**Write short notes on. (any three)**	**18**
	a)	Types of steels	
	b)	Manufacturing of metal/non metal powders	
	c)	Classification of composite materials	
	d)	Bottom up approaches	

Section – II

Q.4	**a)**	Explain Effect of Chemical Forces on Physical Properties	**09**
	b)	Discuss Soft and Hard Magnetic materials.	**08**
Q.5	**a)**	What is Shape Memory Alloy? Explain properties and Applications.	**09**
	b)	Explain Types, properties and applications of Plastics.	**08**
Q.6		**Write short note on (any three)**	**18**
	a)	factors affecting on electrical resistivity	
	b)	Thermal Expansion & Surface Energy.	
	c)	Epoxy resins and Polyurethanes.	
	d)	Proteins and Protein structures.	

SLR-GE-56

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Engineering Fracture Mechanics (7072210)

Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Section-I Q.1 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Use of electronic calculator is allowed.
5) Assume suitable data if necessary.

Section – I

Q.1 **a)** Discuss the significance of the following: **08**
1) Crack tip opening displacement.
2) Stress intensity factor.

b) A plate of 1.5 m width and 3 m length is required for construction operations. The expected load in the longitudinal direction is 4 MN. Experimental methods to detect through thickness edge cracks are valid only for cracks longer than 2.7 mm. Two steel plates 'm' and 'n' are being considered for this purpose. Steel- m has yield strength of 850 MPa and steel-n has yield strength of 1500 MPa. The corresponding critical stress intensity factors for the two material are: for 'm', K_{Ic}= 100 MPa $\sqrt{m}$, and for 'n', K_{Ic}= 60 MPa $\sqrt{m}$. A factor of safety of 1.5 is to be used. Minimum weight is important. Which of the two material should be selected? Inspection did not reveal any apparent cracks in the two sheets. Take correction factor as 1.1. **10**

Q.2 **a)** Explain Resistance curve (R curve) for brittle and ductile material. **06**

b) Explain with neat sketches, opening, sliding and tearing mode. **06**

c) Determine the critical energy release rate of a DCB specimen loaded in a tensile testing machine. The thickness of the DCB specimen is 30 mm, depth of each cantilever 12 mm and crack length 50 mm. It is made of a hardened steel with the modulus of 207 GPa and the crack is about to propagate at 15405 N pulling load. **05**

Q.3 **a)** Explain historical aspects of fracture mechanics. **05**

b) What are advantages of J-integral approach to fracture toughness testing over the plane strain fracture toughness measurement for ductile materials? Explain any one test method to determine J integral. **08**

c) Distinguish between the trans-granular and inter-granular fracture. **04**

Section – II

Q.4 **a)** Explain the plastic zone shape according to Tresca and Von-Mises criteria? **10**

b) A large plate of 5 mm thickness, made of medium carbon steel ($б_{ys}$ = 350 MPa) with a through the thickness centre crack of 2a = 40 mm length, is subjected to a stress of 150 MPa. For mode-I loading, determine the effective crack length using Irwin's correction. **07**

Q.5 **Write short note on following.** **18**

a) S-N diagram.

b) fatigue crack propagation law.

c) load displacement test.

Q.6 **a)** An edge crack, detected on a large plate, is of length 3.1 mm under a constant amplitude cyclic load having $б_{max}$ = 310 MPa and $б_{min.}$ = 172 MPa. If the plate is made of ferrite- pearlite steel $\frac{da}{dN} = 6.8\times10^{-12}(\Delta k)^{3.0}$ and K_{Ic}=165 MPa $\sqrt{m}$, determine. **10**

1) propagation life upto failure.
2) propagation life if the crack length 'a' is not allowed to exceed 25 mm. Take correction factor as 1.12.

b) What are different mechanisms of fracture? Explain any two mechanism with neat diagrams. **07**

SLR-GE-57

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Project Management (7072211)

Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Section-I Q.3 is compulsory. Attempt any one question from the remaining.
2) Section-II Q.6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4 Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** What do you mean by Project Management? Explain the characteristics of project. **09**
b) Explain the CPM/PERT Networks for project scheduling and planning. **08**

Q.2 **a)** What do you mean by Work content? Explain Project risk management. **09**
b) Explain in detail the project planning process. **08**

Q.3 **Write short notes on (any three)** **18**
a) HTPM for project management
b) Project Crashing and Project Finance
c) Time estimation method
d) Work breakdown structure

Section – II

Q.4 **a)** Explain the significance of computers in project management. **08**
b) What is Management of Special Projects? Explain in detail the R&D Project Management. **09**

Q.5 **a)** What is post project analysis? Explain in detail the post project analysis importance in project implementation. **09**
b) Explain the resource levelling and resource allocation for project scheduling. **08**

Q.6 **Write short notes on (any three)** **18**
a) Project Plan Development
b) Hi-Tech Project Management
c) Contract Management
d) Software Engineering Project Management

SLR-GE-60

Seat No.		Set	P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Business Analytics (7072304)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining. Question no. 6 is compulsory in section II, and solve any one question from the remaining.
2) Figures to the right indicate full marks.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section I

Q.1 Attempt any two of the following.

a) What do you mean by Business Analytics? Explain the relation of Business Analytics process and Organization decision making process. **09**

b) Describe any three approaches for visualizing data. **08**

Q.2 a) What is Dimension Reduction. Elaborate the process of converting a Categorical Variable to a Numerical Variable. **09**

b) Explain in detail classification and prediction in data mining. **08**

Q.3 Write short notes on (any three) **18**

a) Business Analytics Process
b) Recommendation system using association rule mining
c) Manipulations in data visualization.
d) Curse of dimensionality

Section II

Q.4 a) Explain the method for Evaluating Predictive Performance in detail. **09**

b) Describe the Regression Equation and Prediction. **08**

Q.5 a) Explain in detail the Tree Structure and how to evaluate the Performance of a Classification Tree. **09**

b) Explain feature selection for clustering in detail. **08**

Q.6 Write short notes on (any three) **18**

a) Advantages and Weaknesses of a Tree
b) Reducing the Number of Predictors
c) Confusion Matrix
d) K-means algorithm

SLR-GE-61

Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Mechanical – Design Engineering
Operation Research (7072305)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining.
2) Question no. 5 is compulsory in section II, and solve any one question from the remaining.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Briefly discuss 'duality' in linear programming. **05**

b) Max $Z = 3x + 5y$ **12**
Subject to
i) $3x + 2y \leq 18$
ii) $x \leq 4$
iii) $y \leq 6$
and $x, y \geq 0$

Q.2 **a)** Explain the term artificial variables and its use in linear programming. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
$Z = 40x_1 + 25x_2 + 50x_3$
Subject to
i) $x_1 + x_2 + x_3 \leq 36$
ii) $2x_1 + x_2 + 4x_3 \leq 60$
iii) $2x_1 + 5x_2 + 4x_3 \leq 45$
and $x_1, x_2, x_3 \geq 0$

Q.3 **a)** What are the characteristics of the Queuing System? **05**

b) Discuss the fields of application for queuing theory. Explain queue discipline and its various forms. **05**

c) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find out: **08**
i) Average queue length
ii) Average time spent in the system
iii) Probability that there would be two customers in the queue

Section – II

Q.4 **a)** Explain Selective Inventory management techniques. **05**

b) Explain the various costs associated with Inventory. **04**

c) The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 36 and the cost of carrying inventory is 25 per cent of the investment in the inventories. The price is Rs 10 per kg. Help the purchase manager to determine an ordering policy for raw material. **08**

Q.5 **a)** What are situations that make the replacement of items necessary? **04**

b) Write a note on Group Replacement Policy. **04**

c) A truck owner finds, from his past records, that the maintenance costs per year of a truck whose purchase price is Rs 8,000 are as given below: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	1000	1300	1700	2000	2900	3800	4800	6000
Resale Price	4000	2000	1200	600	500	400	400	400

Determine what time would it be profitable to replace the truck.

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. **12**

Activity (i-j)	Estimated Duration (weeks)	Immediate predecessor
A	5	-
B	7	A
C	2	B
D	3	B
E	1	C
F	2	D
G	1	C
H	3	E, F
I	10	G, H

i) Draw the network, find the critical path, the expected project completion time.

ii) What is the minimum completion time for the project?

b) What are situations that make the replacement of items necessary? **05**

SLR-GE-62

Seat No.		Set	P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Cost Management of Engineering Projects (7072306)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 & 5 are compulsory.
2) Solve any two questions out of remaining 3 questions from each section.
2) Figure to the right Indicate full marks.
3) Assume necessary suitable data if required.

Section – I

Q.1	**a)**	What is Cost Estimating? State the objective of cost estimating.	**06**
	b)	Differentiate between costing and cost estimating and value analysis.	**05**
Q.2	**a)**	Explain in brief various elements of cost with one example.	**06**
	b)	Differentiate between fixed and variable cost.	**06**
Q.3	**a)**	Progress measurement and earned value	**06**
	b)	Two third technique of duration estimate of proposed project.	**06**
Q.4	**a)**	List various items which constitute the overhead expenses.	**06**
	b)	Explain in brief difference between cost, value and price with one example.	**06**

Section – II

Q.5	**a)**	What is the relation between Phases of project, life cycle and cost escalation?	**06**
	b)	Explain in brief feed forward techniques used in cost management.	**05**
Q.6	**a)**	What do you understand about integrated cost management programme? Explains with one example.	**06**
	b)	Explain with one example value engineering concept. Why there is need of value analysis?	**06**
Q.7	**Write detailed notes on.**		**12**
	a)	Earned Value Management	
	b)	Relationship between project. Cost, Value and Risk	
Q.8	**a)**	Why there is need for value management in project? Explain with one example.	**06**
	b)	Write detail note on - causes of changes in project	**06**

SLR-GE-63

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
MECHANICAL – (DESIGN ENGINEERING)
Non conventional Energy (7072307)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

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

Section I

Q.1 Attempt any two of the following. **14**
- **a)** Explain Conventional energy, sources with their advantages and disadvantages?
- **b)** Explain the Indian Power scenario for hydroelectric power potential?
- **c)** Explain the necessity of energy storage. What are the methods of energy Storage?

Q.2 What is Solar Collector? Compare concentrating and Non-Concentrating type Solar Collectors. **07**

Q.3 Attempt any two of the following. **14**
- **a)** Explain the hot air industrial process solar heating system with a neat sketch.
- **b)** What are the emerging new technologies for energy conservation and efficiency?
- **c)** Explain thermal energy storage with sensible heat storage and latent heat storage?

Section II

Q.4 Attempt any two of the following. **14**
- **a)** Describe the classification of Solar Cells based on the type of active material used?
- **b)** Explain the Solar PV array and how Solar PV output is maximized?
- **c)** What are the different modes of wind power generation? Explain stand-alone Mode of wind power generation?

Q.5 Attempt any one of the following. **07**
- **a)** What are the desirable features of the wind turbine siting?
- **b)** Explain the advantages of Biomass energy in detail?

Q.6 Attempt any two of the following. **14**
- **a)** Giving classification of fuel cells, explain its potential applications.
- **b)** Explain the Municipal Solid Waste (MSW) incineration plant?
- **c)** Explain with neat sketch Fuel Cell Power Plant.

SLR-GE-64

Seat No.	

Set P

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Digital Design and Verification (MTEL101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Attempt any TWO of the following. **14**

a) Explain and compare the direct testing method and constrained random stimulus for testing the design.

b) Explain the communication between the testbench and DUT along with the code for communicate with the port.

c) Explain following array operations of system Verilog along with suitable example.
i) For and foreach
ii) Copy and compare

Q.2 Attempt any ONE of the following. **05**

a) Explain FIFO memories with suitable application.

b) Write short note on Metastability.

Q.3 Attempt following. **16**

a) Write Verilog code for modeling D Flip-flop. Also write the testbench for testing it.

b) Write Verilog code for modeling 4bit parallel adder. Also write the testbench for testing it.

Section – II

Q.4 Attempt following. **14**

a) What is IP? What are the different forms of IP? Explain in brief.

b) Write note on: Use of External Hard IP during prototyping.

Q.5 Attempt any ONE of the following. **07**

a) What are wire load models? Explain.

b) What is IR drop? How to analyze IR drop? Explain.

Q.6 Attempt following. **14**

a) What are the coarse-grained reconfigurable devices? Explain any one type in brief.

b) Explain antifuse based FPGA in brief.

SLR-GE-65

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Advanced Digital Signal Processing (MTEL102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicated full marks.

Section – I

Q.1 Attempt any Five. **35**

a) Explain FIR filter and steps to design FIR filter using Frequency Sampling Method.
b) What is Decimator and Interpolator? Explain Sampling rate conversion.
c) Explain steps in designing IIR filter using Impulse Invariance Method.
d) Explain AR lattice and ARMA lattice ladder filters.
e) Explain wiener filtering and prediction.
f) Explain steps in designing IIR filter using BLT Method.

Section – II

Q.2 Attempt any Five. **35**

a) Explain recursive least square algorithm.
b) What are non-parametric methods for power spectrum estimation.
c) How wavelets are used in Image processing?
d) Explain applications of DSP in Radar signal processing.
e) What are parametric methods for power spectrum estimation.
f) Explain applications of DSP in Speech processing.

SLR-GE-66

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Voice and Data Networks (MTEL103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Q.1 Answer following questions. **12**

a) Explain Network design issues.
b) What is layered and layer-less communication? Describe cross layer communication briefly.
c) Explain data networks and its design.

Q.2 Answer any two from following questions. **12**

a) Explain centralized and distributed approaches for network design.
b) Describe operations mechanism of circuit switching. Which control signals are used in circuit switching?
c) Explain the following retransmission mechanisms-
1) ARQ
2) Hybrid ARQ

Q.3 Answer following questions.

a) Explain different Network terminology. **06**
b) What is the need of multiplexing in communication? Discuss statistical multiplexing. **05**

OR

Describe Go_ Back_N and selective repeat ARQ mechanism in details. **05**

Q.4 Answer following questions. **12**

a) Write note on Inter-networking and bridging.
b) Draw IPV4 header format and describe it in detail.
c) What are different types of cryptographic algorithm? Describe RSA algorithm.

Q.5 Answer any two from following questions. **12**

a) Explain slow start, fast retransmit /fast recovery in network.
b) Explain packet scheduling algorithms.
c) Explain access control and firewalls in network security.

Q.6 Answer following questions. **06**

a) What is congestion avoidance in TCP? Describe RED mechanism briefly
b) Describe network attacks and compare between them. **05**

OR

Write note on RED. **05**

SLR-GE-67

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Machine Learning© (MTEL104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section I

Q.1	**a)**	Explain Bayesian Linear regression with example in brief.	**06**
	b)	Explain the Linear regression and Logistic regression in brief.	**06**
Q.2		Explain overfitting and underfitting in detail.	**12**
Q.3		Explain Supervised and Unsupervised learning with examples.	**11**
		OR	
		Distinguish between supervised learning and unsupervised learning.	

Section II

Q.4	**a)**	Explain Feed-forward network function.	**06**
	b)	Explain key perspectives on machine learning in brief.	**06**
Q.5	**a)**	Explain regularization in neural Networks in brief.	**06**
	b)	Explain where machine learning is headed next.	**06**
Q.6		Explain deep neural networks and its applications in brief.	**11**
		OR	
		Distinguish between Machine learning and Deep learning.	

SLR-GE-70

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Image and Video Processing (MTEL108)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Solve any four Questions **20**

a) Write short note on sampling in 2 & 3-dimension image.
b) Explain digital video basics.
c) Discuss the properties and applications of
i) Hadamard transforms
ii) Haar Transforms
d) Explain frame rate conversion and deinterlacing.
e) Write note on maximum entropy restoration.

Q.2 Solve the following Questions.

a) Explain the following: **08**
i) Inverse & Wiener filtering
ii) Multi frame restoration
b) Explain multi spectral image enhancement. **07**

Section – II

Q.3 Solve any four Questions **20**

a) Explain any two method of edge detection.
b) Explain semantic video object segmentation.
c) Explain Lossless image compression including entropy coding.
d) Explain any one international standards for image and video compression.
e) Write short note on scene matching & detection.

Q.4 Solve the following Questions.

a) Explain the following: **08**
i) Spatial feature extraction
ii) Boundary Extraction
b) Explain video compression technique. **07**

SLR-GE-71

Seat No.	

Set P

F.Y (M. Tech.) (Sem - I) (New) (Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Digital Design and Verification (7078101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Attempt any TWO of the following. **14**

a) Explain and compare the direct testing method and constrained random stimulus for testing the design.

b) Explain the communication between the testbench and DUT along with the code for communicate with the port.

c) Explain following array operations of system verilog along with suitable example.
i) For and for each
ii) Copy and compare

Q.2 Draw and explain Booth's multiplier. **05**

Q.3 Attempt following. **16**

a) Write verilog code for modeling JK Flip-flop. Also write the testbench for testing it.

b) Write verilog code for modeling 2:4 decoder. Also write the testbench for testing it.

Section – II

Q.4 Attempt the following. **14**

a) Explain the following.
i) IP as RTL source code
ii) IP as a Encrypted source code

b) What are stuck at faults? Explain how to detect these faults with a suitable example.

Q.5 Attempt any ONE of the following. **07**

a) What are wire load models? Explain.

b) What is iR drop? How to analyze iR drop? Explain.

Q.6 Attempt following. **14**

a) What are the coarse grained reconfigurable devices? Explain any one type in brief.

b) Explain antifuse based FPGA in brief.

SLR-GE-72

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Advanced Digital Signal Processing (7078102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicated full marks.

Section – I

Q.1 Attempt any Five. **35**

a) Explain FIR filter and steps to design FIR filter using Frequency Sampling Method.
b) What is Decimator and Interpolator? Explain Sampling rate conversion.
c) Explain steps in designing IIR filter using Impulse Invariance Method.
d) Explain AR lattice and ARMA lattice ladder filters.
e) Explain wiener filtering and prediction.
f) Explain steps in designing IIR filter using BLT Method.

Section – II

Q.2 Attempt any Five. **35**

a) Explain recursive least square algorithm.
b) What are nonparametric methods for power spectrum estimation.
c) How wavelets are used in Image processing?
d) Explain applications of DSP in Radar signal processing.
e) What are parametric methods for power spectrum estimation.
f) Explain applications of DSP in Speech processing.

SLR-GE-74

Seat No.		Set	P

F.Y (M.Tech.) (Sem - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Machine Learning © (7078104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Solve Any Four **16**

a) What is a well posed learning problem?
b) Explain Maximum likelihood estimation in linear regression.
c) Explain Newton's method for minimizing a strictly convex function.
d) What are the appropriate types of problems which can be solved using decision tree.
e) With suitable example explain - Multi-class logistic regression.

Q.2 Solve Any Two **12**

a) With suitable example justify - in a decision tree, entropy measures homogeneity in a data pattern.
b) What is bias-variance dilemma in machine learning? How it is related to overfitting and underfitting?
c) Why to prefer a short hypotheses in a decision tree algorithm.

Q.3 Solve Any One. **07**

a) With suitable example explain steps in designing a typical learning system.
b) With suitable example explain how the weight vector parameters are calculated in a linear regression model.

Section – II

Q.4 Solve Any Four. **16**

a) Explain Relevance Vector Machines.
b) With suitable example explain Rand index used to measure performance of the clustering algorithm.
c) Explain infinite mixture models in clustering.
d) Explain multiclass SVMs.
e) Explain Local quadratic approximation used in feedforward ANN.

Q.5 Solve Any Two. **12**

a) Explain Maximum Margin Classifiers.
b) How Relevance Vector Machines can be used for classification applications?
c) Explain deep auto-encoders.

Q.6 Solve Any One. **07**

a) With suitable equations, explain error backpropagation for feedforward ANN.
b) Explain hierarchical clustering algorithm.

SLR-GE-75

Seat No.		Set	P

F.Y. (M.Tech) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Wireless Sensor Networks (7078106)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 **a)** Explain local power management aspects. **07**
b) Classify with examples - different routing algorithms for WSN. **06**

Q.2 **Solve Any Two** **12**
a) Discuss different design objectives for WSN.
b) Justify - MAC for wired network fails for WSN.
c) Explain any hybrid MAC.

Q.3 **Solve Any Two** **10**
a) Explain any one type of on demand routing.
b) What are non based metrics used to evaluate performance of routing.
c) Explain any one application of dynamic WSN in detail.

Section – II

Q.4 **a)** Explain need and classification of power management in WSN node. **07**
b) What are different hardware platforms available for realization of WSN? **06**

Q.5 **Solve Any Two** **12**
a) Explain energy efficient link layer.
b) Explain GPS based localization.
c) Discuss 802.15.4

Q.6 **Solve Any Two** **10**
a) Explain data transfer in beckon enabled networks.
b) What are various factors affecting dynamic power management strategy.
c) Explain super Harvard architecture.

SLR-GE-76

Seat No.		Set	P

F.Y. (M.Tech) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Analog & Digital CMOS VLSI Design (7078107)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. 1 & 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

Q.1 **a)** What is dynamic behavior of CMOS inverter? **05**

b) What is placement and routing for digital CMOS design. **06**

Q.2 **a)** What is speed and power dissipation in dynamic logic. **06**

b) Explain pass transistor logic. **06**

Q.3 **a)** Explain master-slave negative edge triggered register using multiplexers. **06**

b) Explain dynamic latches and registers. **06**

Q.3 **Write notes on any two of following.** **12**
a) Metal gate technology
b) Ratioed logic
c) TFET

Section – II

Q.5 **a)** Explain small signal analysis of CS stage with diode connected load. **06**

b) What is common mode response of differential amplifier. **05**

Q.6 **a)** Draw circuit for differential pair with resistance load and explain. **06**

b) Draw circuit for common gate stage and explain it's frequency response. **06**

Q.7 **a)** Explain active current mirrors. **06**

b) What is frequency compensation of OPAMP? What are it's techniques? Explain any one of them. **06**

Q.8 **Write notes on any two of following.** **12**
a) Cascading of dynamic gates
b) Cascode stage
c) Slew rate of OPAMP

SLR-GE-79

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Research Methodology & IPR© (7078201)

Day & Date: Thursday, 18-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section - I

Q.1 Answer the following questions. **12**
- **a)** Discuss the research design. What are its features?
- **b)** Explain ethical issues in research.
- **c)** Explain objective of research.

Q.2 Answer any three of the following questions. **18**
- **a)** What are different types of research? Explain any two with suitable examples.
- **b)** What is a need of literature review? What are the steps to carry it?
- **c)** Explain writing technical research paper for publication.
- **d)** Write a comprehensive note on the “Writing Research Proposal (Synopsis)”.

Q.3 Explain characteristics of good abstract. **05**

Section – II

Q.4 Write Short notes on **12**
- **a)** Need of simulation in research.
- **b)** Copyright-IPR.
- **c)** Scope of Patent rights.

Q.5 Answer any three of the following questions. **18**
- **a)** Explain need and techniques of mathematical modelling.
- **b)** Briefly explain procedure for grants of patents.
- **c)** Explain in brief “Filing Copyright”.
- **d)** Explain trademarks for identification of products or services.

Q.6 Explain Designs as Intellectual Property. **05**

SLR-GE-80

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Communication Buses & Interfaces (7078202)

Day & Date: Saturday, 06-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Q.1 Attempt any Five. **35**

1) What are features of serial communication.
2) Explain SPI with its limitations.
3) Differentiate between RS232 and RS 485.
4) Explain RS485 with its pin configuration.
5) Differentiate between I^2C and SPI.
6) Explain in short CAN frame formats.

Q.2 Attempt any Five. **35**

1) Explain in short configuration space
2) Explain different types of transfer in USB.
3) Explain hardware protocols and applications.
4) Explain descriptor types and contents.
5) What is data streaming serial communication protocol.
6) Explain enumeration in USB.

SLR-GE-81

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Advanced IOT (7078203)

Day & Date: Monday,08-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicates full marks.
3) Assume suitable data If necessary.
4) Draw neat sketches wherever necessary.

Q.1 Attempt any one question: **10**
a) What is fog computing? Explain Security in fog.
b) Explain wireless sensor network.

Q.2 Explain concept of Ipv4 and Ipv6 **10**

Q.3 Attempt any one question: **15**
a) Explain IoT Protocol Stack.
b) What are need of cloud based IoT data

Q.4 Attempt any one question: **10**
a) Describe open-source hardware and embedded systems platforms for IoT.
b) Discuss security and legal considerations.

Q.5 Explain big data for IoT applications. **10**

Q.6 Attempt any one question: **15**
a) Explain the following IoT applications:
i) Connected cars IoT transportation.
ii) Smart Grid sectors using IoT.
b) Explain multithreading concepts in IoT.

SLR-GE-82

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
PLC, SCADA and Distributed Control Systems (7078204)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1	**a)**	What are continuous, discrete and mixed process controls?	**06**
	b)	What are analog I/O modules?	**06**
Q.2	**a)**	Explain memory organization for PLC.	**06**
	b)	Draw architecture of PLC and explain.	**06**
Q.3	**a)**	What are different programming languages for PLC?	**11**
		OR	
	b)	Explain PLC timers and counters.	

Section – II

Q.4	**a)**	What is distributed control system?	**06**
	b)	Explain data communication techniques used in DCS.	**06**
Q.5	**a)**	Draw block schematic of SCADA and explain.	**06**
	b)	What are functions of MTU and RTU used in SCADA?	**06**
Q.6	**a)**	Explain steam boiler control system using PLC.	**11**
		OR	
	b)	Explain conveyor belt automation system using PLC.	

SLR-GE-85

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
VLSI in Signal Processing (7078208)

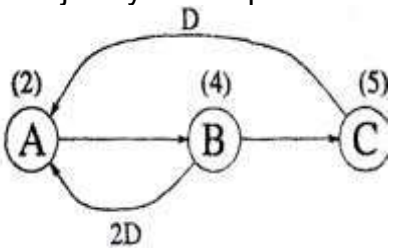
Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 Attempt any four: **20**

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

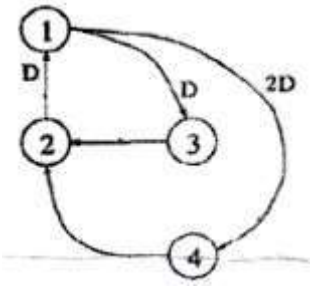


b) Explain the advantages of pipelining & parallel processing on account of power consumption and justify the same.

c) What is retiming of DFG? Explain application of retiming in DSP system. Explain properties of retiming.

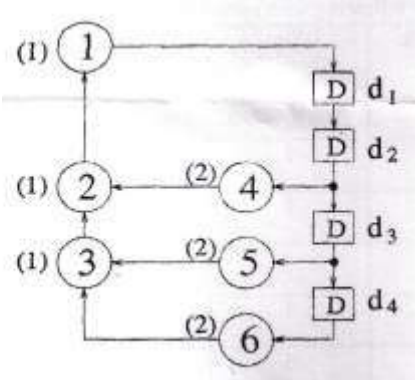
d) Draw DFG for 3 tap FIR filter.

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



Q.2 Solve any following.

a) For DFG shown below find iteration bound using LPM algorithm. **08**



b) Explain MCM algorithm. **07**

Section – II

Q.3 Attempt any four: **20**

a) Write a note on systolic design for matrix-matrix multiplication.
b) Design B2 filter for FIR systolic array.
c) Mention the step to minimize register in folding architecture.
d) Explain unfolding algorithm.
e) Explain 4 X 4-bit Baugh Wooley carry save multiplier. Also draw DG for the same.

Q.4 Solve the following:

a) Draw the circular life time chart for following with period N = 9: **08**

Variable Name	Tin
a	0
b	1
c	2
d	3
e	4
f	5
g	6
h	7
i	8

b) How the systolic architecture is designed? What are the basic vectors involved in systolic array design? Define them. Hence, explain the feasibility constraints for the same. **07**

SLR-GE-87

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS ENGINEERING
Business Analytics (7078307)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining. Question no. 6 is compulsory in section II, and solve any one question from the remaining.
2) Figures to the right indicate full marks.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section I

Q.1 Attempt any two of the following.

a) What do you mean by Business Analytics? Explain the relation of Business Analytics process and Organization decision making process. **09**

b) Describe any three approaches for visualizing data. **08**

Q.2 a) What is Dimension Reduction. Elaborate the process of converting a Categorical Variable to a Numerical Variable. **09**

b) Explain in detail classification and prediction in data mining. **08**

Q.3 Write short notes on (any three) **18**

a) Business Analytics Process
b) Recommendation system using association rule mining
c) Manipulations in data visualization.
d) Curse of dimensionality

Section II

Q.4 a) Explain the method for Evaluating Predictive Performance in detail. **09**

b) Describe the Regression Equation and Prediction. **08**

Q.5 a) Explain in detail the Tree Structure and how to evaluate the Performance of a Classification Tree. **09**

b) Explain feature selection for clustering in detail. **08**

Q.6 Write short notes on (any three) **18**

a) Advantages and Weaknesses of a Tree
b) Reducing the Number of Predictors
c) Confusion Matrix
d) K-means algorithm

SLR-GE-88

Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics Engineering
Operation Research (7078308)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining.
2) Question no. 5 is compulsory in section II, and solve any one question from the remaining.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Briefly discuss 'duality' in linear programming. **05**

b) Max $Z = 3x + 5y$ **12**
Subject to
i) $3x + 2y \leq 18$
ii) $x \leq 4$
iii) $y \leq 6$
and $x, y \geq 0$

Q.2 **a)** Explain the term artificial variables and its use in linear programming. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
$Z = 40x_1 + 25x_2 + 50x_3$
Subject to
i) $x_1 + x_2 + x_3 \leq 36$
ii) $2x_1 + x_2 + 4x_3 \leq 60$
iii) $2x_1 + 5x_2 + 4x_3 \leq 45$
and $x_1, x_2, x_3 \geq 0$

Q.3 **a)** What are the characteristics of the Queuing System? **05**

b) Discuss the fields of application for queuing theory. Explain queue discipline and its various forms. **05**

c) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find out: **08**
i) Average queue length
ii) Average time spent in the system
iii) Probability that there would be two customers in the queue

Section – II

Q.4 **a)** Explain Selective Inventory management techniques. **05**

b) Explain the various costs associated with Inventory. **04**

c) The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 36 and the cost of carrying inventory is 25 per cent of the investment in the inventories. The price is Rs 10 per kg. Help the purchase manager to determine an ordering policy for raw material. **08**

Q.5 **a)** What are situations that make the replacement of items necessary? **04**

b) Write a note on Group Replacement Policy. **04**

c) A truck owner finds, from his past records, that the maintenance costs per year of a truck whose purchase price is Rs 8,000 are as given below: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	1000	1300	1700	2000	2900	3800	4800	6000
Resale Price	4000	2000	1200	600	500	400	400	400

Determine what time would it be profitable to replace the truck.

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. **12**

Activity (i-j)	Estimated Duration (weeks)	Immediate predecessor
A	5	-
B	7	A
C	2	B
D	3	B
E	1	C
F	2	D
G	1	C
H	3	E, F
I	10	G, H

i) Draw the network, find the critical path, the expected project completion time.

ii) What is the minimum completion time for the project?

b) What are situations that make the replacement of items necessary? **05**

SLR-GE-89

Seat No.		Set	P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics Engineering
Cost Management of Engineering Projects (7078309)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 & 5 are compulsory.
2) Solve any two questions out of remaining 3 questions from each section.
2) Figure to the right Indicate full marks.
3) Assume necessary suitable data if required.

Section – I

Q.1	**a)**	What is Cost Estimating? State the objective of cost estimating.	**06**
	b)	Differentiate between costing and cost estimating and value analysis.	**05**
Q.2	**a)**	Explain in brief various elements of cost with one example.	**06**
	b)	Differentiate between fixed and variable cost.	**06**
Q.3	**a)**	Progress measurement and earned value	**06**
	b)	Two third technique of duration estimate of proposed project.	**06**
Q.4	**a)**	List various items which constitute the overhead expenses.	**06**
	b)	Explain in brief difference between cost, value and price with one example.	**06**

Section – II

Q.5	**a)**	What is the relation between Phases of project, life cycle and cost escalation?	**06**
	b)	Explain in brief feed forward techniques used in cost management.	**05**
Q.6	**a)**	What do you understand about integrated cost management programme? Explains with one example.	**06**
	b)	Explain with one example value engineering concept. Why there is need of value analysis?	**06**
Q.7	**Write detailed notes on.**		**12**
	a)	Earned Value Management	
	b)	Relationship between project. Cost, Value and Risk	
Q.8	**a)**	Why there is need for value management in project? Explain with one example.	**06**
	b)	Write detail note on - causes of changes in project	**06**

SLR-GE-90

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics Engineering
Non conventional Energy (7078310)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

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

Section I

Q.1 Attempt any two of the following. **14**
- **a)** Explain Conventional energy, sources with their advantages and disadvantages?
- **b)** Explain the Indian Power scenario for hydroelectric power potential?
- **c)** Explain the necessity of energy storage. What are the methods of energy Storage?

Q.2 What is Solar Collector? Compare concentrating and Non-Concentrating type Solar Collectors. **07**

Q.3 Attempt any two of the following. **14**
- **a)** Explain the hot air industrial process solar heating system with a neat sketch.
- **b)** What are the emerging new technologies for energy conservation and efficiency?
- **c)** Explain thermal energy storage with sensible heat storage and latent heat storage?

Section II

Q.4 Attempt any two of the following. **14**
- **a)** Describe the classification of Solar Cells based on the type of active material used?
- **b)** Explain the Solar PV array and how Solar PV output is maximized?
- **c)** What are the different modes of wind power generation? Explain stand-alone Mode of wind power generation?

Q.5 Attempt any one of the following. **07**
- **a)** What are the desirable features of the wind turbine siting?
- **b)** Explain the advantages of Biomass energy in detail?

Q.6 Attempt any two of the following. **14**
- **a)** Giving classification of fuel cells, explain its potential applications.
- **b)** Explain the Municipal Solid Waste (MSW) incineration plant?
- **c)** Explain with neat sketch Fuel Cell Power Plant.

SLR-GE-94

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Research Methodology & IPR (MTETC101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.

Section – I

Q.1 Solve any four. **20**

a) With suitable example explain different ways to classify research.
b) Explain some features of good design.
c) Discuss research design. What are its features?
d) With suitable example explain applied Vs fundamental research.
e) Explain different objectives of research.

Q.2 Solve any two. **15**

a) With suitable engineering example explain guidelines for design of experiment.
b) What is the difference between qualitative and quantitative research? Include in your answer advantages and disadvantages also.
c) What is a need of literature review? What are steps to carry it?

Section – II

Q.3 Solve any four.

a) Explain Generalization and Interpretation in data analysis. **20**
b) Write a note on IPR and laws.
c) Explain sampling method in data collection.
d) Discuss Citation and acknowledgement in report writing in detail.
e) Write a note on trade related aspects of Intellectual Property Rights.

Q.4 Solve any two. **15**

a) Describe characteristics of a good hypothesis.
b) Explain bibliography, references and footnotes in detail.
c) Briefly explain structure and components of scientific reports.

SLR-GE-95

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Antenna Theory and Techniques (MTEC102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.

Section – I

Q.1 Solve any Two questions. **10**

a) List and define the antenna parameters.
b) Explain broadside and end fire array radiation pattern.
c) Explain the characteristics of Microstrip antenna and also mention its advantages and disadvantages.

Q.2 Solve any one question. **07**

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 Cavity model for the analysis of micro strip antenna

Q.3 Solve any three questions. **18**

a) Given a linear, broadside, uniform array of 10 isotropic elements with a separation of $\lambda/4$ between the elements, find the directivity of the array.
b) Derive an array factor equation for linear array of n-isotropic point sources.
c) Explain the radiation mechanism of a microstrip antenna.
d) Explain End fire Array radiation pattern with mathematical expression.

Section – II

Q.4 Solve any Two questions. **10**

a) Explain the effects of substrate parameters on Bandwidth.
b) Explain broad banding using stacked Elements.
c) Explain parallel feed, one and two dimension excitation methods for microstrip Antenna.

Q.5 Solve any one question. **07**

a) Explain Linear array design with Micro strip patches using corporate feed Arrays.
b) Explain about antenna design consideration and its application for:
1) Global Positioning System (GPS)
2) WLAN (Wi-Fi)

Q.6 Solve any three questions. **18**

a) Explain about the aperture coupled microstrip antenna for broad band antennas.

b) Explain Linear array design with Microstrip patches using Series feed arrays.

c) Explain about antenna design consideration and its application for:
1) Bluetooth
2) Zig-bee

d) Explain Linear array design with Micro strip patches using corporate feed Arrays.

SLR-GE-96

Seat No.		Set	P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Embedded System (MTETC103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if required.

Section – I

Q.1 Solve any TWO. **20**

a) Explain the concept of hardware and software co design in embedded system.
b) Write a note on embedded memories.
c) Describe process for product development in details. Why revisions are carried out at development stage of a product.

Q.2 Solve any TWO. **15**

a) Draw and explain memory structure of ARM 11.
b) Write a note on embedded system development life cycle with block diagram.
c) Describe the challenges in embedded computing system design.

Section – II

Q.3 Solve any TWO.

a) Draw block diagram of Raspberry Pi and explain each block in detail. **20**
b) Explain software design process and lifecycle.
c) What are different software development tools?

Q.4 Solve any TWO. **15**

a) Explain Task scheduling in RTOS.
b) Explain Mutex management and Semaphore management.
c) Explain the features of RT Linux.

SLR-GE-98

Seat No.		Set	P

F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Soft Computing Methods (MTEC106)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.
3) Use of Non programmable calculator is allowed.
4) Assume necessary data if necessary.

Section – I

Q.1 Solve any four. **20**

a) Enlist the properties of fuzzy sets.

b) What is Defuzzification? Explain different defuzzification method with an example.

c) Methane biofilters can be used to oxidize methane using biological activities. It has become necessary to compare performance of two test columns, A and B. The methane outflow level at the surface, in nondimensional units of X = {50, 100, 150, 200], was detected and is tabulated below against the respective methane inflow into each test column. The following fuzzy sets represent the test columns:

$$\underset{\sim}{A} = \left\{\frac{0.15}{50} + \frac{0.25}{100} + \frac{0.5}{150} + \frac{0.7}{200}\right\} \quad \underset{\sim}{B} = \left\{\frac{0.2}{50} + \frac{0.3}{100} + \frac{0.6}{150} + \frac{0.65}{200}\right\}$$

Calculate the union, intersection, and the difference for the test columns.

d) Consider fuzzy relations

$$R = \begin{bmatrix} 0.7 & 0.6 \\ 0.8 & 0.3 \end{bmatrix} \qquad S = \begin{bmatrix} 0.8 & 0.5 & 0.4 \\ 0.1 & 0.6 & 0.7 \end{bmatrix}$$

Find the relation T=R o S using max-min.

e) Using your own intuition and your own definitions of the universe of discourse, plot fuzzy membership functions for the following variables: Age of people

i) Very young
ii) Young
iii) Middle-aged
iv) Old
v) Very Old

Q.2 Solve any two. **15**

a) Enumerate steps followed by GA.

b) Describe various operators of Genetic Algorithm?

c) We will define inputs on the universe X = [0, 50, 100, 150, 200] femtotesla & outputs on the universe Y = [0, 50, 100, 150, 200] femtotesla. We will define two fuzzy sets, two different stimuli, on the universe X.

$$W = \text{weak stimulus} = \left\{\frac{1}{0} + \frac{0.9}{50} + \frac{0.3}{100} + \frac{0}{150} + \frac{0}{200}\right\} \subset X$$

$$M = \text{medium stimulus} = \left\{\frac{0}{0} + \frac{0.4}{50} + \frac{1}{100} + \frac{0.4}{150} + \frac{0}{200}\right\} \subset X$$

& one fuzzy set on the output universe Y,

$$S = \text{severe response} = \left\{\frac{1}{0} + \frac{0.9}{50} + \frac{0.3}{100} + \frac{0}{150} + \frac{0}{200}\right\} \subset Y$$

Construct the preposition: If “weak stimulus” THEN “not severe response” using fuzzy implication?

Section – II

Q.3 Solve any four. **20**

a) Distinguish between supervised learning and unsupervised learning.
b) Write a short note on McCulloch - Pitts Model of ANN.
c) What is Neural Network Architecture? Give its types and explain them.
d) Explain in detail Convolutional Neural Network.
e) Draw a 4-5-1 artificial neural network.

Q.4 Solve any two. **15**

a) Write the Back Propagation Algorithms. Discuss the Convergence issues in the back propagation algorithms.
b) Discuss in detail various types of activation functions used in neural network with the aid of graphical as well as mathematical representation and output.
c) Elaborate on Neural-Network-Based Fuzzy Systems.

SLR-GE-99

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Research Methodology & IPR (7076101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Solve any four. **20**

a) Discuss research design. What are its features?
b) With suitable example explain applied Vs fundamental research.
c) With suitable example explain how to write an abstract of technical report.
d) What are motivational factors for carrying research?
e) Explain different objectives of research.

Q.2 Solve any two. **15**

a) What are the problems encountered by researchers in India?
b) Write a note on defining and formulating the research problem.
c) What is the difference between qualitative and quantitative research? Include in your answer advantages and disadvantages also.

Section – II

Q.3 Solve any four. **20**

a) Explain in brief Intellectual property rights and patent law.
b) Describe Structure and components of scientific reports.
c) Explain data processing and analysis strategies with example.
d) Write a note on trade related aspects of Intellectual Property Rights.
e) Explain Generalization and Interpretation in data analysis.

Q.4 Solve any two. **15**

a) Describe characteristics of a good hypothesis.
b) Explain bibliography, references and footnotes in detail.
c) “Researchers would be lost without good sampling techniques”. Discuss this statement and describe four methods of sampling that are commonly used.

SLR-GE-100

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Antenna Design and Application (7076102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicated full marks.

Section – I

Q.1 Solve any Two questions. **10**

a) List and define the antenna parameters.
b) Explain broadside and end fire array radiation pattern.
c) Explain the characteristics of Microstrip antenna and also mention its advantages and disadvantages.

Q.2 Solve any One question. **07**

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 Cavity model for the analysis of micro strip antenna.

Q.3 Solve any Three questions.

a) Given a linear, broadside, uniform array of 10 isotropic elements with a separation of $\lambda/4$ between the elements, find the directivity of the array. **18**
b) Derive an array factor equation for linear array of n-isotropic point sources.
c) Explain the radiation mechanism of a microstrip antenna.
d) Explain End fire Array radiation pattern with mathematical expression.

Section – II

Q.4 Solve any Two questions. **10**

a) Explain the effects of substrate parameters on Bandwidth.
b) Explain broad banding using stacked Elements.
c) Explain parallel feed, one and two dimension excitation methods for microstrip Antenna.

Q.5 Solve any One question. **07**

a) Explain Linear array design with Micro strip patches using corporate feed Arrays.
b) Explain about antenna design consideration and its application for:
1) Global Positioning System (GPS)
2) WLAN (Wi-Fi)

Q.6 Solve any Three questions. **18**

a) Explain about the aperture coupled microstrip antenna for broad band antennas.
b) Explain Linear array design with Microstrip patches using Series feed arrays.
c) Explain about antenna design consideration and its application for:
1) Bluetooth,
2) Zig-bee
d) Explain Linear array design with Micro strip patches using corporate feed Arrays.

SLR-GE-101

Seat No.		Set	P

F.Y (M. Tech) (Sem - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Soft Computing Methods (7076103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Sole any Four. **20**

a) Enlist the properties of fuzzy sets.

b) Consider two fuzzy sets A & B find complement, union, Intersection, Difference & DeMorgan's law.

$A = \{\frac{0.1}{2} + \frac{0.25}{3} + \frac{0.86}{4} + \frac{0.32}{5} + \frac{0.86}{6}\}$ $B = \{\frac{0.55}{2} + \frac{0.58}{3} + \frac{0.47}{4} + \frac{0.77}{5} + \frac{0.93}{6}\}$

c) Using your own intuition and your own definitions of the universe of discourse, plot fuzzy membership function for the following variables:
Age of people.
1) Very young
2) Young
3) Middle-aged
4) Old
5) Very old

d) Enumerate step followed by GA.

e) Consider fuzzy relations.

$R = \begin{bmatrix} 0.8 & 0.2 \\ 0.7 & 0.3 \end{bmatrix}$ $S = \begin{bmatrix} 0.7 & 0.5 & 0.4 \\ 0.9 & 0.6 & 0.8 \end{bmatrix}$

Find the relation $T = R$ o S using max- product composition.

Q.2 Solve any Two. **15**

a) Explain any one of applications of fuzzy systems.

b) Define Genetic Algorithms. Explain the various operators of GA.

c) We will define inputs on the universe$X = [0,50,100,150,200]$ femtotesla & output on the universe $Y = [0,50,100,150,200]$ femtotesla. We will define two fuzzy sets, two different stimuli, on the universe X.
$W = \text{"weak stimulus"} = \{1/(0) + 0.9/(50) + 0.3/100 + 0/150 + 0/200\} \subset X$
$M = \text{"medium stimulus"} = \{0/(0) + 0.4/(50) + 1/100 + 0.4/150 + 0/200\} \subset X$
& one fuzzy set on the output universe Y,
$S = \text{"severe response"} = \{1/(0) + 0.9/(50)\} + 0.3/100 + 0/150 + 0/200\} \subset Y$
Construct the preposition:
If "weak stimulus" THEN "not severe response" using fuzzy implication?

Section – II

Q.3 Solve any Four. **20**

a) Explain the characteristics of Neural Network.
b) Sketch and Explain in detail the model of artificial neuron.
c) Explain Deep learning technique.
e) Explain in detail Convolutional Neural Network.
f) Write a short note on McCulloch - Pitts Model of ANN.

Q.4 Solve any Two. **15**

a) Give the Backpropagation Learning Algorithm with Example.
b) Discuss in detail various types of activation functions used in neural network with the aid of graphical as well as mathematical representation and output.
c) Explain Hybrid Systems.

SLR-GE-102

Seat No.	

Set P

F.Y. (M. Tech) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Network System (7076104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Solve any four. **20**
- **a)** Differentiate between circuit & Packet switching.
- **b)** How DQDB works? Explain in detail.
- **c)** Explain official & unofficial internet.
- **d)** Explain Domain mapping message format.
- **e)** What is difference between layer 2 and layer 3 VPN services?

Q.2 Solve any two **15**
- **a)** Explain the structure of FDDI & explain ring topology used in network?
- **b)** What is DNS technique? Explain naming techniques in DNS.
- **c)** Illustrate the architecture of MPLS.

Section – II

Q.3 Solve any four **20**
- **a)** Write a short note on adaptive self-healing network.
- **b)** Write a short note on queue management algorithm.
- **c)** Which are the next generation networks?
- **d)** Write a short note on cyber physical system.
- **e)** What is the performance parameter for security in NGN?

Q.4 Solve any two **15**
- **a)** What is network management? Explain the parameters related to network management.
- **b)** What is traffic engineering in QoS of networking?
- **c)** Explain various device network related to smart devices.

SLR-GE-104

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (New/Old) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Embedded System (7076107)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if required.

Section – I

Q.1 Solve any Two **20**

a) Draw and explain register structure of ARM 11.
b) Explain embedded system design challenges. State applications of embedded systems.
c) Explain the features of ARM 11 MP core processor with the help of block diagram.

Q.2 Solve any Two **14**

a) Draw and explain Big-endian and Little-endian address format of ARM 11.
b) Write a note on embedded system development life cycle with block diagram.
c) Describe Power management and Debug programming support system in MP11 CPU.

Section – II

Q.3 Solve any Two

a) Explain software development process life cycle and its model in detail. **20**
b) Describe Task Control Blocks and Memory management in detail.
c) What are different software development tools?

Q.4 Solve any Two **16**

a) Explain Task scheduling in RTOS.
b) Explain in detail interfacing components on Raspberry Pi board.
c) Draw connection diagram and write a code to interface LCD(16×2) with Raspberry Pi to display “WELCOME”.

SLR-GE-106

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Internet of Things (7076201)

Day & Date: Thursday, 18-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to right indicate full marks.
3) Use of non-programable calculator is allowed.
4) Assume necessary data if necessary.

Section I

Q.1 Solve any TWO. **20**

a) State and explain various building blocks Industry 4.0.
b) What is IIOT? Describe Phases of Industrial Revolutions with examples.
c) State Feature of LPC1768. Write C-programs to toggle bit 0 of Port0 with some delay.

Q.2 Solve any TWO. **14**

a) Describe applications of IOT in embedded systems with examples.
b) Interface Stepper motor to rotate in clockwise direction using LPC1768 microcontroller. Draw connection diagram and write appropriate code also.
c) Explain peripherals associated with Cortex M-3 in detail.

Section II

Q.3 Solve any TWO. **20**

a) Describe BLE Connection Establishment with diagram. Explain Four Active States of BLE.
b) Explain working Principle of RFID with types of tags. State applications of RFID.
c) Write a note on Application Programming Interface (API).

Q.4 Solve any TWO. **16**

a) Describe various types of Zigbee devices. Explain types of topologies supported by Zegbee. State applications of Zegbee.
b) State various IOT Cloud platforms. Explain various performance metrics for cloud platforms in IOT.
c) Justify the costing structure of cloud for IoT in detail.

SLR-GE-107

Seat No.		Set	P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
RF Circuit Design (7076202)

Day & Date: Saturday, 06-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 Solve any two questions. **10**

a) Define S-parameters. Explain S parameters from SPICE analysis.
b) Define and Derive expressions for two port power gains.
c) Explain the working principal of Schotky diode.

Q.2 Solve any one question. **07**

a) Explain PIN diode phase shifter.
b) The S parameters for the HP HFET-102 GaAs FET at 2 GHz with a bias voltage of Vgs = 0 are given as follow (Z0 = 50 Ohm):
$S_{11} = 0.894, < -60.6, S_{21} = 3.122 < 123.6, S_{12} = 0.020 < 62.4,$
$S_{22} = 0.781 < -27.6$
Determine the stability of this transistor using the $K - \Delta$ test and the μ test, and plot the Stability circles on the Smith Chart.

Q.3 Attempt any three questions. **18**

a) Explain in brief types of lossless feedback amplifier.
b) Explain about different diodes like Gunn Diode. IMPATT diodes.
c) Explain how to design an amplifier for less than maximum gain, with a corresponding improvement in bandwidth.
d) Explain stability of amplifier and Derive the expressions for input and Output stability circles and also sketch stability circles using smith chart.

Section – II

Q.4 Solve any two questions. **10**

a) Explain two port oscillator design
b) Explain $K - \beta$ diagram and wave velocities.
c) Explain the process of filter design by insertion loss method.

Q.5 Solve any one questions. **07**

a) What is role of Richard transformation in implementation of filter? Explain in brief.
b) List MMIC fabrication Techniques and explain.

Q.6 Attempt any three questions. **18**

a) Write a note on Richards's transformation for filter implementation.
b) Explain the characteristics of ideal substrate material and ideal conductor material used for the manufacturing of monolithic microwave integrated circuits.
c) State the image parameters for T and π network of filter design.
d) Explain Kuroda's identity.

SLR-GE-108

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Artificial Intelligence & Machine Learning (7076203)

Day & Date: Monday, 08-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if required.

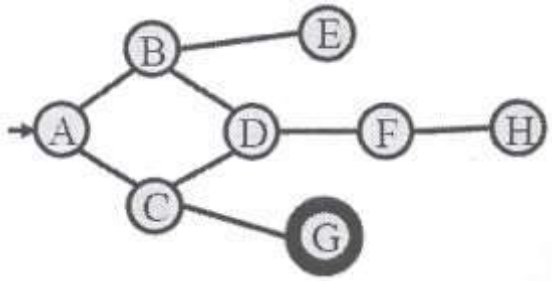
Section – I

Q.1 Solve any four **20**

a) What does the Turing test say about the nature of intelligence?
b) Define Breadth first-search and explain it with algorithm.
c) What are the goals of knowledge representation?
d) What do you mean by a well-posed learning problem?
e) Define an agent. What is an agent function?

Q.2 Solve any two **15**

a) Give PEAS description for different agent types.
b) Define in your own words the following terms: State, State space, Search tree, Search node, Goal, Action, Successor function, Branching factor.
c) Consider the following graph.



Starting from state A, execute DFS. The goal node is G. Show the order in which the nodes are expanded. Assume that the alphabetically smaller node is expanded first to break ties.

Section – II

Q.3 Solve any four **20**

a) What are the important objectives of machine learning?
b) Distinguish between Linear and Logistic Regression.
c) Explain the method for dimensionality reduction.
d) What is the objective of cluster analysis?
e) List out the applications of clustering algorithm.

Q.4 Solve any two. **15**

a) Differentiate between Supervised, Unsupervised and Reinforcement Learning.
b) Describe Maximum Likelihood Hypothesis for predicting probabilities.
c) How does the structure of decision tree help in classifying a data instance?

SLR-GE-109

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Cryptography and Network Security (7076204)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 Solve any four. **20**
- **a)** Explain the Symmetric cipher model.
- **b)** What is the difference between a block cipher and a stream cipher?
- **c)** Explain different types of key Management.
- **d)** Explain the security services.
- **e)** Explain RC5 algorithm in detail.

Q.2 Solve any two. **15**
- **a)** Explain a model for network security.
- **b)** Explain Triple DES algorithm in detail.
- **c)** Discuss implementation of RSA algorithm with suitable example.

Section – II

Q.4 Solve any four. **20**
- **a)** Explain what are the requirements of message authentication.
- **b)** Describe elements of public -key infrastructure.
- **c)** Write a note on Combining Security Associations.
- **d)** Write a note on viruses and related threats.
- **e)** Write a note on Kerberos.

Q.5 Solve any two. **15**
- **a)** Describe X.509 certificates.
- **b)** Discuss secure hash algorithm.
- **c)** Explain architecture of IPSec.

SLR-GE-112

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Automation and Industrial Robotics (7076208)

Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.
3) Use of non-programmable calculator is allowed.
4) Assume suitable data if required.

Section – I

Q.1 Solve Any Three **21**

a) Explain Automation in Production System.
b) What is PLC? Describe one of the applications of it.
c) Write Short notes on ladder logic functions.
d) Explain Advanced Automation Functions.

Q.2 Solve Any Two **14**

a) Write Short notes on Levels of Automation.
b) Enlist and Explain the terms of memory types?
c) Write Short notes on Electric wire.

Section – II

Q.3 Solve Any Three **21**

a) Write a short note on Pallet loading and unloading.
b) Explain the Electric actuation.
c) Explain the Machine loading.
d) Write a short note on Robotics and artificial intelligence.

Q.4 Solve Any Two **14**

a) Write a short note on application of robot in
1) Investment Casting
2) Spot Welding
b) Explain the terms of Spot welding, Arc welding.
c) Explain touch sensing & Vision.

SLR-GE-113

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics & Telecommunication Engineering
Business Analytics (7076307)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining. Question no. 6 is compulsory in section II, and solve any one question from the remaining.
2) Figures to the right indicate full marks.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section I

Q.1 Attempt any two of the following.

a) What do you mean by Business Analytics? Explain the relation of Business Analytics process and Organization decision making process. **09**

b) Describe any three approaches for visualizing data. **08**

Q.2 a) What is Dimension Reduction. Elaborate the process of converting a Categorical Variable to a Numerical Variable. **09**

b) Explain in detail classification and prediction in data mining. **08**

Q.3 Write short notes on (any three) **18**

a) Business Analytics Process
b) Recommendation system using association rule mining
c) Manipulations in data visualization.
d) Curse of dimensionality

Section II

Q.4 a) Explain the method for Evaluating Predictive Performance in detail. **09**

b) Describe the Regression Equation and Prediction. **08**

Q.5 a) Explain in detail the Tree Structure and how to evaluate the Performance of a Classification Tree. **09**

b) Explain feature selection for clustering in detail. **08**

Q.6 Write short notes on (any three) **18**

a) Advantages and Weaknesses of a Tree
b) Reducing the Number of Predictors
c) Confusion Matrix
d) K-means algorithm

SLR-GE-114

Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics & Telecommunication Engineering
Operation Research (7076308)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining.
2) Question no. 5 is compulsory in section II, and solve any one question from the remaining.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Briefly discuss 'duality' in linear programming. **05**

b) Max $Z = 3x + 5y$ **12**
Subject to
i) $3x + 2y \leq 18$
ii) $x \leq 4$
iii) $y \leq 6$
and $x, y \geq 0$

Q.2 **a)** Explain the term artificial variables and its use in linear programming. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
$Z = 40x_1 + 25x_2 + 50x_3$
Subject to
i) $x_1 + x_2 + x_3 \leq 36$
ii) $2x_1 + x_2 + 4x_3 \leq 60$
iii) $2x_1 + 5x_2 + 4x_3 \leq 45$
and $x_1, x_2, x_3 \geq 0$

Q.3 **a)** What are the characteristics of the Queuing System? **05**

b) Discuss the fields of application for queuing theory. Explain queue discipline and its various forms. **05**

c) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find out: **08**
i) Average queue length
ii) Average time spent in the system
iii) Probability that there would be two customers in the queue

Section – II

Q.4 **a)** Explain Selective Inventory management techniques. **05**

b) Explain the various costs associated with Inventory. **04**

c) The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 36 and the cost of carrying inventory is 25 per cent of the investment in the inventories. The price is Rs 10 per kg. Help the purchase manager to determine an ordering policy for raw material. **08**

Q.5 **a)** What are situations that make the replacement of items necessary? **04**

b) Write a note on Group Replacement Policy. **04**

c) A truck owner finds, from his past records, that the maintenance costs per year of a truck whose purchase price is Rs 8,000 are as given below: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	1000	1300	1700	2000	2900	3800	4800	6000
Resale Price	4000	2000	1200	600	500	400	400	400

Determine what time would it be profitable to replace the truck.

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. **12**

Activity (i-j)	Estimated Duration (weeks)	Immediate predecessor
A	5	-
B	7	A
C	2	B
D	3	B
E	1	C
F	2	D
G	1	C
H	3	E, F
I	10	G, H

i) Draw the network, find the critical path, the expected project completion time.

ii) What is the minimum completion time for the project?

b) What are situations that make the replacement of items necessary? **05**

SLR-GE-115

Seat No.		Set	P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics & Telecommunication Engineering
Cost Management of Engineering Projects (7076309)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 & 5 are compulsory.
2) Solve any two questions out of remaining 3 questions from each section.
2) Figure to the right Indicate full marks.
3) Assume necessary suitable data if required.

Section – I

Q.1	**a)**	What is Cost Estimating? State the objective of cost estimating.	**06**
	b)	Differentiate between costing and cost estimating and value analysis.	**05**
Q.2	**a)**	Explain in brief various elements of cost with one example.	**06**
	b)	Differentiate between fixed and variable cost.	**06**
Q.3	**a)**	Progress measurement and earned value	**06**
	b)	Two third technique of duration estimate of proposed project.	**06**
Q.4	**a)**	List various items which constitute the overhead expenses.	**06**
	b)	Explain in brief difference between cost, value and price with one example.	**06**

Section – II

Q.5	**a)**	What is the relation between Phases of project, life cycle and cost escalation?	**06**
	b)	Explain in brief feed forward techniques used in cost management.	**05**
Q.6	**a)**	What do you understand about integrated cost management programme? Explains with one example.	**06**
	b)	Explain with one example value engineering concept. Why there is need of value analysis?	**06**
Q.7	**Write detailed notes on.**		**12**
	a)	Earned Value Management	
	b)	Relationship between project. Cost, Value and Risk	
Q.8	**a)**	Why there is need for value management in project? Explain with one example.	**06**
	b)	Write detail note on - causes of changes in project	**06**

SLR-GE-116

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Electronics & Telecommunication Engineering
Non conventional Energy (7076310)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

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

Section I

Q.1 Attempt any two of the following. **14**
- **a)** Explain Conventional energy, sources with their advantages and disadvantages?
- **b)** Explain the Indian Power scenario for hydroelectric power potential?
- **c)** Explain the necessity of energy storage. What are the methods of energy Storage?

Q.2 What is Solar Collector? Compare concentrating and Non-Concentrating type Solar Collectors. **07**

Q.3 Attempt any two of the following. **14**
- **a)** Explain the hot air industrial process solar heating system with a neat sketch.
- **b)** What are the emerging new technologies for energy conservation and efficiency?
- **c)** Explain thermal energy storage with sensible heat storage and latent heat storage?

Section II

Q.4 Attempt any two of the following. **14**
- **a)** Describe the classification of Solar Cells based on the type of active material used?
- **b)** Explain the Solar PV array and how Solar PV output is maximized?
- **c)** What are the different modes of wind power generation? Explain stand-alone Mode of wind power generation?

Q.5 Attempt any one of the following. **07**
- **a)** What are the desirable features of the wind turbine siting?
- **b)** Explain the advantages of Biomass energy in detail?

Q.6 Attempt any two of the following. **14**
- **a)** Giving classification of fuel cells, explain its potential applications.
- **b)** Explain the Municipal Solid Waste (MSW) incineration plant?
- **c)** Explain with neat sketch Fuel Cell Power Plant.

SLR-GE-120

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
Computer Science & Engineering
Applied Algorithms (MTCSE101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 PM To 12:00 PM

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

Section I

Q.1 Answer both questions. **15**

a) Explain the concept of the growth of functions in the context of algorithm analysis.

b) Provide examples of algorithms and express their time complexity using asymptotic notation.

Q.2 Answer Any One question. **10**

a) Explain the Ford-Fulkerson algorithm for finding the maximum flow in a flow network.

b) Describe the Huffman coding algorithm for constructing variable-length codes.

Q.3 Answer Any One question. **10**

a) Describe the Johnson algorithm for solving the All-Pairs Shortest Paths problem.

b) Explain the concept of an optimal binary search tree.

Section II

Q.4 Answer both questions. **15**

a) Explain the convex hull problem in computational geometry.

b) Describe an algorithm for solving the closest pair of points problem.

Q.5 Answer Any One question. **10**

a) Explain with an example of how a problem is proven to be NP-complete through reducibility.

b) Define the travelling salesman problem and its applications.

Q.6 Answer Any One question. **10**

a) Explain the concept of the greatest common divisor (GCD) and write the applications of GCD in number theory.

b) Explain the concept of parallel algorithms using the mesh algorithm as an example.

SLR-GE-121

Seat No.	

Set P

F.Y. (M. Tech) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Theory of Computation (MTCSE102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Solve any four of the following. **24**

a) Design the finite automat for the following regular expression.
1) (0 + 1)*011
2) 1(01 + 10) + 0(11 +10)*

b) Construct the PDA for the following CFG.
G: S → aSa | bSb | c

c) Explain different types of grammar.

d) Explain any four variations of TM.

e) What is decidable language? prove that A_{CFG} is decidable.

Q.2 Solve any one of the following. **06**

a) Prove that halting problem of TM is undecidable.

b) Design the TM for accepting language of Palindrome.

Q.3 Discuss the TM and Computer. **05**

Section – II

Q.4 Solve any four of the following. **24**

a) Show that EQ_{TM} is undecidable

b) Illustrate the tractable and intractable problems.

c) Define Mapping Reducibility and show that if $A \leq_m B$ and B is decidable then A is decidable.

d) Explain Time complexity of TM.

e) Explain NP Problems with Example.

Q.5 Solve any one of the following. **06**

a) Show that Post Correspondence Problem is undecidable.

b) Show that ALL_{CFG} is undecidable.

Q.6 Explain Growth Rate Functions. **05**

SLR-GE-122

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Data Mining (MTCSE103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from each Section.
2) Figures to the right indicate full marks.
3) Assume suitable data if needed.

Section – I

Q.1 Define data warehouse. Explain how it differs from a traditional database? **07**

Q.2 Describe the essential components of a data warehouse architecture in detail. **07**

Q.3 Write a short note on modeling transaction. **07**

Q.4 Explain in detail association rule mining. **07**

Q.5 Define clustering. State the difference between clustering and classification? **07**

Q.6 Write a short note on decision tree algorithm. **07**

Q.7 Explain in detail KDD environment. **07**

Section – II

Q.8 What is data generalization? Explain in detail. **07**

Q.9 Describe the key steps involved in mining class comparison. **07**

Q.10 Explain in detail the main types of data mining primitives. **07**

Q.11 Write a short note on spatial mining. **07**

Q.12 What is web content mining? Explain in detail. **07**

Q.13 Write a short note on multimedia data mining. **07**

Q.14 Explain in detail mining descriptive statistical measures in large database. **07**

SLR-GE-123

Seat No.		Set	P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Machine Learning© (MTCSE104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Attempt any four questions. **20**

a) Compare supervised learning and unsupervised learning.
b) Explain Simple linear regression with an example.
c) Write the differences between Bagging and boosting.
d) Define machine learning. Write its applications.
e) Explain Bayesian logistic regression.

Q.2 Attempt Any Two questions. **10**

a) Explain the use of pruning method in the decision tree.
b) write differences between bias and variance.
c) explain the stochastic optimization technique.

Q.3 Attempt the following. **05**

Explain logistic regression with an example.

Section – II

Q.4 Attempt any four questions. **20**

a) Explain clustering with example.
b) Define neural network. Write its applications.
c) Explain the concept of Regularization.
d) Explain the terms training and testing.
e) Write the applications of clustering.

Q.5 Attempt Any Two questions. **10**

a) Explain Dirichlet process mixture models.
b) state the key ideas in machine learning and explain it.
c) explain the use of backpropagation in deep neural network.

Q.6 Attempt the following. **05**

Explain the Support vector machine with an example.

SLR-GE-124

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Natural Language Processing (MTCSE106)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.

Section-I

Q.1 Solve any two.
- **a)** What is NLP? Explain Components, terminologies and applications of NLP. **14**
- **b)** Explain Biology of speech processing in detail
- **c)** Explain phonetics in detail.

Q.2 Solve any two.
- **a)** What is semantic role? Explain different semantic roles with example. **14**
- **b)** What is semantic relatedness? Explain measures for semantic relatedness in detail.
- **c)** What is morphology? Explain morphology fundamentals in detail.

Q.3 Solve any one.
- **a)** Explain Parsing algorithms in detail. **07**
- **b)** Explain scope ambiguity and attachment ambiguity.

Section – II

Q.4 Solve any two. **14**
- **a)** Explain Viterbi algorithm in detail.
- **b)** Explain forward backward probability.
- **c)** Explain sentiment analysis and opinions on the Web.

Q.5 Solve any two. **14**
- **a)** Explain HMM training in detail.
- **b)** Explain Dependency parsing in detail.
- **c)** Explain Machine Translation and MT tools.

Q.6 Solve any one. **07**
- **a)** Explain sentiment analysis in detail.
- **b)** Explain Question answering in multilingual setting.

SLR-GE-127

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Object Oriented Software Engineering (MTCSE109)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section-I

Q.1 Write answers to any three questions **15**

a) Explain Multi-Disciplinary Overview in software Architecture.
b) Explain Software architecture in the context of the overall software life cycle.
c) Draw sequence diagram and collaboration diagram for issuing a book from Library.
d) Explain life cycle of domain object.

Q.2 Write answers to any two questions.

a) What is architectural modeling **10**
b) Define software architecture. explain it in detail
c) Explain State machines and advanced state machines.

Q.3 Attempt the following.

Draw and explain use case diagram for Student/Course Registration System. **10**
Assume necessary data.
At the beginning of each semester, students may request a course catalogue containing a list of course offerings for the semester. Information about each course, such as professor, department, and prerequisites, will be included to help students make informed decisions. The new system will allow students to select four course offerings for the coming semester. In addition, each student will indicate two alternative choices in case the student cannot be assigned to a primary selection. Once the registration process is completed for a student, the registration system sends information to the billing system so the student can be billed for the semester. The college will keep the existing course catalogue database where all course information is maintained.. The registrar's office will continue to maintain course information through another system. At the end of the semester, the student will be able to access the system to view an electronic report card. Professors will be able to access the system to sign up to teach courses as well as record grades.

Section-II

Q.4 Attempt any three questions. **15**

a) Explain code architecture view with example.
b) Explain Content design.
c) Compare product and quantity archetype patterns.
d) Explain Component-and-Connector View type.

Q.5 Attempt any two questions. **10**

a) Write a short note on IS2000: The Advanced Imaging Solution.
b) Explain Customer Relationship Management (CRM) Archetype Pattern.
c) Explain model-driven architecture with archetype Patterns.

Q.6 Attempt the following. **10**

Explain Patterns for Concurrent and Networked Objects in Detail.

SLR-GE-128

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Applied Algorithms (7079101)

Day & Date: Wednesday, 17-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Attempt the following questions. **15**
a) List and explain various criterias an algorithm must satisfy.
b) Write a note on Huffman Code.
c) Explain the concept of Longest Common Sequences.

Q.2 Attempt any one of the following questions.
a) What is Amortized Analysis? List and discuss various methods. **10**
b) With the help of suitable example, explain in detail Prim's algorithm.

Q.3 Attempt any one of the following questions. **10**
a) With the help of suitable example, explain in detail Ford-Fulkerson algorithm.
b) Discuss in detail Matrix Chain Multiplication Method. Use suitable examples.

Section – II

Q.4 Attempt the following questions. **15**
a) List and explain Line Segment Properties.
b) Discuss NP-Completeness and Reducibility.
c) Discuss Number Theoretic Notion.

Q.5 Attempt any one of the following questions. **10**
a) With the help of suitable example, explain indetail Jarvis March Algorithm.
b) With the help of suitable example, explain in detail Rabin-karp Algorithm.

Q.6 Attempt any one of the following questions. **10**
a) With the help of suitable example, explain in detail. The Vertex-Cover Problem algorithms.
b) With the help of suitable example, explain in detail Game Theoretic Techniques.

SLR-GE-129

Seat No.		Set	P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Theory of Computation (7079102)

Day & Date: Friday, 05-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

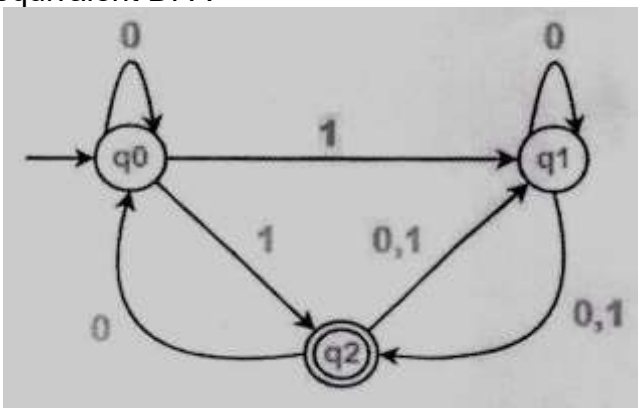
Section – I

Q.1 Attempt any Five. **25**

a) Explain finite automata and its types with example.
b) Explain CFG and its corresponding CFL with example.
c) Explain varients of TM in detail.
d) Prove that the Halting problem is undecidable.
e) Explain decidable languages with example.
f) Design a PDA for the language $L = \{a^n b^n \mid n >= 1\}$.

Q.2 Attempt any one **10**

a) Convert into its equivalent DFA



b) Explain Halting problem and diagonalization method.

Section – II

Q.3 Attempt any Five **25**

a) Explain Undecidable problems of regular languages with example.
b) Explain a simple undecidable problem in detail.
c) Explain recursive function with example.
d) Explain tractable problems.
e) Explain theory of optimization.
f) Explain the concept of reducability.

Q.4 Attempt any One **10**

a) Explain recursion theorem in detail.
b) Explain Computation of Growth rate of function.

SLR-GE-130

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Data Mining (7079103)

Day & Date: Sunday, 07-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from each Section.
2) Assume suitable data if needed.
3) Figures to the right indicate full marks.

Section – I

Q.1	What are different issues in data mining?	**07**
Q.2	What are the important steps in data warehouse implementation?	**07**
Q.3	Using k means clustering technique classify following data in 2 clusters. {2,4,10,12,3,20,30,11,25}	**07**
Q.4	Explain in brief data warehousing methodology.	**07**
Q.5	What is different similarity measures used for data mining techniques?	**07**
Q.6	What is classification? Explain nearest neighbor algorithm?	**07**
Q.7	Compare data mining verses KDD process.	**07**

Section – II

Q.8	Explain K-d tree with an example.	**07**
Q.9	Explain with algorithm temporal association rule.	**07**
Q.10	Explain web structure mining.	**07**
Q.11	Explain in brief applications of data mining.	**07**
Q.12	Explain in detail spatial data mining primitives.	**07**
Q.13	What are different visualization techniques?	**07**
Q.14	Write a short note on designing GUI based on a data mining query language.	**07**

SLR-GE-131

Seat No.		Set	P

F.Y. (M.Tech.) (Sem - I) (Old) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Machine Learning© (7079104)

Day & Date: Tuesday, 09-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Answer briefly any three **15**

a) What is a learning system? Draw a block diagram to represent it.
b) Generate a diagrammatic representation of a Decision Tree system.
c) Compare between Supervised and Reinforced learning.
d) Comment on Ensemble methods.
e) What is pruning w.r.t 'Decision trees'?

Q.2 Attempt Any Two. **10**

a) List and elaborate on different Linear Regression models.
b) How is machine learning carried out?
c) Demonstrate a over-fitting w.r.t Decision trees.

Q.3 Attempt Any Two. **10**

a) What are the steps in designing a linear regression model?
b) Illustrate Bagging and Boosting methods.
c) What are the types of machine learning? Illustrate each.

Section – II

Q.4 Answer briefly Any Three. **15**

a) What are the methods of modeling clusters? Illustrate.
b) How do Support Vector Machines work?
c) Define the term 'Splitting attribute' and illustrate how it is done in Decision Tree Learning.
d) Give the exact meanings of the terms 'Training' and 'Testing'.
e) How are number of hidden layers decided in Neural Networks?

Q.5 Attempt Any Two. **10**

a) List and illustrate the applications of deep Learning.
b) How does the Error Back-propagation Algorithm work?
c) Develop an output for Hierarchical clustering.

Q.6 Attempt Any Two. **10**

a) What are the applications of 'Machine Learning'? Illustrate one application.
b) What are the basic features of Neural Networks? Elaborate.
c) List the different types of Clustering. Illustrate one of these.

SLR-GE-132

Seat No.		Set	P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Natural Language Processing (7079106)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Answer briefly. (Any Three) **15**
- **a)** What does Natural language processing include?
- **b)** Generate a diagrammatic representation of a Word net.
- **c)** Compare between Machine learning and Natural language Processing activities.
- **d)** Comment on Word boundaries.
- **e)** How is Morphology dealt with in speech?

Q.2 Attempt Any Two. **10**
- **a)** List and elaborate on different models of speech.
- **b)** How is Morphological Learning carried out for Indian languages?
- **c)** Demonstrate various ambiguity problems w.r.t parsers.

Q.3 Attempt Any Two. **10**
- **a)** What are the steps in designing a speech analysis system?
- **b)** Illustrate rule based and probabilistic models for labeling in parsing.
- **c)** What are the types of Word net theories? Illustrate each.

Section – II

Q.4 Answer briefly. (Any Three) **15**
- **a)** What is phonology? How is it different from text classification?
- **b)** How does POS tagging work?
- **c)** Define the term ‘Speech recognition’ and illustrate.
- **d)** Give the exact meanings of the terms ‘Precision’ and ‘Recall’.
- **e)** What is sentiment analysis?

Q.5 Attempt Any Two. **10**
- **a)** List and illustrate the applications of Natural Language Processing.
- **b)** How does the Baum Welch Algorithm work?
- **c)** Develop an output for a cross lingual information retrieval system.

Q.6 Attempt Any Two. **10**
- **a)** What are the applications of ‘Sentiment Analysis’? Illustrate one application.
- **b)** What are the key perspectives on phonology? Elaborate.
- **c)** List the different types of graphical models used in NLP. Illustrate one of these.

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Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Research Methodology & IPR© (7079201)

Day & Date: Thursday, 18-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.

Section – I

Q.1 Solve any two. **14**
- **a)** List and explain characteristics of good research.
- **b)** Describe descriptive and conceptual research.
- **c)** Explain Research design in detail.

Q.2 Solve any two. **14**
- **a)** Explain Report writing and presentation of results in detail.
- **b)** Explain IEEE format in case of Report writing.
- **c)** Describe evaluation of report in detail.

Q.3 Solve any one. **07**
- **a)** Explain in detail how to write technical paper.
- **b)** Explain protocols and graphs in case of report writing.

Section – II

Q.4 Solve any two. **14**
- **a)** Explain need, techniques and classification of Mathematical modeling.
- **b)** What are IPR? Discuss ownership of Patents and their transferability.
- **c)** Explain in detail role of probability and statistics in simulation.

Q.5 Solve any two. **14**
- **a)** Explain in detail the procedure for grants of patents.
- **b)** Explain process of patenting and development.
- **c)** Write note on patenting under PCT.

Q.6 Solve any one. **07**
- **a)** Describe in detail Patents, Design, Trade and Copyright.
- **b)** Explain patent information and databases.

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Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Internet of Things (7079202)

Day & Date: Saturday, 06-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 Attempt any Two. **14**
- **a)** What are design principles for connected devices in IoT? Explain in detail.
- **b)** Explain in detail: IOT Node Structure.
- **c)** Write a short note on Bluetooth Smart in IOT.

Q.2 Attempt any Two. **14**
- **a)** What is a sensor network in IoT? Explain in detail.
- **b)** Draw and Explain Layered/Stack architecture of IoT.
- **c)** Write a note on: Networking in IoT.

Q.3 Describe ZigBee with help of its Architecture and Protocol Layers. **07**

Section – II

Q.4 Attempt any Two. **14**
- **a)** What are APIs in IOT? Explain in detail.
- **b)** Write a note on: AT &T M2M platform.
- **c)** Describe smart cities using IOT.

Q.5 Attempt any Two. **14**
- **a)** Write a note on: the role of IOT in smart grid.
- **b)** Explain in detail Raspberry Pi Interfaces.
- **c)** Compare between SQL vs NoSQL.

Q.6 How is IoT used in environment? Explain. **07**

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Seat No.	

Set P

F.Y (M. Tech) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Internet Routing Algorithm (7079203)

Day & Date: Monday, 08-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All question are compulsory.
2) Figures to the right indicates full marks.

Section – I

Q.1 Write answer to any two questions: **10**

a) Which IPv4 address blocks are reserved for current usage? Why is it necessary to reserve some addresses from an address space rather than making all of them available?

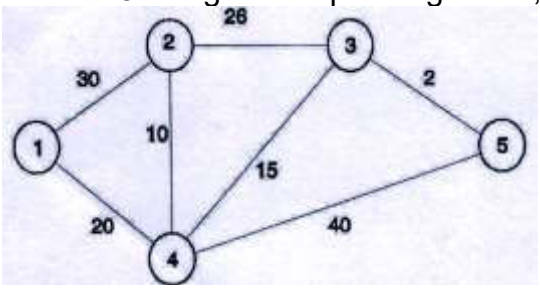
b) Write a short note on OSI Model.

c) Write a short note on network management architecture.

Q.2 Write answer to any two questions: **10**

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

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).



c) What are the different BGP timers?

Q.3 a) What are the different states in the BGP finite state machine? **10**

b) Explain Naive's solution for Packet classification. **05**

Section – II

Q.4 Write answer to any two questions. **10**

a) What is Policy Based Routing? State its three phases.

b) List the router bottlenecks and its cause.

c) With diagram explain Point-of-presence (Pop) topological architecture.

Q.5 Write answer to any two questions. **10**

a) Explain hierarchical tries solution for packet classification.

b) For a given IP address, how would you find out its home AS number?

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

Q.6 **a)** Explain the grid of tries type of two-dimensional packet classification algorithm and state its advantages. **10**

b) Which are the basic forwarding functions implemented in a router? **05**

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Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Reinforcement Learning (7079205)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 Solve any two of the following. **10**

a) What is Reinforcement Learning and how does it differ from other machine learning approaches?

b) Provide examples of real-world applications where Reinforcement Learning has been successfully implemented.

c) Explain the key elements of Reinforcement Learning and their roles in the learning process.

Q.2 Solve any three questions. **15**

a) Explain the concept of a k-armed Bandit Problem

b) What are action-value methods in Reinforcement Learning? And What is an incremental implementation?

c) Describe the Agent-Environment Interface and the concepts of goals and rewards.

d) Define returns. What is the Unified Notation for Episodic and Continuing Tasks with respect to reinforcement learning?

Q.3 Solve any two of the following **10**

a) Describe the role of Value Functions and What are Policies in the context of Finite Markov Decision Processes?

b) Define the Agent-Environment Interface Explain the concepts of Goals and Rewards.

c) Define Returns and Episodes and Discuss the significance of Unified Notation for Episodic and Continuing Tasks in Finite Markov Decision Processes.

Section – II

Q.4 Solve any three of the following. **15**

a) Briefly introduce Monte Carlo Methods and their role in Reinforcement Learning.

b) What is Policy Evaluation and Explain the Concept of Policy Improvement in Dynamic Programming?

c) What is Value Iteration and how does it differ from Policy Iteration in Dynamic Programming?

d) Discuss the concept of Asynchronous Dynamic Programming

Q.5 Solve any two of the following **10**

a) What is TD Prediction? Discuss the advantages of TD Prediction methods

b) Describe the Sarsa algorithm and its role in On-policy TD Control. What is Off-policy TD Control in Temporal-Difference Learning?

c) Discuss the role of models in planning and learning, and the concept of models and planning.

Q.6 Solve any two of the following **10**

a) Explain the Dyna architecture and how it integrates planning, acting, and learning.

b) How are personalised web services enhanced by the application of Reinforcement Learning? What is thermal soaring, and how does it relate to Reinforcement Learning?

c) Explain Watson's Daily-Double Wagering and How does optimizing memory control contribute to the performance of Reinforcement Learning algorithms?

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Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Advanced Cloud Computing (7079206)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 Solve any three of the following. **21**
- **a)** What is cloud computing? Explain working of cloud computing.
- **b)** Explain the term Business Driver for adopting cloud computing?
- **c)** Explain any one service model in details
- **d)** What is virtualization explain various approaches of virtualization.

Q.2 Solve the following. **14**
- **a)** Differentiate between cloud computing and distributed computing.
- **b)** Explain cloud computing stack.

Section – II

Q.3 Solve any three of the following. **21**
- **a)** What is platform as service model? Explain various issues and benefits of PaaS.
- **b)** What is service level agreement and why it is important in cloud computing?
- **c)** What are various access control policies with respect to cloud environment
- **d)** Explain Salesforce platform?

Q.4 Solve the following. **14**
- **a)** Explain cloud security at various levels such as network, host and application.
- **b)** Write short note on web 2.0.

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Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Software Defined Network (7079208)

Day & Date: Wednesday, 10-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Question No. 1 and 5 are compulsory.
2) Answer any two questions in each section.
3) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1 Answer briefly. **15**
a) Write a note Network Access Control.
b) Explain the reliability of SDN.
c) Describe the network protocol; ICMP and RIP.

Q.2 Answer the following.
a) Explain the architecture of SDN. **05**
b) Explain in detail the link state routing algorithms. **05**

Q.3 Answer the following.
a) Explain Opportunities and Challenges in SDN. **05**
b) Explain network as a service (NaaS). **05**

Q.4 Describe the following properties of SDN. **10**
a) Scalability
b) Consistancy

Section – II

Q.5 Answer briefly. **15**
a) Write a note on Mininet.
b) Explain Resource Utilization in SDN
c) Explain constrained forwarding model in Network Virtualization.

Q.6 Answer the following.
a) Write a short note on bandwidth calendaring. **05**
b) Explain the network management. **05**

Q.7 Answer the following.
a) Write and explain the applications of SDN design and development. **05**
b) Explain network service chaining and network programmability. **05**

Q.8 Write a note on following SDN Controller. **10**
a) POX
b) Floodlight

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Seat No.		Set	P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Infrastructure Management (7079210)

Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM to 05:00 PM

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

Section – I

Q.1 Attempt the following questions. **15**
a) List and Explain various Infrastructure activities.
b) Discuss how systems have eveolved from Mainframe to New-Age Systems.
c) Which complexities are to be dealt for today's computing environment?

Q.2 Attempt any one of the following questions. **10**
a) What are IT infrastructure design factors and considerations?
b) How finances are managed in service delivery process?

Q.3 Attempt any one of the following questions. **10**
a) How system components are identified to manage processes?
b) What do you understand by capacity management in service delivery?

Section – II

Q.4 Attempt the following questions. **15**
a) How configuration management is done? Discuss in detail.
b) What are various regulatory issues in infrastructure management? Discuss.
c) How archives are managed? What issues are faced while retrieving them?

Q.5 Attempt any one of the following questions. **10**
a) How are databases & their applications are secured in infrastructure projects?
b) How recovery is done in case of disasters? Discuss with examples.

Q.6 Attempt any one of the following questions. **10**
a) How various problems faced in managing infrastructure are tackled? Explain in detail.
b) How technology change management is handled in infrastructure sectors?

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Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Oct/Nov-2023
COMPUTER SCIENCE & ENGINEERING
Real Time Operating System (7079211)

Day & Date: Friday, 12-01-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Q.1 from section I and Q.5 from section II are compulsory.
2) Attempt any two questions from Q.2 to Q.4 for section I and any two questions from Q.6 to Q.8 for Section II.
3) Figures to the right indicates full marks.

Section-I

Q.1 Explain the features of languages which helps to promote desirable properties of software design. **07**

Q.2 **a)** Explain Memory Technology with respect to real time systems. **07**
b) Explain in detail instruction processing. **07**

Q.3 **a)** Explain Selection Criteria and a Metric for Commercial Real-Time Operating Systems. **07**
b) Explain different types of buffer. **07**

Q.4 **a)** Explain the synchronization policies. **07**
b) Demonstrate with example standard optimization techniques. **07**

Section – II

Q.5 Explain the role of UML in specification and design of software. **07**

Q.6 **a)** List and Explain models and elements of structured analysis and structured design. **07**
b) List and explain standard requirement classes. **07**

Q.7 **a)** Explain the software development Agile Methodologies. **07**
b) Explain term reliability and demonstrate the calculation of system reliability. **07**

Q.8 **a)** Explain single server queue model. **07**
b) Analyze memory Utilization giving example. **07**

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Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Computer Science & Engineering
Business Analytics (7079308)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining. Question no. 6 is compulsory in section II, and solve any one question from the remaining.
2) Figures to the right indicate full marks.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section I

Q.1 Attempt any two of the following.

a) What do you mean by Business Analytics? Explain the relation of Business Analytics process and Organization decision making process. **09**

b) Describe any three approaches for visualizing data. **08**

Q.2 a) What is Dimension Reduction. Elaborate the process of converting a Categorical Variable to a Numerical Variable. **09**

b) Explain in detail classification and prediction in data mining. **08**

Q.3 Write short notes on (any three) **18**

a) Business Analytics Process
b) Recommendation system using association rule mining
c) Manipulations in data visualization.
d) Curse of dimensionality

Section II

Q.4 a) Explain the method for Evaluating Predictive Performance in detail. **09**

b) Describe the Regression Equation and Prediction. **08**

Q.5 a) Explain in detail the Tree Structure and how to evaluate the Performance of a Classification Tree. **09**

b) Explain feature selection for clustering in detail. **08**

Q.6 Write short notes on (any three) **18**

a) Advantages and Weaknesses of a Tree
b) Reducing the Number of Predictors
c) Confusion Matrix
d) K-means algorithm

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Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Computer Science & Engineering
Operation Research (7079309)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 3 is compulsory in section I, and solve any one question from the remaining.
2) Question no. 5 is compulsory in section II, and solve any one question from the remaining.
3) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Briefly discuss 'duality' in linear programming. **05**

b) Max $Z = 3x + 5y$ **12**
Subject to
i) $3x + 2y \leq 18$
ii) $x \leq 4$
iii) $y \leq 6$
and $x, y \geq 0$

Q.2 **a)** Explain the term artificial variables and its use in linear programming. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
$Z = 40x_1 + 25x_2 + 50x_3$
Subject to
i) $x_1 + x_2 + x_3 \leq 36$
ii) $2x_1 + x_2 + 4x_3 \leq 60$
iii) $2x_1 + 5x_2 + 4x_3 \leq 45$
and $x_1, x_2, x_3 \geq 0$

Q.3 **a)** What are the characteristics of the Queuing System? **05**

b) Discuss the fields of application for queuing theory. Explain queue discipline and its various forms. **05**

c) In a service department manned by one server, on an average one customer arrives every 10 minutes. It has been found out that each customer requires 6 minutes to be served. Find out: **08**
i) Average queue length
ii) Average time spent in the system
iii) Probability that there would be two customers in the queue

Section – II

Q.4 **a)** Explain Selective Inventory management techniques. **05**

b) Explain the various costs associated with Inventory. **04**

c) The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 36 and the cost of carrying inventory is 25 per cent of the investment in the inventories. The price is Rs 10 per kg. Help the purchase manager to determine an ordering policy for raw material. **08**

Q.5 **a)** What are situations that make the replacement of items necessary? **04**

b) Write a note on Group Replacement Policy. **04**

c) A truck owner finds, from his past records, that the maintenance costs per year of a truck whose purchase price is Rs 8,000 are as given below: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	1000	1300	1700	2000	2900	3800	4800	6000
Resale Price	4000	2000	1200	600	500	400	400	400

Determine what time would it be profitable to replace the truck.

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. **12**

Activity (i-j)	Estimated Duration (weeks)	Immediate predecessor
A	5	-
B	7	A
C	2	B
D	3	B
E	1	C
F	2	D
G	1	C
H	3	E, F
I	10	G, H

i) Draw the network, find the critical path, the expected project completion time.

ii) What is the minimum completion time for the project?

b) What are situations that make the replacement of items necessary? **05**

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Seat No.		Set	P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Computer Science & Engineering
Cost Management of Engineering Projects (7079310)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 & 5 are compulsory.
2) Solve any two questions out of remaining 3 questions from each section.
2) Figure to the right Indicate full marks.
3) Assume necessary suitable data if required.

Section – I

Q.1	**a)**	What is Cost Estimating? State the objective of cost estimating.	**06**
	b)	Differentiate between costing and cost estimating and value analysis.	**05**
Q.2	**a)**	Explain in brief various elements of cost with one example.	**06**
	b)	Differentiate between fixed and variable cost.	**06**
Q.3	**a)**	Progress measurement and earned value	**06**
	b)	Two third technique of duration estimate of proposed project.	**06**
Q.4	**a)**	List various items which constitute the overhead expenses.	**06**
	b)	Explain in brief difference between cost, value and price with one example.	**06**

Section – II

Q.5	**a)**	What is the relation between Phases of project, life cycle and cost escalation?	**06**
	b)	Explain in brief feed forward techniques used in cost management.	**05**
Q.6	**a)**	What do you understand about integrated cost management programme? Explains with one example.	**06**
	b)	Explain with one example value engineering concept. Why there is need of value analysis?	**06**
Q.7	**Write detailed notes on.**		**12**
	a)	Earned Value Management	
	b)	Relationship between project. Cost, Value and Risk	
Q.8	**a)**	Why there is need for value management in project? Explain with one example.	**06**
	b)	Write detail note on - causes of changes in project	**06**

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Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: Oct/Nov-2023
Computer Science & Engineering
Non conventional Energy (7079311)

Day & Date: Tuesday, 26-12-2023 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

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

Section I

Q.1 Attempt any two of the following. **14**
- **a)** Explain Conventional energy, sources with their advantages and disadvantages?
- **b)** Explain the Indian Power scenario for hydroelectric power potential?
- **c)** Explain the necessity of energy storage. What are the methods of energy Storage?

Q.2 What is Solar Collector? Compare concentrating and Non-Concentrating type Solar Collectors. **07**

Q.3 Attempt any two of the following. **14**
- **a)** Explain the hot air industrial process solar heating system with a neat sketch.
- **b)** What are the emerging new technologies for energy conservation and efficiency?
- **c)** Explain thermal energy storage with sensible heat storage and latent heat storage?

Section II

Q.4 Attempt any two of the following. **14**
- **a)** Describe the classification of Solar Cells based on the type of active material used?
- **b)** Explain the Solar PV array and how Solar PV output is maximized?
- **c)** What are the different modes of wind power generation? Explain stand-alone Mode of wind power generation?

Q.5 Attempt any one of the following. **07**
- **a)** What are the desirable features of the wind turbine siting?
- **b)** Explain the advantages of Biomass energy in detail?

Q.6 Attempt any two of the following. **14**
- **a)** Giving classification of fuel cells, explain its potential applications.
- **b)** Explain the Municipal Solid Waste (MSW) incineration plant?
- **c)** Explain with neat sketch Fuel Cell Power Plant.

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Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: Oct/Nov-2023
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Satellite Communication (MTETC108)

Day & Date: Thursday, 11-01-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Solve any four of the following. **16**
- **a)** Explain in details Launch and Launch Vehicles.
- **b)** Explain different subsystems used in satellite
- **c)** Explain basic transmission Theory.
- **d)** What are different performance parameters for earth station
- **e)** Explain Coverage & frequency consideration.

Q.2 Solve any two of the following. **16**
- **a)** With the help of Block diagram explain Telemetry, Tracking & Command (TT&C) subsystem of satellite.
- **b)** Write short Notes on:
  1) Elliptical orbits
  2) Molniya orbit
  3) Iridium
- **c)** Explain Earth Station Architecture.

Section – II

Q.3 Solve any five of the following. **20**
- **a)** Write short Notes on:
  1) Teledesic
  2) Sun-synchronous orbit.
- **b)** Explain the working of VSAT hub master control station.
- **c)** Explain in brief different types of Earth Station.
- **d)** Write short note on Earth design consideration.
- **e)** Write a short note on transponders.
- **f)** Write short note on Equipment reliability and space Qualification.

Q.4 Solve any three of the following. **18**
- **a)** Compare Elliptical orbits & Sun-synchronous orbit
- **b)** Explain in details Altitude & Orbit Control system (AOCS).
- **c)** Explain the GPS position location principle. How does the position in GPS is done?
- **d)** Explain R.F equipment for Earth station.