SLR-JD-1

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Advanced structural analysis (MTCE0101)

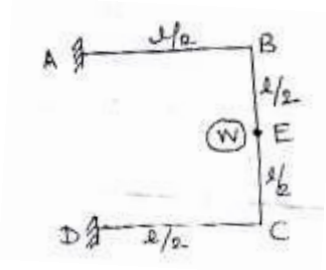
Day & Date: Monday, 13-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

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 moment at A, moment at C and shear force at C for fixed beam AB, C being its midpoint. Take ordinates at 2m interval and span AB = 10m. **12**

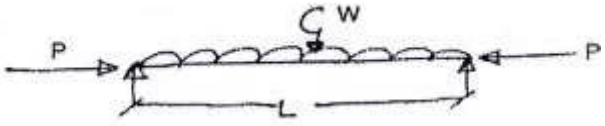
Q.2 A circular section of radius 'r' is bent as shown in the figure. It is subjected to downward load 'W' at point E. Determine, SF, BM and defection at E. Take G = 0.4 E **12**



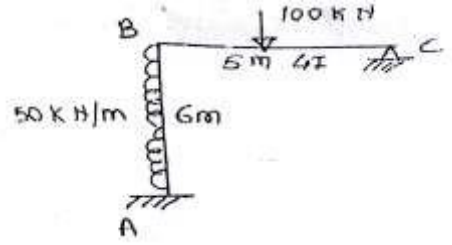
Q.3 An infinitely long beam supported on elastic foundation is subjected to a concentrated load P per unit width of Long Beam. Draw SFD, BMD, deflection and foundation pressure diagram. **11**

Section – II

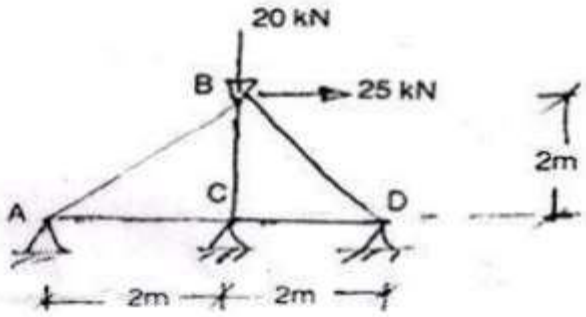
Q.4 A simply supported beam column is subjected to loading shown in Figure. Find maximum deflection and maximum bending moment in the beam column. **12**



Q.5 Analyze the frame shown in fig. 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-JD-2

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
CIVIL - (STRUCTURES ENGINEERING)
Advanced Solid Mechanics (MTCE0102)

Day & Date: Tuesday, 14-05-2024 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 indicates full marks.
3) 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 assumption made in theory of Elasticity.	**05**
Q.2		Write differential equilibrium equation of 3-D cylindrical coordinate systems.	**10**
Q.3	**a)**	Explain Plane strain condition.	**04**
	b)	Obtain differential equations of equilibrium for 2-D problems in Polar coordinate system.	**06**

Section – II

Q.4	**a)**	Explain Torsion of Rectangular bar.	**08**
	b)	Differentiate between Elasticity and Plasticity.	**08**
Q.5	**a)**	Explain Plastic Stress-Strain Relations.	**06**
	b)	Write short note on Isotropic hardening	**04**
Q.7	**a)**	Explain Von Mises Yield Criterion.	**04**
	b)	Write short note on Strain Hardening.	**05**

SLR-JD-3

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Dynamics & Earthquake Engineering (MTCE0103)

Day & Date: Wednesday, 15-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

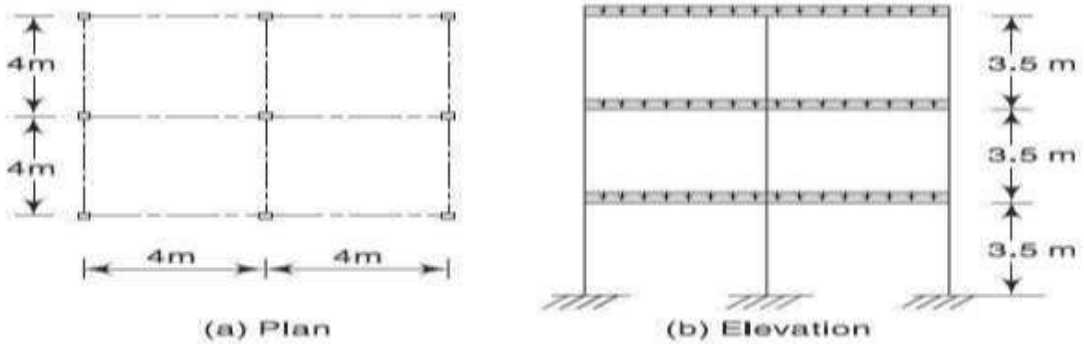
Instructions: 1) Solve any 5 questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary and assume it clearly.
4) Use IS 1893.

Q.1 From the first principle derive the governing differential equation of the undamped forced vibration. **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**



Q.5 **a)** Explain ductility of structure importance how will you make RCC structures, and steel structures ductile? **07**
b) Explain the design philosophy for seismic forces with reference to minor, moderate and severe earthquakes. How it is different from the gravity load design? **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)**	Differentiate between the magnitude and intensity of an earthquake. What are the different magnitude scales? How intensity of an earthquake is evaluated? Also, define iso-seismal lines.	**07**
	b)	What do you understand by soil liquefaction? Explain various remedial measures to control soil liquefaction.	**07**

SLR-JD-4

Seat No.	

Set P

F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Structural Audits (MTCE0106)

Day & Date: Thursday, 16-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) In Section-I Q. No. 1 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 3 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.

Section – I

Q.1 Solve following. **10**

a) Prepare the format involving any eight-information data of building for structural audit.

b) Describe the steps involved while performing structural audit. **05**

Q.2 Solve any TWO from following.

a) State methods used for repair of corroded RCC elements. Also, explain in brief any two of them. **10**

b) Describe the term Structural Health Monitoring and explain the purpose of executing Structural Health Monitoring with examples. **10**

c) Explain in details importance of SHM along with short and long-term monitoring. **10**

Section – II

Q.3 Solve following.

a) Explain various parameters for assessment for restoration strategies. **10**

b) Elaborate Shortly about Fire safety in buildings. **05**

Q.4 Solve any TWO from following.

a) Explain in details the Safety measures to be considered during construction. **10**

b) Explain the Procedure for demolition of building and structures. **10**

c) Discuss importance about study of structural system and structural drawings in Demolition of Structure. **10**

SLR-JD-6

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
Civil – (Structures Engineering)
Advanced Design of Foundation (MTCE0108)

Day & Date: Thursday, 16-05-2024 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)** Explain with neat sketches. **06**
1) General shear failure
2) Local shear failure
3) Punched shear failure

b) 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 $\emptyset = 35^0$. $N_q = 41.4$, $N\gamma = 42.4$ and $\gamma = 19$ kN/m^3 Determine the size of the footing if the water table is at a great depth. **06**

Q.2 **a)** Explain the procedure for the design of strap footing. **05**

b) Estimate the immediate settlement of a concrete footing 1m × 2m placed at a depth of 1m in a soil with E=25000 kN/m^2 and $\mu = 0.3$. The footing is subjected to a load of 400 kN. Assume the footing to be rigid and take influence factor as 1.31. **04**

c) Write a note on isolated footing. **04**

Q.3 **a)** Write a note on different types of raft foundation. **03**

b) Explain different design methods for raft foundation. **07**

Section – II

Q.4 **a)** Write a note on under-reamed piles. **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. Take a=0.7 and factor of safety 2.5. Also find safe allowable load. **08**

Q.5 **a)** What are the advantages and disadvantages of drilled pier compared to well foundation? **06**

b) What do you understand by scour depth and grip length? What is its importance in well foundation? **05**

Q.6 **a)** Explain the terms natural frequency, magnification, free vibration, forced vibration. **05**

b) Explain design of simple machine foundations using IS code method. **07**

SLR-JD-8

Seat No.	

Set P

F.Y. (M.Tech) (Sem - I) (New) (CBCS) Examination: March/April-2024
CIVIL – STRUCTURES ENGINEERING
Research Methodology and IPR© (MTCE0104)

Day & Date: Friday, 17-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q.No.3 and Q.No.6 are compulsory and solve any one question from remaining question from each section.
2) Figures to right indicate full marks.
3) Make necessary assumptions if required.

Section – I

Q.1 **a)** Explain literature survey in detail. **09**
b) Write short note on the 'Hypothesis' and 'Scientific Method'. **08**

Q.2 **a)** What is Research Design and Explain Necessity of 'Research Design'. **09**
b) Define research and explain steps in research. **08**

Q.3 **Write short notes. (Any Three).** **18**
a) Hypothesis
b) Research Proposal
c) Brain Storming
d) Types of data

Section – II

Q.4 **a)** What is patent? And what are rights of patentee? **08**
b) Write short note on 'Designs' and 'Trademarks'. **09**

Q.5 **a)** Write short note on the 'Technology Transfer' in detail. **08**
b) Explain the Steps to file patents in India. **09**

Q.6 **Write short notes. (Any Three).** **18**
a) Inventions which are not patentable in India
b) Right arising from trade mark registration
c) 'Geographical Indications'
d) 'Patent Database'

SLR-JD-9

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Advanced structure Analysis (70710101)

Day & Date: Monday, 13-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q.no1. 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, SF_c **11**

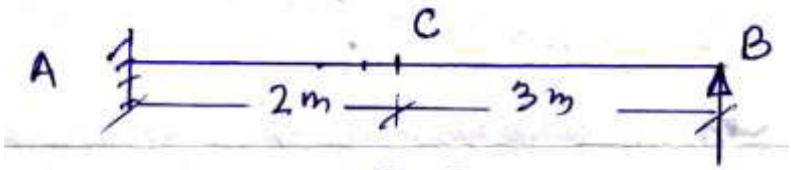


Fig ①

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

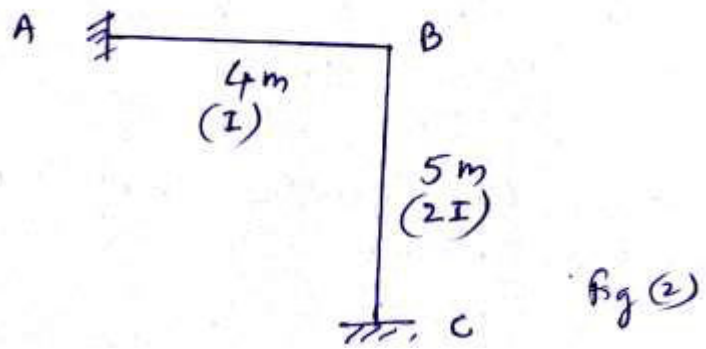


fig ②

Q.3 Draw SFD, BMD and TMD of BMC shown in following fig. 3 **12**

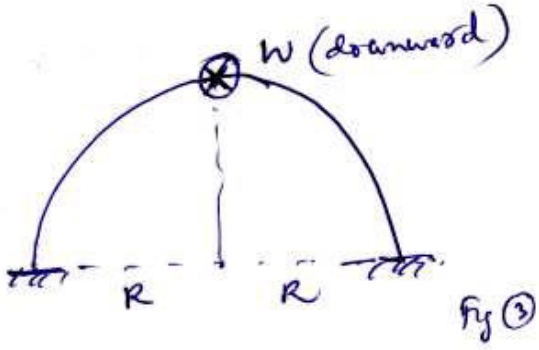


fig ③

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**

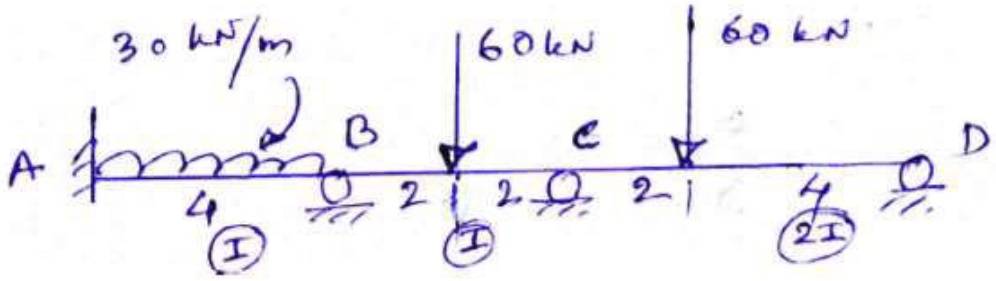
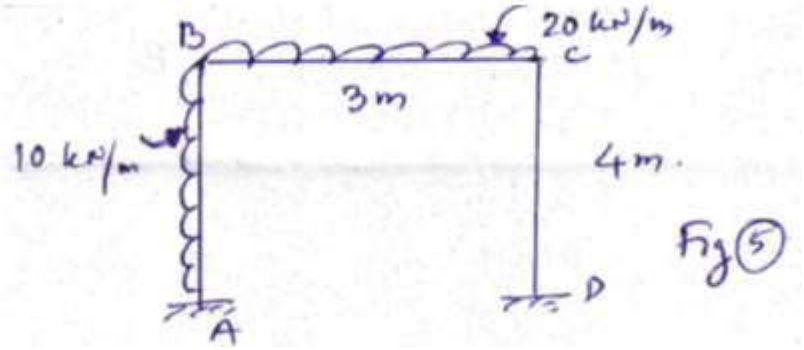


Fig – (4)

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



Q.7 **a)** Derive the equation for transformation matrix of truss element for displacement. **04**
b) Derive the equation for Global stiffness matrix of truss element. **08**

Q.8 A simply supported beam column is subjected to constant axial force ‘P’ and udl of ‘w’ throughout it’s length. Find maximum deflection and maximum BM in the beam column. **12**

SLR-JD-10

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
CIVIL - (STRUCTURES ENGINEERING)
Advanced solid Mechanics (70710102)

Day & Date: Tuesday, 14-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) Q.2 and Q.5 are compulsory.
2) Attempt any one question from both Section.
3) Figures to the right indicates full marks.
3) Use of non-programmable calculator is allowed.
4) Use suitable data if necessary and mention it clearly.

Section – I

Q.1 **a)** Write six combability equations in Cartesian co-ordinates for 3D problem of elasticity. **06**
b) What are Plane stress and plane Strain conditions? Describe with neat sketches and examples. **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 generalized Hooke's law. **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.5 **a)** Differentiate between Elasticity and Plasticity. **04**
b) What is idealized stress strain Curve? Explain with neat sketches. **07**
c) Write a short note on membrane analogy. **06**

Q.6 **Explain following terms.** **18**
a) Isotropic hardening.
b) Von Mises Criteria.
c) Idealized Stress strain curve.

Q.7 **a)** Tresca's Yield Criteria. **06**
b) Explain Principle of Normality and Plastic Potential. **05**
c) Explain Torsion of Rectangular bar. **06**

SLR-JD-11

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
CIVIL - (STRUCTURES ENGINEERING)
Structural Dynamics (70710103)

Day & Date: Wednesday, 15-05-2024 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 Derive an expression for force transmitted to foundation by a reciprocating type of machine exerting an external force $F(t) = F_o \sin(\omega t)$. Plot the graph of transmissibility vs frequency ratio for the damping ratio R = 5% and 10%. **14**

Q.2 **A)** A damper offers resistance 0.08N at a constant velocity of 0.06m/s. The damper is used with a spring of stiffness equal to 12N/m. Determine the damping ratio and Damped natural frequency of the system with mass of the system as 0.3kg. **10**

B) Write a note on Transmissibility ratio. **04**

Q.3 A 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**

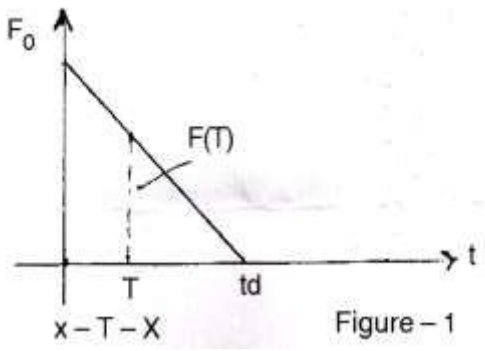


Figure – 1

Q.4 From the first principle derive the governing differential equation of damped forced vibration of a four storey building. Also explain two numerical methods to find fundamental natural frequencies. **14**

Q.5 Determine first three frequencies and mode shapes for a simply supported continuous beam. **14**

Q.6 A two-degree of freedom system has properties as shown in Figure. 2. Determine the natural frequency and mode shapes of the system. **14**

Consider $k_1 = 3\ kN/m$; $k_2 = 2\ kN/m$; $k_3 = 5kN/m$

$m_1 = 200kg$ $m_2 = 300kg$.

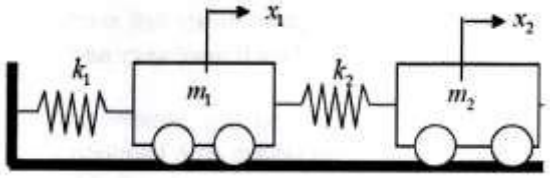


Figure 2

Q.7 **Write a note on.** **14**

a) Orthogonality conditions

b) Modal Analysis of MDoF system

SLR-JD-12

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: March/April-2024
Civil – (Structures Engineering)
Research Methodology and IPR© (70710104)

Day & Date: Thursday, 16-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Make suitable assumptions if required.

Section – I

Q.1 **a)** Describe the different types of research, clearly pointing out the difference between an experiment and a survey. **09**

b) Explain the meaning of the following in context of Research design. **08**
1) Extraneous variables
2) Research hypothesis

Q.2 **a)** Under what circumstances stratified random sampling design is considered appropriate? How would you select such sample? Explain by means of an example. **09**

b) Discuss the process of 'Research problem formulation' with a suitable example. **08**

Q.3 **Write short notes on any Three of the following.** **18**
a) Quantitative research and qualitative research.
b) Hypothesis and its testing.
c) Brain storming technique for 'Idea' generation.
d) Errors in a research.

Section – II

Q.4 **a)** List the types if Intellectual property and explain those in a brief. **09**

b) What is a Patent? What can be patented? Describe the process of application for a patent? **08**

Q.5 **a)** What are the objectives of granting a copyright? How is it useful for encouraging authors, composers and artists? **09**

b) What is mean by '"Design' under the Designs Act, 2000? How one can get information on registration of design? **08**

Q.6 **Write short notes. (Any Three)** **18**
a) Benefits of registering a trademark and the remedies for infringement of a trademark.
b) Trade secrets and Geographical Indicators.
c) 'Copy Right' and the types of Intellectual works for which one can take a copyright.
d) Various stages involved in the grant of patent?

SLR-JD-13

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (Old) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Advanced Design of Concrete Structures (70710106)

Day & Date: Friday, 17-05-2024 Max. Marks: 70
Time: 09:00 AM To 01:00 PM

Instructions: 1) In Section – I, Q. No. is 3 is compulsory and attempt one question from the remaining.
2) In Section – II, Q. No. is 4 is compulsory and attempt one question from the remaining.
3) Use of IS 456 and IS 3370 part IV are allowed.
4) Assume suitable data if necessary.
5) Draw neat sketches wherever necessary.

Section – I

Q.1 **a)** A circular slab of diameter $6.2\ \mathrm{m}$ is subjected to a super imposed load of $4\ \mathrm{kN/m^2}$. It may consider as simply supported. Use $\mathrm{M_{25}}$ grade of concrete and $\mathrm{Fe_{500}}$ steel. Design the slab and sketch the reinforcement details. Assume Poisson's ratio as zero. **13**

b) Draw the section for flat slab, section passing through middle strip and column strip. **04**

Q.2 **a)** A simply supported deep beam is $300\ \mathrm{mm}$ wide, $4200\ \mathrm{mm}$ deep and has a clear span of $6\mathrm{m}$. The carries a superimposed load of $300\ \mathrm{kN/m}$. The beam has a bearing of $450\ \mathrm{mm}$ at each end. Design the beam with $\mathrm{M_{20}}$ concrete and $\mathrm{Fe_{500}}$ steel. **14**

b) Explain imperial design method for shear wall subjected to in plane vertical loads. **03**

Q.3 **a)** Design a combined footing to support two columns of $400\ \mathrm{mm} \times 400\ \mathrm{mm}$ and $600\ \mathrm{mm} \times 600\ \mathrm{mm}$ spaced $4.5\ \mathrm{m}$ apart, carrying axial loads of $1000\ \mathrm{kN}$ and $1200\ \mathrm{kN}$ respectively. The SBC of the soil is $200\ \mathrm{kN/m^2}$. Adopt $\mathrm{M_{20}}$ grade of concrete and $\mathrm{Fe_{415}}$ steel. **14**

b) Draw a neat sketch showing reinforcement arrangement in case of raft footing. **04**

Section – II

Q.4 Design a circular ESR by assuming top slab simply supported at edges, vertical walls by assuming top free and bottom hinged. The bottom slab is supported by beams resting on four peripheral columns. The circular ESR is having capacity 40,000 litres. The depth of water may be kept as $3.5\ \mathrm{m}$ with free board $0.3\ \mathrm{m}$. Adopt IS code method of design and use $\mathrm{M_{25}}$ grade of concrete and $\mathrm{Fe_{500}}$ Steel. **18**

Q.5 **a)** A silo with internal diameter $5.2\ \mathrm{m}$, height of cylindrical portion $18\ \mathrm{m}$ and central opening with $0.5\ \mathrm{m}$ is to be built to store wheat. Design the silo using M_{25} concrete and Fe_{500} steel. **14**

b) Draw a sketch of bunker and show its components. **03**

Q.6 Design a R.C. chimney using M_{25} concrete and Fe_{500} steel for the following requirement and check the stresses at a depth $52\ \mathrm{m}$ below the top. **17**
External Diameter = $4.3\ \mathrm{m}$ and
Internal diameter = $4.0\ \mathrm{m}$.
Thickness of fire brick lining = $100\ \mathrm{mm}$ and air gap is $100\ \mathrm{mm}$.
Temperature difference is 80° C. Assume missing data suitably.

SLR-JD-15

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
CIVIL - (STRUCTURAL ENGINEERING)
Advanced Design of Foundation (70710108)

Day & Date: Friday, 17-05-2024 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)** Derive Terzaghi's formula for ultimate bearing capacity. **08**

b) A square footing $1.7\text{m} \times 1.7\text{m}$ is placed over loose sand of density $16\ \text{KN/m}^3$ and at a depth of $0.9\ \text{m}$. The angle of shearing resistance is 30°. Determine the Total load that can be carried by the footing. Take $\text{N}_\text{c} = 30.14$, $\text{N}_\text{q} = 18.4$ and $\text{Ny} = 15.1$. **05**

Q.2 **a)** Differentiate between shallow and deep foundations **03**

b) Explain in detail design of strap footing. **05**

c) Estimate the immediate settlement of a concrete footing $1\text{m} \times 2\text{m}$ placed at a depth of 1m in a soil with $\text{E} = 25000\ \text{KN/m}^2$ and $\mu = 0.3$. The fooling is subjected to a load of $400\ \text{KN}$. Assume the looting to be rigid and take influence factor as 1.31. **04**

Q.3 **a)** What are different types of raft foundation? **03**

b) Explain in detail the conventional design of raft foundations. **07**

Section – II

Q.4 **a)** Write a note on classification of piles. **04**

b) In a 16 pile group, the pile diameter is $450\ \text{mm}$ and centre to centre spacing of the square group is $1.5\ \text{m}$. If $\text{C} = 50\ \text{KN/m}^2$, 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 $10\ \text{m}$ long. Take $\text{a} = 0.7$ and factor of safety 2.5. Also find safe allowable load. **08**

Q.5 **a)** Describe various components of well foundation by typical sketch. **06**

b) Discuss in detail forces acting on well foundation. **05**

Q.6 **a)** Describe various types of machine foundation. **04**

b) Explain IS-code method of machine foundation. **08**

SLR-JD-17

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
FEM in Structural Engineering (MTCE0201)

Day & Date: Tuesday, 21-05-2024 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 Principle of minimum potential energy, variation principle. **09**
b) Explain the concept of FEM briefly and outline the procedure. **05**

Q.2 **a)** Derive the expression for shape function for a two noded bar element taking natural coordinate ξ as varying from -1 to 1. **05**
b) Determine the shape functions for 4 noded rectangular elements. Use natural coordinate system. Solution: The typical 4 noded rectangular element shown in following figure: 1 **09**

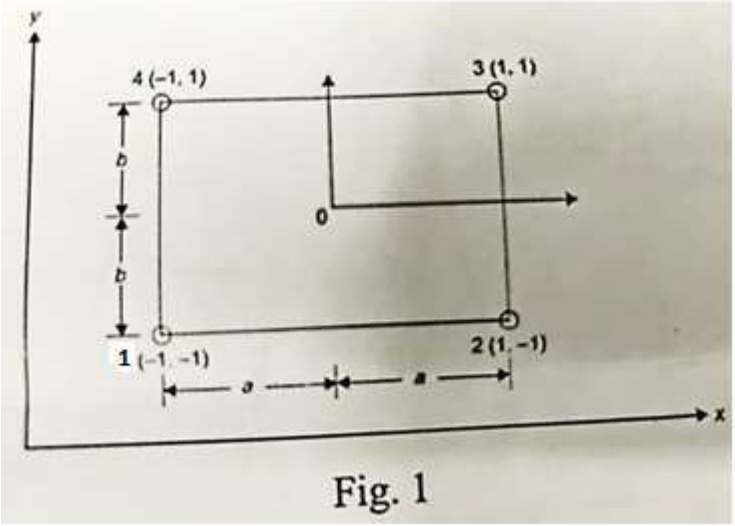


Fig. 1

Q.3 a) Explain the terms. **06**
i) Constant strain triangle (CST)
ii) Linear strain triangle (LST)
iii) Quadratic strain triangles (QST
b) Discuss the various points to be considered while discretizing a structure for finite element analysis. **08**

Q.4 a) Explain Nodes, primary nodes, secondary nodes, and internal nodes. **04**

b) Determine the extension of the bar shown in Fig.2 due to self-weight and a concentrated load of 400N applied at its end. Given b_1 = 150 mm b_2 = 75 mm t = 20 mm E = 2 x 10^5 N/mm^2 p =08 X 10^{-4} N/mm^3 **10**

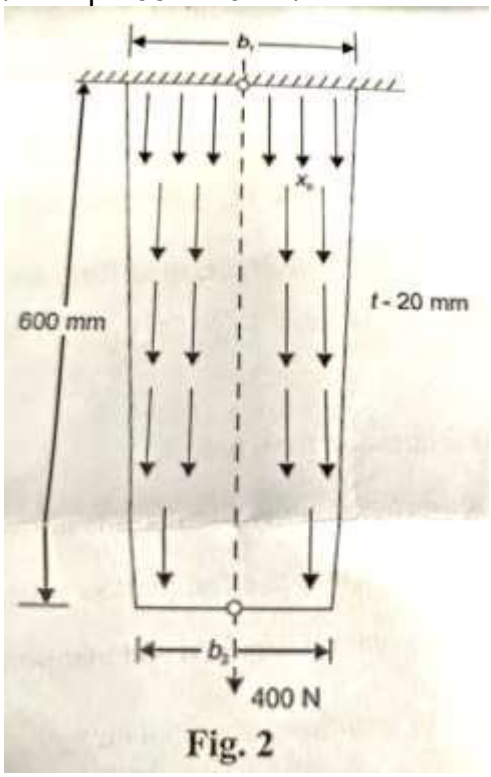


Fig. 2

Q.5 **a)** Explain the isoparametric concept in finite element analysis and explain the isoparametric concept in finite element analysis. **10**

b) Explain Gaussian quadrature integration technique. **04**

Q.6 **a)** Determine the Cartesian coordinate of the point P $(\xi = 05, \eta = 06)$ shown in Fig. 3 **08**

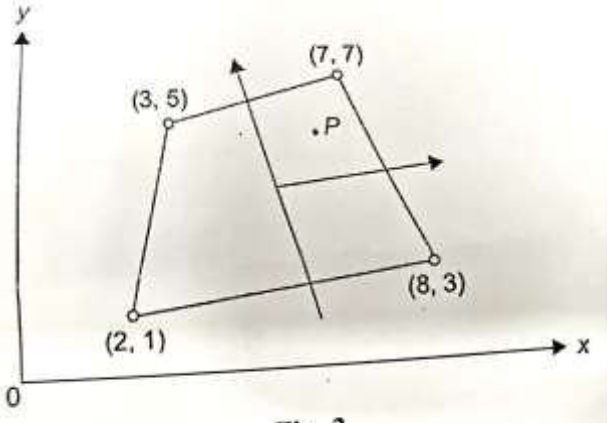


Fig. 3

b) Explain finite element application to structural dynamics. **06**

Q.7 **a)** Explain development of stiffness matrix for tetrahedron element. **10**

b) What is axisymmetric element and explain hamillon's principle. **04**

SLR-JD-18

Seat No.	

Set P

F.Y. (M. Tech) (Sem- II) (New) (CBCS) Examination: March/April-2024
CIVIL (STRUCTURAL ENGINEERING)
Advanced Design of Concrete Structures (MTCE0202)

Day & Date: Saturday, 25-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 1 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Assume suitable data wherever needed and mention it clearly.
5) Use of calculator and IS 456, IS 3370 Part IV are allowed.
6) Draw the appropriate sketches wherever necessary.

Section – A

Q.1 **a)** Explain with neat sketch the reinforcement details for flat slab. **05**

b) Design a circular slab and sketch the reinforcement details by using following data: **12**
1) Diameter of slab = 5.8 m
2) Superimposed load = 4 kN/m^2
3) Support condition = Partially fixed
4) Materials = M20 & Fe 500

Q.2 Design a reinforced concrete combined rectangular slab footing for two columns located at 4.5 m apart. The overall sizes of the columns are 400 mm x 400 mm and 600 x 600 mm and they transfer the loads 600 kN and 1000 kN respectively. The centre of the lighter column is 0.4 m from the property line. The SBC of soil is 150 kN/m^2. Use M20 & Fe 415. Sketch the reinforcement details. **18**

Q.3 **a)** A simply supported deep beam is 300 mm wide, 4200 mm deep and has a clear span of 6m. The carries a superimposed load of 300 kN/m. The beam has a bearing of 450 mm at each end. Design the beam with M20 concrete and Fe500 steel. **14**

b) Explain imperial design method for shear wall subjected to in plane vertical loads. **04**

Section – B

Q.4 **a)** Design a top slab by assuming simply supported at edges, vertical walls by assuming top free and bottom hinged. The bottom slab is supported by beams resting on four peripheral columns. The circular ESR is having capacity 40,000 litres. The depth of water may be kept as 3.2 m with free board 0.3m. Adopt IS code method of design and use M25 grade of concrete and Fe500 Steel. **14**

b) Draw a sketch of bunker and show its components. **04**

Q.5 A silo with internal diameter 5.5 m, height of cylindrical portion 18 m and central opening with 0.5 m is to be built to store wheat. Design the silo using M25 concrete and Fe500 steel. **17**

Q.6 **a)** Design R.C chimney using M25 concrete and Fe500 steel for the following requirement and check the stresses at a depth 50m below the top. External Diameter 4.3 m and internal diameter 4.0 m. Thickness of fire brick lining 100 mm and air gap is 100 mm. Temperature difference is 80° C. Assume missing data suitably. **14**

b) Write on temperature stresses developed in chimney. **04**

SLR-JD-19

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (New) (CBCS) Examination: March/April 2024
CIVIL STRUCTURES ENGINEERING
Special Concrete & Concrete Composite (MTCE0203)

Day & Date: Monday, 27-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) All question are compulsory.
2) Draw neat sketches whenever necessary.
3) Figures to the right indicate full marks.

Section – I

Q.1 Attempt Any SEVEN.

a)	Differntiate Ferrocement and Fiber Reinforced Concrete?	**05**
b)	What is Ferrocement? What are the applications of Ferrocement.	**05**
c)	Explain properties of Materials used in Ferrocement.	**05**
d)	Explain applications of Ferrocement.	**05**
e)	What is Light weight concrete? What are the applications of Light weight concrete?	**05**
f)	What is High Density Concrete? What are the applications of High Density Concrete?	**05**
g)	Explain uses Fly Ash in Concrete and availability of Fly Ash in Concrete?	**05**
h)	Enlist Chemical admixtures used in concrete? Explain any one?	**05**
i)	Explain Self-Compacting Concrete.	**05**
j)	What is high performance concrete? What are the applications of High Performance Concrete?	**05**

Section – II

Q.2 Attempt Any SEVEN.

a)	Explains types of fiber used in concrete in details.	**05**
b)	What is fiber reinforced concrete? State the applications of fiber reinforced concrete.	**05**
c)	Explain the behaviour of fiber reinforced concrete under flexure.	**05**
d)	What is silica fume concrete? Explain advantages of silica fume concrete.	**05**
e)	Explain the effect of silica fume on workability of concrete.	**05**
f)	Explain the physical and chemical properties of silica fume concrete.	**05**
g)	Explain the mechanical properties of silica fume concrete.	**05**
h)	What is polymer concrete? What are its application?	**05**

i) State the role polymer inconcrete. **05**

j) State the role of polymer in concrete. **05**

SLR-JD-20

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
CIVIL - (STRUCTURES ENGINEERING)
Theory of Plates and Shell (MTCE0206)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 1 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 4 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Assume suitable data, if required and mention it clearly.

Section – I

Q.1	**a)**	State the assumptions made in developing bending theory of thin plates with small deflections.	**04**
	b)	Distinguish between theory of thin plates with small deflections and thin plates with large deflections.	**04**
	c)	Derive differential equation for the deflection surface of laterally loaded rectangular Plates.	**10**
Q.2	**a)**	Compare Navier's method and Levy's methods as applied to solution of rectangular plate problems.	**05**
	b)	Using Navier's solution obtain expression for deflection of a simply supported plate subjected to UDL.	**12**
Q.3	**a)**	Write a note on different boundary conditions for rectangular plates.	**05**
	b)	Analyse a circular plate of radius 'a' supported throughout along its outer edgeand subject to uniform moment M.	**12**

Section – II

Q.4	**a)**	Explain application of Shells in civil engg with neat sketches.	**07**
	b)	Obtain equations of equilibrium for cylindrical shells using membrane theory.	**11**
Q.5	**a)**	Describe Membrane theory of shells. Also explain advantages of shells over plates.	**10**
	b)	A cylindrical pipe carries fluid under a pressure of 100 N/mm^2. Find maximum hoop and circumferential stress developed in pipe if a thickness of pipe is 10 mm and diameter is 1 m. Take modulus of Elasticity for pipe material as 2×10^5 N/mm^2.	**07**
Q.6	**a)**	Differentiate between the membrane theory and the bending theory of shells	**07**
	b)	Describe thermal stresses in plates and shells.	**10**

SLR-JD-22

Seat No.		Set	P

F.Y. (M. Tech) (Sem - II) (New) (CBCS) Examination: March/April-2024
CIVIL– (STRUCTURES ENGINEERING)
Repair and Rehabilitation of Structures (MTCE0208)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

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

Q.1	**a)**	Explain the primary causes of deterioration in concrete structures. Discuss how environmental factors contribute to the degradation of concrete.	**07**
	b)	Describe the common diagnostic methods used to assess the condition of concrete structures.	**07**
Q.2	**a)**	Explain the role of protective coatings in preventing corrosion of concrete structures. Explain the electrochemical mechanisms involved in the corrosion of steel reinforcement.	**07**
	b)	Describe how different climatic conditions influence the serviceability and durability of concrete structures.	**07**
Q.3	**Solve Any Two.**		
	a)	Define Deterioration, Repair, Rehabilitation, Retrofit, Restoration of concrete structures.	**07**
	b)	Explain the Rapid Visual Inspection in detail.	**07**
	c)	List and Summarize the factors contributing to corrosion of RC Structures.	
Q.4	**a)**	Discuss the various facets or components involved in maintenance programs for concrete structures.	**07**
	b)	Describe the process of applying protective coatings and the factors affecting their performance and longevity.	**07**
Q.5	**a)**	Describe measures to prevent cracking and spalling in concrete due to thermal expansion and contraction.	**07**
	b)	Discuss the importance of visual inspections and non-destructive testing techniques in structural assessment.	**07**
Q.6	**a)**	Discuss the potential consequences of water leakage on the structural integrity and durability of concrete structures.	**07**
	b)	Discuss the challenges associated with repairing concrete structures after fire damage, including concerns about residual strength and material properties	**07**
Q.7	**a)**	Explain the principles behind testing techniques such as ultrasonic testing, rebound hammer testing, and core sampling.	**07**
	b)	Discuss the role of routine maintenance versus corrective maintenance in structural preservation.	**07**

SLR-JD-25

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Design of RCC Bridges (MTCE0211)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 6:00 PM

Instructions: 1) Q. No.3 and Q. No. 4 are compulsory. Solve any one remaining questions from Section I.
2) Q. No.6 and Q. No. 7 are compulsory. Solve any one remaining questions from Section II.
3) Figures to the right indicates full marks.
4) Assume suitable data is necessary and mention it clearly.

Section – I

Q.1 **a)** An RCC deck slab bridge is to be constructed over a trapezoidal channel of 6m base width and side slope 1:1 laid at a bed slope of 0.2 m/km. The following details are available. Design the slab bridge. **11**

1) Chezy s constant =60.
2) Bed level of stream: 100 m
3) Bottom slab level: 103.0 m
4) Loading - IRC Class AA (Tracked)
5) Materials- M25 Concrete, Fe 415 Steel
6) Road width=7.5 m
7) Footpath: 600 mm on either side
8) Wing wall; Splayed type
9) Span Of the deck =4 m

Give details of reinforcement with the help of neat sketch.

Q.2 A box culvert having inside dimension of 3m × 3m. this culvert is subjected to a dead load of 14kN/m^2 and a live load of IRC Class AA tracked vehicle. Assume the unit weight of soil to be 18 kN/m^3. the angle of repose of soil is 30^0.Use M25 concrete and 415 steel. Road width is 7.5 m. Span is 3.3 m. Calculate Bending moment, Shear force and axial force, for the case Dead load and live loads acting from outside side, while water pressure acting from inside. **11**

Q.3 **a)** Write a note on Piguad's theory for the analysis of slab panels. What is the limitations of the theory? **06**

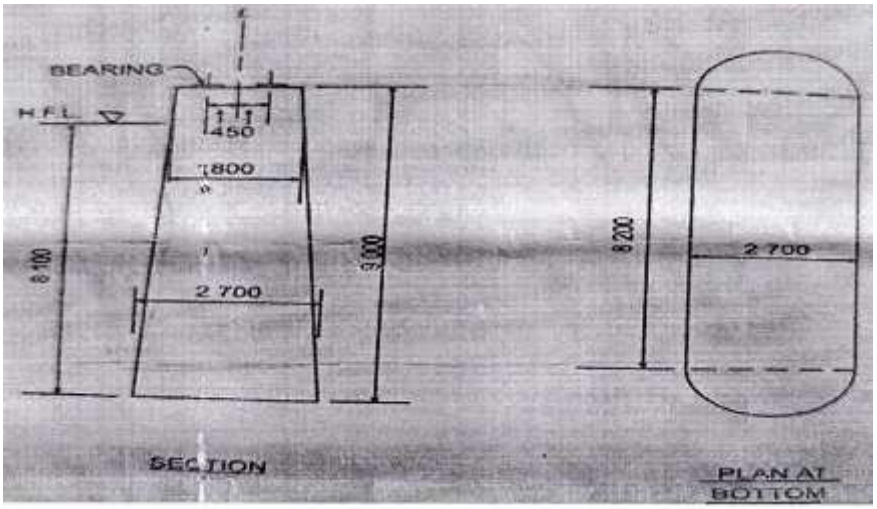
b) Define bridge alignment. Explain factors affecting on selection of site of bridge. **06**

Q.4 **Write short note on.** **12**

a) Write importance of bridge engineering.
b) Investigation of bridge site.
c) Breaking forces on bridge.
d) Bridge bearing

Section – II

Q.5 Design of pier By using following data **11**
Super structure: Simply supported T- beam of 21.3 m span
Foundation: Well foundation
Reaction due to live load on the one span = 900 kN
Dead load from each span=2250 kN.
Maximum mean velocity of current =3.6 m/sec
Material for pier: Cement concrete M 20 grade
Live load: IRC Class A whichever produces severer effect
Only the straight portion of the pier will be considered in design here.
It is required to check the adequacy of the dimensions.



Q.6 **Write Short note on:** **12**
a) Erection method of bridges.
b) Forces on bearing.
c) Types of the pier.
d) Piles & Caissons.

Q.7 **a)** Write on different types of abutment with their suitability. **04**
b) Write note on expansion bearing. Enlist type of Expansion bearing and explain any one with sketch. **04**
c) Explain various types of expansion joints. **04**

Q.8 **a)** It is required to design an elastomeric pad bearing foe a two-lane R.C. T-beam bridge of 15.0 m clear span with following data: **06**
Maximum Dead load reaction per bearing: 280KN
Maximum live load reaction per bearing: 520KN
Vertical reaction induced by longitudinal forces per bearing : 12kN
Longitudinal force per bearing : 33 kN
Concrete for t- beam and bed block over pier: M20
A1/A2 >2
Rotation at bearing of superstructure due to D.L. and L.L.=0.0025 rad.
b) Explain Types of bridge maintenance. **05**

SLR-JD-28

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
FEM in Structural Engineering (70710201)

Day & Date: Tuesday, 21-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) Solve any 5 questions.
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.

Q.1 **a)** Explain the concept of FEM briefly and outline the procedure. **05**
b) Explain Principle of minimum potential energy, Galerkin approach and Rayleigh - Ritz method. **09**

Q.2 **a)** For a two noded bar element, determine the shape functions. Use natural coordinate system L1 and L2. **07**
b) Derive the expression for shape function for a two noded bar element taking natural coordinate ξ as varying from -1 to 1. **07**

Q.3 For the bar given in Figure 1 find the deflection at Free end. Take 2 elements of for solving the example and the Data as given below: **14**
A_0= 1000 mm^2
P= 1000 kN
L= 1m
E=210GPa

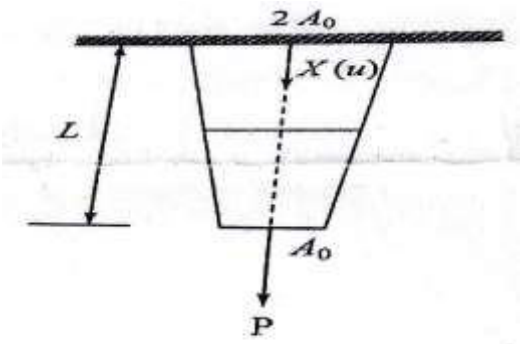


Figure 1

Q.4 **a)** Discuss the various points to be considered while discretizing a structure for finite element analysis. **07**
b) Explain convergence and compatibility requirements. **07**

Q.5 For the isoperimetric quadrilateral elements shown in Figure 2, if the $x-y$ coordinates of four nodes as follows Node1-> (1,1), Node2 ->(5,3), Node3->(5,7) and Node4-> (2,6) determine **14**

a) Cartesian coordinates of the point P which has local coordinates $\xi = 0.45$ and $\eta = 0.69$

b) Local coordinates of the point Q which has Cartesian coordinates (4,5)

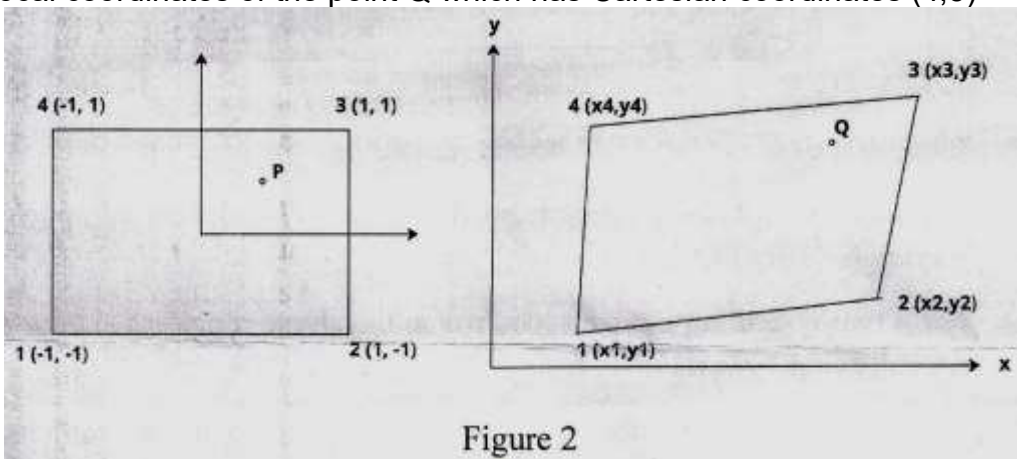


Figure 2

Q.6 **a)** Explain the following terms **03**

i) Isoparametric elements
ii) Superparametric element
iii) Subparametric element

b) Explain the procedure to arrive stiffness matrix of triangular elements for plate bending with 6 degrees of freedom (Constant Moment Triangle). **11**

Q.7 Explain the element mass matrix for dynamic consideration (Consistent mass matrix and lumped mass matrix) for various elements and Derive the Consistent Mass Matrix for 2 Noded Bar element. **14**

SLR-JD-29

Seat No.		Set	P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Theory of plates and shells (70710202)

Day & Date: Saturday, 25-05-2024 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)**	State the assumption made in thin plate theory.	**04**
	b)	Give classification of plates.	**04**
	c)	Obtain strain displacement relations for cylindrical shells.	**10**
Q.2	**a)**	Differentiate between rectangular and circular plates.	**05**
	b)	Derive expression for maximum deflection of a simply supported rectangular plate subjected UDL use Levy's method.	**12**
Q.3	**a)**	Describe Rayleigh-Ritz approach for analysis of plates.	**05**
	b)	Analyse a circular plate of radius 'a' carrying UDL q, if its outer edge is having fixed support.	**12**

Section – II

Q.4	**a)**	Give the classification of shells. Draw neat sketches.	**06**
	b)	Obtain equations of equilibrium for cylindrical shells using membrane theory.	**12**
Q.5	**a)**	Describe stress resultants. Write their expressions for thin shells.	**06**
	b)	State and explain Finsterwalder's theory. Also give assumptions given in this theory.	**11**
Q.6	**a)**	Describe thermal stresses in plates and shells.	**11**
	b)	A cylindrical pipe carries fluid under pressure of $100N/mm^2$. Find maximum hoop and circumferential stresses developed in pipe if thickness of pipe is 10mm and diameter is 1m. Take modulus of elasticity for pipe material as $2x10^5$ N/mm^2.	**06**

SLR-JD-30

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS)
Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Seismic Design of Multistoried Buildings (70710203)

Day & Date: Monday, 27-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
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**

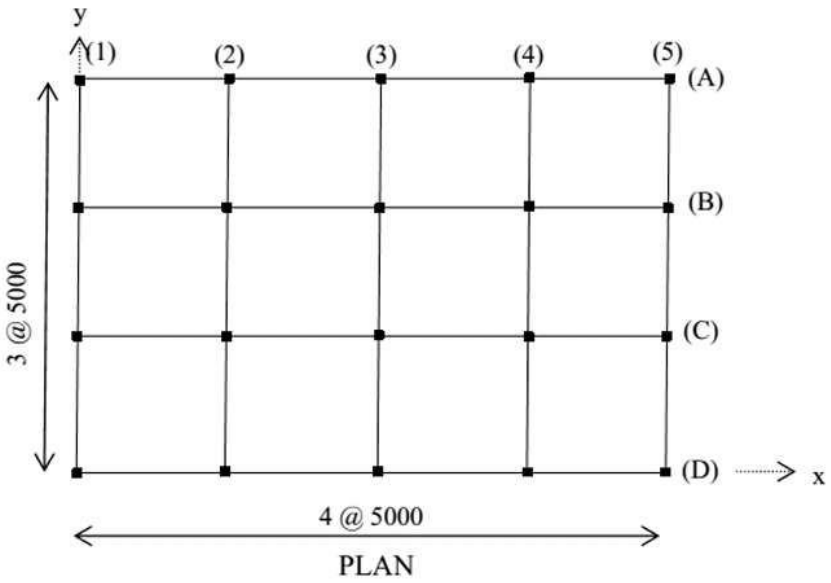
Section – II

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 Consider a four-storey reinforced concrete office building shown in Fig. 1.1. The building is located in Shillong (seismic zone V). The soil conditions are medium stiff and the entire building is supported on a raft foundation. The R. C. frames are infilled with brick-masonry. The lumped weight due to dead loads is 12 kN/m^2 on floors and 10 kN/m^2 on the roof. The floors are to cater for a live load of 4 kN/m^2 on floors and 1.5 kN/m^2 on the roof. Determine design seismic load on the structure as per new code. **18**

Figure 1



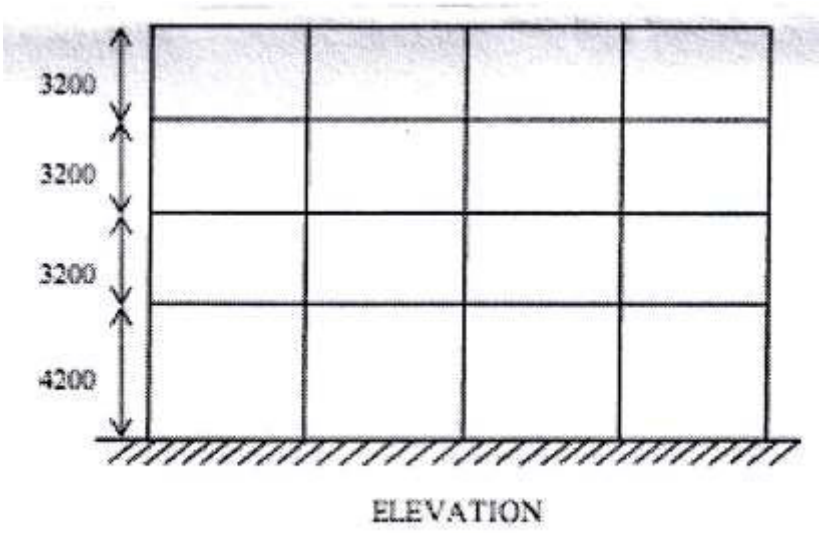


Figure 1.1 – Building configuration

SLR-JD-31

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Design of Prestressed Concrete Structures (70710206)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 1 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 4 is compulsory. Attempt any one questions from the remaining.
3) Use of is 1343 and non-programmable calculator are allowed.
4) Figures to the right indicates full marks.
5) Assume suitable data, if required.
6) Draw neat sketches wherever necessary.

Section – I

Q.1 Pretensioned concrete beam section of size 300 mm x 400 mm and is provided with 40 wires of 5 mm diameter distributed uniformly over the section. Wires are tensioned initially in the prestressing beds with a total force of 600 kN. Determine the stress in concrete and the percentage loss of stress in wires. Consider E_s = 2.1 x 10^5 N/mm^2, E_c=36.85 x 10^5 N/mm^2, Ultimate creep strain = 32 x 10^{-6} mm/mm per N/mm^2, Shrinkage of concrete =200 x 10^{-6}, Relaxation of steel stress= 5 % of the initial stress. **18**

Q.2 A Prestressed Concrete beam of size 400 mm x 800 mm. Determine the horizontal, vertical, shear stress and principal stresses. The tendons are placed at an eccentricity of 100 mm. the anchor plate is 300 mm wide and 200 mm deep. Prestressing force in the tendons is 900kN. By Magnel's method, find principal stress at Q (600, 200) by considering top edge of beam as origin. **17**

x/d	Kq	Kz
0.75	0.251	-2.47
0.76	0.226	-2.33

Q.3 Design a prestressed concrete beam for following requirements, span=16 m, superimposed load= 30 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 17%, allowable tensile stress in concrete = 0.129 $\sqrt{fck}$, 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 x 900 mm and a cast-in- Situ slab of 900 mm x 150 mm. if the differential shrinkage is 1.2 x 10^{-4}mm/mm, find the shrinkage stress at the extreme edges of the slab and the stem. Take E_c = 2.75 x 10^{-4} N/mm^2. **18**

Q.5 A post tensioned continuous beam consist of two spans each of 18 m long. The external loading other than the dead load of the beam is 20 kN/m. Design the beam. **17**

Q.6 Design a non - cylinder prestressed concrete pipe of 1100 mm diameter to withstand a working hydrostatic pressure of 1.1 N/mm^2, using a 2.5 mm high tensile wire stressed to 1000 N/mm^2 at transfer. Permissible maximum and minimum stresses in concrete at transfer and service loads are 14 and 0.7 N/ mm^2. The loss ratio is 0.8. Calculate also the test pressure required to produce a tensile stress of 0.7 N/ mm^2 in concrete when applied immediately after tensioning and also the winding stress in steel if Es = 210 kN/mm^2 and Ec = 35kN/mm^2. **17**

SLR-JD-33

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
CIVIL – (STRUCTURES ENGINEERING)
Concrete Composites (70710208)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 1 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 4 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.

Section – I

Q.1	**a)**	Explains the behavior of fiber reinforced concrete under the compression tension and flexure.	**06**
	b)	What is mean by Fiber Reinforced Concrete. Explains the different types of fibers used for construction Fiber Reinforced Concrete.	**06**
	c)	Explains the factors affecting the properties of Fiber Reinforced Concrete.	**05**
Q.2	**a)**	What are the applications of Fiber Reinforced Concrete?	**06**
	b)	Explains the mechanical properties of Ferro cement? Explains the application of Ferrol cement.	**06**
	c)	Explains the mechanical properties of Fiber reinforced concrete.	**06**
Q.3	**a)**	Explains the mechanical properties Fiber reinforced concrete.	**06**
	b)	Explain the materials used in Ferro cement.	**06**
	c)	Explains the merits of Ferro cement as a structural material?	**06**

Section – II

Q.4	**a)**	Explain the physical and mechanical properties of Silica Fume Concrete with respect to durability of concrete.	**06**
	b)	State the applications of Silica Fume Concrete.	**06**
	c)	Explain the reaction mechanism of Silica Fume Concrete.	**05**
Q.5	**a)**	What are the applications of polymer impregnated concrete and polymer concrete?	**06**
	b)	Briefly explain the following:	
		i) Classification of polymer concrete	**06**
		ii) Merits of Silica Fumes Concrete	**06**
Q.6	**a)**	Write note on types of polymer concrete.	**06**
	b)	Explain properties of constituent materials of Polymer Concrete.	**06**
	c)	Explain different physical and chemical properties of Silica Fumes.	**06**

SLR-JD-36

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (Old) (CBCS) Examination: March/april-2024
CIVIL– (STRUCTURES ENGINEERING)
Design of RCC Bridges (70710211)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 1 is compulsory. Attempt any two question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any two questions from the remaining.
2) Figure to the right indicate full Marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1 Design a deck slab for following details: **11**
- **a)** Clear span - 5.5 m
- **b)** Width of footpath on either side - 1 m
- **c)** Wearing coat - 100 mm thick
- **d)** Loading - IRC Class AA (Tracked)
- **e)** Material - M35 concrete, Fe 415 steel
- **f)** α 2.88

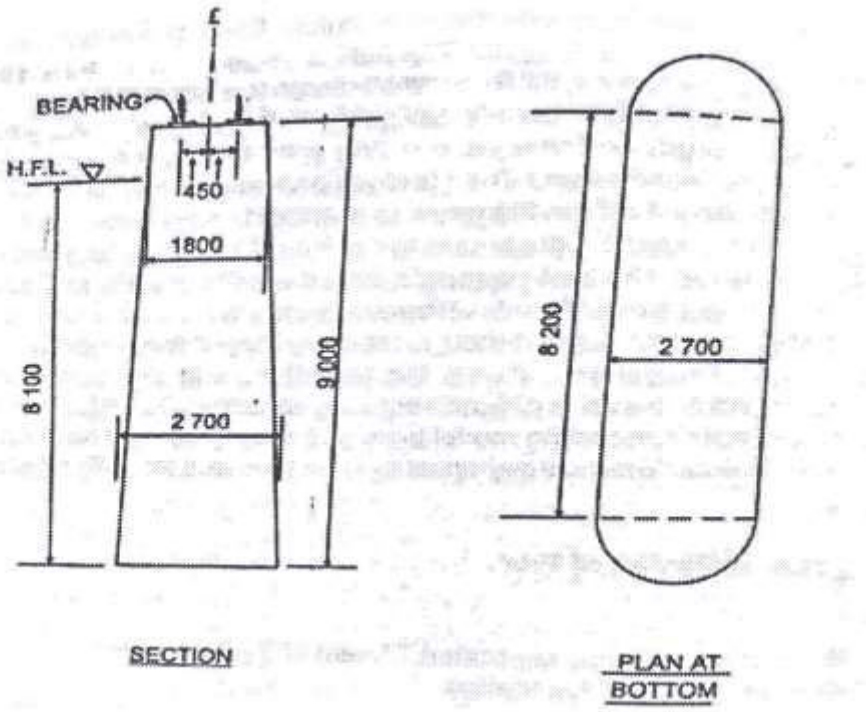
Q.2 **Answer the following (Any Two)** **12**
- **a)** Explain IRC class loadings.
- **b)** What is economic span? Derive for the same.
- **c)** Write a note on Piguad's theory. And write the limitations of the theory.

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 -7.5 m
- **b)** Span of bridge -14 m
- **c)** Live Load - IRC class AA Tracked
- **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-25 concrete and Fe -415 steel

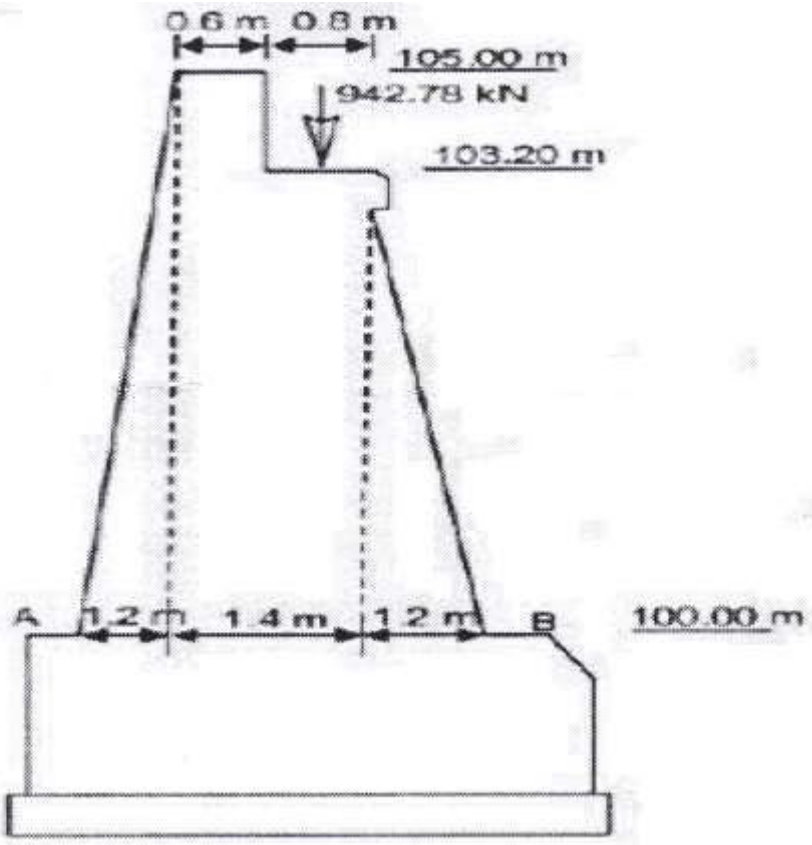
Q.4 **Write a note on:** **12**
- **a)** Components of bridges.
- **b)** Importance of bridges.
- **c)** General design considerations for bridges.

Section – II

Q.5 Verify the suitability of pier for following data: **11**
Superstructure: 21.3 m span
Reaction due to live load on the one span - 900 KN
Maximum mean velocity of current - 3.6 m/sec
Material for pier: M20 grade concrete
Live load: IRC Class AA



Q.6 Verify the stability of abutment shown in fig. **12**
Material of abutment - Concrete M20
Density of the soil - 18 KN/m^3
Coefficient of friction - 0.6
Angle of friction (Φ) - 30°
Live load - IRC Class AA (Tracked)
Span of bridge - 15m
Angle of friction between soil & concrete δ 18°



Q.7 **Write a note on following (Any Three)** **12**
a) Erection methods for Bridges
b) Types of bearing
c) Expansion joints
d) Well foundation

Q.8 **a)** Design a elastomeric unreinforced bearing pad for following data. **07**
Vertical load (sustained) 200 KN
Vertical load (dynamic) 40 KN
Horizontal force (H) 60 KN
Modulus of rigidity of elastomer (G) 1 N/mm^2
Friction coefficient 0.3
b) Write about inspection of bridges. **05**

SLR-JD-39

Seat No.	

Set P

S.Y (M. Tech.) (Sem -III) (New) (CBCS) Examination: March/April-2024
Civil– (Structures Engineering)
Business Analytics (70710305)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section-I

Q.1 **a)** Outline the typical steps involved in the Business Analytics process. What are the main objectives at each stage of the Business Analytics process? **09**

b) Explain the concept of association rules in data mining with an example **08**

Q.2 **a)** Explain the concept of hierarchical data and how it can be visualized effectively. **09**

b) What is data aggregation and explain its significance in data analysis. **08**

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

a) Data Science in Business Analytics.
b) Curse of Dimensionality.
c) Data Exploration and Visualization.
d) Scaling up to large datasets.

Section-II

Q.4 **a)** What is a lift chart, and how can it be used to evaluate the performance of a classifier? **09**

b) Explain the differences between explanatory modeling and predictive modeling in the context of multiple linear regression. **08**

Q.5 **a)** Describe the process of constructing a classification tree. What are the key steps involved in splitting the data and forming the tree structure? **09**

b) Describe the basic principles of filter models used for feature selection in clustering **08**

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

a) Confusion Matrix
b) Reducing the Number of Predictors
c) Tree Structure
d) Clustering

SLR-JD-40

Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: March/April-2024
Civil– (Structures Engineering)
Operation Research (70710306)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method. **12**
Maximize $Z = 4x - 2y$
Subject to constraints
i) $x + y \leq 14$
ii) $3x + 2y \geq 36$
iii) $2x + y \leq 24$
and $x, y \geq 0$

Q.2 **a)** Explain the primal-dual relationship. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Max $Z_x = 3x_1 + 3x_2$
Subject to
i) $2x_1 + 4x_2 \geq 40$
ii) $3x_1 + 2x_2 \geq 50$
and $x_1, x_2 \geq 0$

Q.3 **a)** Explain application of simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that on average nine customers arrive every 5 minutes and that the cashier can serve 10 in 5 minutes. Find: **08**
i) average number of customers queuing for service
ii) probability of having more than 10 customers in the system, and
iii) probability that a customer has to queue for more than 2 minutes

Section – II

Q.4 **a)** Explain the various costs associated with Inventory. **05**

b) Write short note on deterministic models with or without shortages. **04**

c) A company that operates for 50 weeks in a year is concerned about its stocks of copper cable. This costs Rs 240 a meter and there is a demand for 8,000 meters a week. Each replenishment costs Rs 1,050 for administration and Rs 1,650 for delivery, while holding costs are estimated at 25 per cent of value held a year. Determine: **08**

i) Optimal order quantity
ii) Total variable inventory cost
iii) Total inventory cost
iv) What is the gross profit if the company sells the cable for Rs 360 a meter

Q.5 **a)** Write a note on Group Replacement Policy. **04**

b) Explain Maximal flow problem with suitable example. **04**

c) The cost of a machine is Rs 6,100 and its scrap value is Rs 100. The maintenance costs found from experience are as follows: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	100	250	400	600	900	1200	1600	2000

When should the machine be replaced?

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. Activities are identified by their beginning (i) and ending (j) node numbers. **12**

Activity (i-j)	Estimated Duration(weeks)		
	Optimistic	Most Likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

1) Draw the network diagram of the activities in the project and find critical Path.

2) Find the expected duration and variance for each activity. What is the expected project length?

3) Calculate the variance and standard deviation of the project length.

4) What is probability that the project will be completed:
i) at least 4 weeks earlier than expected time.
ii) no more than 4 weeks later than expected time

Given

Z	0.50	0.67	1.00	1.33	2.00
Prob	0.3085	0.2514	0.1587	0.0918	0.0228

b) Explain the following in the context of project management: **05**
(i) Activity variance, and (ii) Project variance.

SLR-JD-41

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
Civil– (Structures Engineering)
Cost Management of Engineering Projects (70710307)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figure to the right Indicate full marks.

Section – I

Q.1 **a)** What is different between cost and expenditure explain how selling price of the product is determined? **09**

b) Differentiate between fixed cost and variable cost with suitable example. Which cost is related to production quantity? **08**

Q.2 **a)** Explain in brief about objective of cost estimation how cost is differ from value. **09**

b) What do you mean by cost control explain the various steps involved in the process of cost control? **08**

Q.3 **Write a short note on any three.** **18**

a) Progress measurement and earned value
b) Parametric cost estimating model
c) Cost analysis
d) Time value of money

Section – II

Q.4 **a)** Explain in brief about feed forward techniques in cost management. **08**

b) Explain in brief about value management as aid to risk assessment. **09**

Q.5 **a)** Explain in brief above project value and risk with suitable example. **09**

b) What is value analysis explain in brief about earned value management for assessing project performance? **08**

Q.6 **Write a short note on any three.** **18**

a) Dimension and measures of value
b) Scope and key principle of VM
c) Lifecycle cost
d) Need for value and cost estimation in management projects.

SLR-JD-42

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
Civil– (Structures Engineering)
Nonconventional Energy (70710308)

Day & Date: Saturday, 01-06-2024 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.
3) Assume necessary data if necessary.

Section I

Q.1 Solve Any Four. **20**

a) Enumerate the criteria based on which energy can classified.
b) What do you understand by energy conservation? Explain its various aspects.
c) Describe thermal energy storage system of solar energy.
d) What are the main advantage and limitations of a battery storage system?
e) Write a note on the growth of energy sector in India.

Q.2 Solve Any Two. **15**

a) Explain hydroelectric conventional energy source using IGCC power generation with schematic diagram.
b) What are the emerging new technologies for the energy conservation and efficiency?
c) Draw a schematic diagram of solar pond based electric power plant with cooling tower and explain its working.

Section II

Q.3 Solve Any Four. **20**

a) Explain the various method of production of hydrogen for use as energy carrier.
b) What are the factors affecting the performance of biogas digester?
c) Explain the major Application of wind power.
d) What are major advantages and disadvantages of a solar PV system?
e) Write a note on environmental effect on fuel cell.

Q.4 Solve Any Two. **15**

a) What is the importance of MPPT in an SPV system? Explain various strategies used for operation of an MPPT.
b) What is the origin of biomass energy? What is its global potential? What is the average efficiency of photosynthetic conversion of solar energy into biomass?
c) Sketch the diagram of a HAWT and explains the function of its main components.

SLR-JD-43

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Advanced stress analysis (MTDE101)

Day & Date: Monday, 13-05-2024 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 from the remaining.
2) Question no. 4 is compulsory in section II, and solve any one questions from the remaining.
3) Figures to the right indicate 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) Describe strain components and discuss their usual notations in the Cartesian coordinate system. **04**

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

c) Explain the importance of Airy's stress function in theory of elasticity. **03**

d) Investigate what problem of a plane stress is solved by the stress function ϕ applied to the region included by $y = \pm c$ for $x = 0\ to\ l$. **07**

$$\phi = \frac{q}{8c^3}\left[x^2(y^3 - 3c^2y - 2c^3) - \frac{1}{5}y^3(y^2 + 2c^2)\right]$$

Q.2 Solve the following questions.

a) Describe the practical applications of polar coordinate system and derive the compatibility equation of strain in polar coordinate system. **06**

b) Explain the concept of polynomial equation and its application in theory of elasticity. **04**

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

Q.3 Solve the following questions.

a) Write a note on assumptions made in theory of elasticity. **03**

b) Explain the need of theory of elasticity for bending of a prismatic bar of elliptical cross section. **06**

c) Derive the equation on stresses in the rotation disc. **08**

Section – II

Q.4 **a)** What is a shear center? Explain the importance of a shear center. **06**

b) Determine position of the shear center of the section of a beam shown in Fig. I. **12**

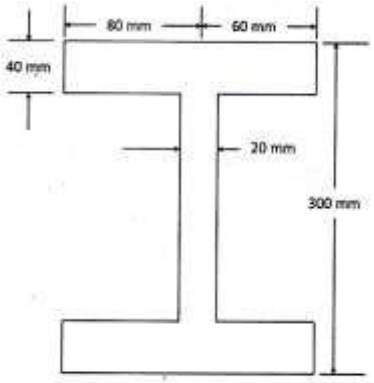


Fig. I

Q.5 **a)** Explain electrical analogy. **05**

b) Derive the expression for torque and angle of angle of twist for a bar of narrow rectangular cross section. **12**

Q.6 **a)** Explain Hertz contact stresses and how do they affect linear bearings? **05**

b) Derive the expression for pressure and area of contact in case of two cylindrical rollers in contact subjected to compressive load. **12**

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Seat No.	

Set P

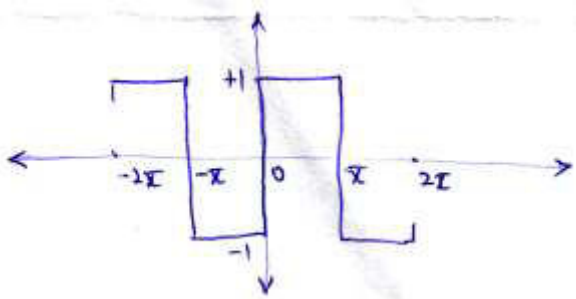
F.Y (M. Tech.) (Sem- I) (New) (CBCS) Examination: March/April-2024
MECHANICAL - (DESIGN ENGINEERING)
Advanced Vibrations and Acoustics (MTDE102)

Day & Date: Tuesday, 14-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

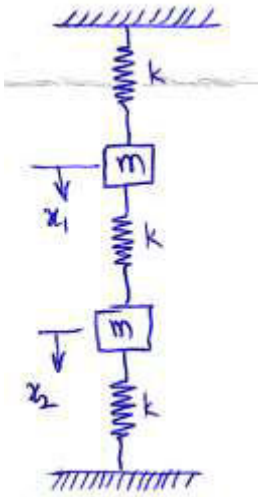
Q.1 a) A periodic square wave is shown in the figure below. Represent this as superposition of component harmonic motions. **07**



b) Derive an equation for the response of 1-DOF undamped system under the harmonic force conditions. **07**

Q.2 a) Derive equation of motion for the transverse vibration of a siring. **07**
b) Write note on Rayleigh's method to determine natural frequencies of multi-DOF system. **07**

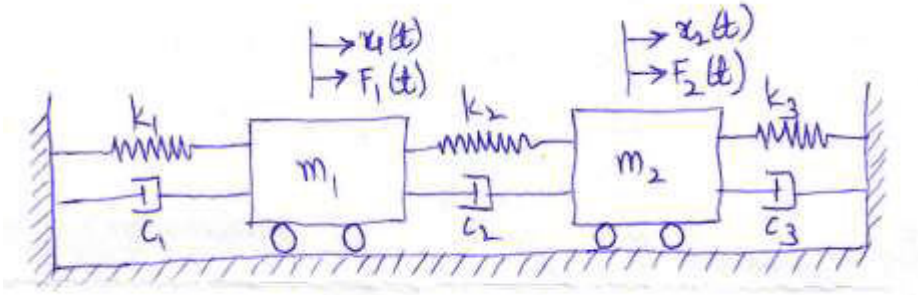
Q.3 a) Briefly explain various devices required in a vibration analysis system. **07**
b) Calculate the natural frequencies and mode shapes of the two degree of freedom system shown below: **07**



Section – II

Q.4 **a)** Explain principle and working of stroboscope. **07**

b) A two degree of freedom system is as shown below. Write the equations of motion and represent these equations in matrix form. **07**



Q.5 **a)** Explain power spectrum and power spectral density in case of random vibrations. **07**

b) Write note on vibration exciters: **07**

1) mechanical exciters
2) electromagnetic shaker

Q.6 **a)** Explain acoustic standing wave patterns. **07**

b) Write note on FRF and its collection through experimental methods. **07**

Q.7 **c)** Define sound pressure level and explain the dB scale. **07**

d) Write note on sound fields. **07**

SLR-JD-45

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Industrial Instrumentation (MTDE103)

Day & Date: Wednesday, 15-05-2024 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)** 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 elastic force measurement devices. **06**
b) Explain the Knudsun gauge with neat sketch. **06**

Q.6 **a)** Explain Real Time Parallel Analyser with neat sketch. **05**
b) Explain with neat sketch electromagnetic flow meter. **06**

Q.7 **a)** Explain with neat sketch Atomic absorption spectrometer. **05**
b) Explain the terms sound pressure level, sound power level & sound intensity level. **06**

Q.8 **Write short notes on. (Any Three)** **12**
a) Electret Microphone
b) System Analysis by Transient Testing
c) Thermistors
d) Galvanometric Recorder

SLR-JD-46

Seat No.		Set	P

F.Y. (M Tech) (Sem - I) (New) (CBCS) Examination: March/April-2024
MECHANICAL - (DESIGN ENGINEERING)
Computational Techniques in Design Engineering (MTDE106)

Day & Date: Thursday, 16-05-2024 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 calculator is allowed.

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) An experiment gave the following values: **06**

V (ft. /min.):	350	400	500	600
T (min.):	61	26	7	2.6

It is known that v and t are connected by the relation $v = at^b$. Find the best possible values of a and b.

c) Using power method. Find all the eigen values of $A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$ **06**

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**

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

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

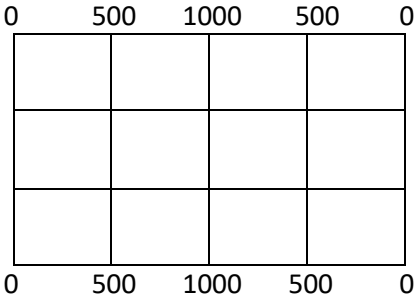
b) Predict the mean radiation dose at an altitude at 3000 feet by fitting an exponential curve to the given data: **09**

Altitude (x)	50	450	780	1200	4400	4800	5300
Dose of radiation (Y)	28	30	32	36	51	58	69

Take exponential curve as $y = ab^x$

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) Explain standard five-point formula and diagonal five-point formula with schematic diagram. **06**

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

b) The velocity V (km/min) of a moped which starts from rest, is given at fixed interval of time t (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; using Simpson's 1/3rd rule.

c) Explain standard form of hyperbolic equation. **06**

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) 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 $x = 0.2, 0.4$ **05**

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

SLR-JD-47

Seat No.		Set	P

F.Y. (M Tech) (Sem - I) (New) (CBCS) Examination: March/April-2024
MECHANICAL – DESIGN ENGINEERING
Reliability Engineering (MTDE107)

Day & Date: Thursday, 16-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory.
2) Attempt any one question from the remaining questions from each section.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** Describe various methods for collecting data. What are the advantages and disadvantages of different data collection techniques. **09**

b) Describe the stages of the life cycle of a system and explain the significance of reliability at each stage. **08**

Q.2 **a)** Explain the significance of MTTF? Derive the expression for MTTF: **09**
$\text{MTTF} = \int_0^\infty R(t)dt$

b) Explain in detail the redundancy with CFR model and time-dependent failure Model. **08**

Q.3 **Write short notes on (Any three)** **18**
a) Bath Tub Curve and conditional reliability
b) Normal and Lognormal distributions
c) Discrete and continuous probability distributions
d) Exponential and Weibull Distribution

Section – II

Q.4 **a)** A system has three components connected in parallel from a reliability point of view having reliabilities 0.20, 0.40, 0.50, respectively, for a mission of 400 hours. What is the percentage increase in the reliability of the system in each of the following cases? **09**
i) Reliability of the first component is increased by 0.1 and that of the second and third components remains the same.
ii) Reliability of the second component is increased by 0.1 and that of the first and third components remains the same.
iii) Reliability of the third component is increased by 0.1 and that of the first and second components remains the same.

b) What is maintainability? Explain in detail the measures of maintainability. **08**

Q.5 **a)** Describe reliability design process and explain the fault tree method in detail. **09**

b) Explain the significance of product testing. Explain the burn-in testing and acceptance testing. **08**

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

a) Mean time to repair (MTTR)

b) Cut and tie set approach for Reliability evaluation

c) Failure modes, effects and criticality analysis (FMECA)

d) Accelerated life testing

SLR-JD-48

Seat No.		Set	P

F.Y (M. Tech.) (Sem- I) (New) (CBCS) Examination: March/Aril-2024
MECHANICAL – (DESIGN ENGINEERING)
Mechanical System Design (MTDE108)

Day & Date: Thursday, 16-05-2024 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) Figures to the right indicate full marks.
4) Use of non-programmable calculator is allowed.
5) Assume suitable data if necessary.

Section – I

Q.1	**a)**	Explain the optimization of structural diagram in the design of multi speed machine tool gear box.	**06**
	b)	Explain the advantages of geometrical progression for selecting the speed of multi speed machine tool gear box.	**06**
Q.2	**a)**	Explain various characteristics of frequency curves.	**05**
	b)	Explain different measures of central tendency and dispersion.	**06**
Q.3	**a)**	Explain with neat sketch Belt tensions at various points.	**05**
	b)	Explain objectives of material handling.	**06**
Q.4	**Write short note on.**		**12**
	a)	Basic consideration in design of multi speed gear box.	
	b)	Population combinations.	
	c)	Unit load and containerization.	

Section – II

Q.5	**a)**	Derive an expression for thickness of pressure vessel using Clavarino's and Birnie's equations.	**06**
	b)	Define Autofrettage and explain the methods of prestressing of the cylinder.	**06**
Q.6	**a)**	Explain design considerations for bore and length of the cylinder.	**05**
	b)	Explain with neat sketch stresses in cylinder walls.	**06**
Q.7	**a)**	Explain optimum design for tension bar.	**05**
	b)	Explain design considerations for forgings.	**06**
Q.8	**Write short note on.**		**12**
	a)	Area compensation method.	
	b)	Design of connecting rod.	
	c)	Redundant specifications.	

SLR-JD-49

Seat No.		Set	P

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Computer Aided Design (MTDE109)

Day & Date: Thursday, 16-05-2024 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.
2) Question No. 6 is compulsory in section II, and solve any one question from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions if required.
5) Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** What are the various input and output devices? Explain in detail with neat sketch. **08**

b) Discuss various types of CAD systems. Comment of system considerations and various software modules. **09**

Q.2 **a)** A triangle PQR has its vertices at P(0,0), Q(4,0), and R(2,3). It is to be translate by 4 units in X-direction, and 2 units in Y-direction, then it is to be rotated in anticlockwise direction about the new position of point R through 90 Degree. Find the new position of the triangle. Plot the new coordinates at each stage. **08**

b) Discuss the mapping of geometric models. Explain various types of mapping with neat sketches. **09**

Q.3 **Write short notes on (Any Three)** **18**

a) Parametric representation of synthetic curves.
b) Orthographic projection.
c) Parametric representation of analytic curves.
d) Bezier, B-Spline and Cubic curve.

Section – II

Q.4 **a)** Explore the characteristics of different transmission media, including guided and unguided media. How does the choice of transmission media impact network performance, reliability, and scalability? **09**

b) Discuss the fundamental principles of computer communications. How do protocols play a crucial role in ensuring effective communication between devices in a network? **08**

Q.5 **a)** Discuss various operations involved in solid manipulations, such as translation, rotation, scaling, and deformation. How do these operations impact the geometry and topology of solid models? **09**

b) Explore the role of solid modeling in handling mechanical tolerances in design. How does solid modeling contribute to ensuring precision and reliability in manufacturing processes? **08**

Q.6 Write short notes on (Any Three) **18**

a) Mesh generation.

b) Simulation approaches.

c) Finite Element Analysis (FEA) and its significance in engineering applications.

d) Need for system simulation in engineering and its key areas of application.

SLR-JD-50

Seat No.	

Set P

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Research Methodology and IPR (MTDE104)

Day & Date: Friday, 17-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) In Section – I, Q. No. is 3 is compulsory and attempt one question from the remaining.
2) In Section – II, Q. No. is 6 is compulsory and attempt one question from the remaining.
2) Figures to the right indicate full marks.
3) Support the answers by neat sketches wherever necessary.

Section – I

Q.1 **a)** What is research? Explain in detail the steps involved in research with flow chart. **08**
b) Write meaning 'Research Design'. Write importance of 'research design' in research. **09**

Q.2 **a)** Explain research problem formulation with suitable example. **08**
b) What is hypothesis testing? Explain how statements of hypothesis is made. **09**

Q.3 **Write short notes on. (any three)** **18**
a) Qualitative Research Vs Quantitative Research
b) Primary Data and Secondary Data in research
c) Brain Storming
d) Scientific Research

Section – II

Q.4 **a)** What is patent? What kinds of inventions cannot be protected by a patent? **08**
b) What are the functions of the Indian Patent Office? **09**

Q.5 **a)** Explain there is need to protect Geographical Indications (GI). Give suitable examples. **08**
b) Describes the various forms of industrial properties. **09**

Q.6 **Write short notes on. (any three)** **18**
a) Patent Co-operation Treaty (PCT)
b) The trademarks and right arising from trade mark registration
c) Patenting Industrial Design
d) Promoting Role of patents in Technology Transfer

SLR-JD-51

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Advanced Stress Analysis (7072101)

Day & Date: Monday, 13-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. 2 & Q. 4 are compulsory.
2) Solve any one question from each section.
3) Make suitable assumptions if necessary and state it clearly.
4) Figures to the right indicate full marks.
5) Use of non-programmable calculator is allowed.

Section – I

Q.1 Solve the following questions.

a) Derive the compatibility equation of strain. **08**

b) Investigate what problem is solved by the stress function $'\phi'$ applied to the region included by $y = 0$ to $y = d$ and $x = 0$ to $x = 1$ **09**

$$\phi = \frac{-F}{d^3} xy^2[3d - 2y]$$

Q.2 Solve the following questions.

a) Derive stresses in thick-walled cylinder under internal and external pressure. **09**

b) Develop the equation for flat disk with central hole. **09**

Q.3 Write short notes on.

a) Equation of Bi harmonic condition. **07**

b) Polynomial equations. **05**

c) Strain components in polar coordinate system. **05**

Q.4 a) Explain the concept of shear center. **06**

b) A channel section has flanges 14 cm and web 30 cm × 1 cm. Determine the shear center of the channel. **12**

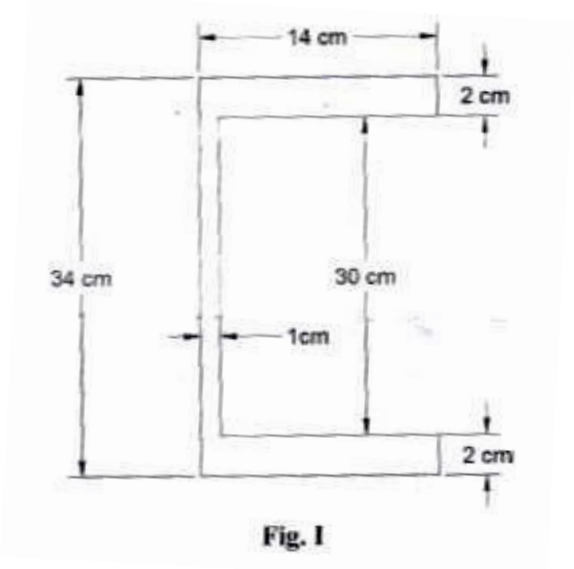


Fig. I

Q.5	**a)**	Explain membrane 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)**	Write a short note on Castigliano's theorem.	**05**
	b)	Derive the expression for pressure and area of contact in case of two cylindrical rollers in contact subjected to compressive load.	**12**

SLR-JD-52

Seat No.	

Set P

F.Y. (M. Tech) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL - (DESIGN ENGINEERING)
Advanced Vibrations and Acoustics (7072102)

Day & Date: Tuesday, 14-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

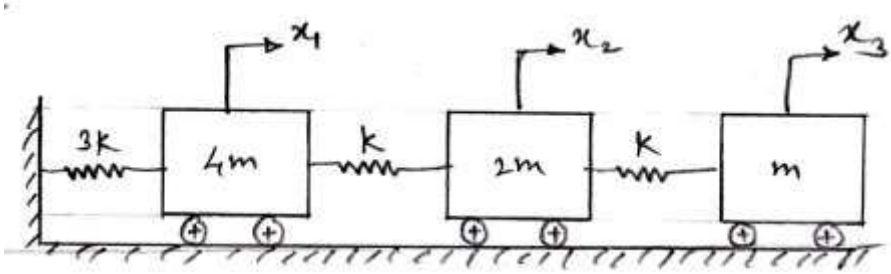
Instructions: 1) Solve any five questions.
2) Figures to the right indicate full marks.
3) Make suitable assumptions if necessary and state them clearly.

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

b) Write a note on undamped dynamic vibration absorber. **07**

Q.2 **a)** Derive an equation for the response of a damped system subjected to an impulsive input. **07**

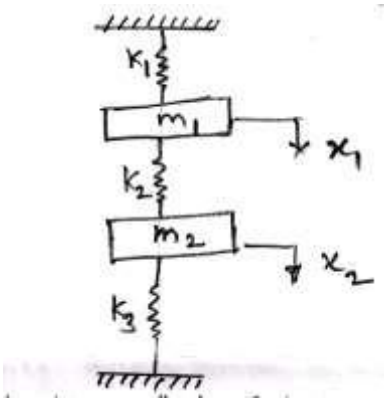
b) A three degree of freedom system is as shown below. Write the equations of motions & represent these equations in matrix form. **07**



Q.3 **a)** Determine two natural frequencies & corresponding mode shapes for a two-rotor torsional system. **07**

b) Explain Rayleigh's method to find natural frequency of multi-degree freedom system. **07**

Q.4 **a)** Derive differential equation of motion for a two degree of freedom system shown in figure. Draw mode shapes. **07**
Assume $k_1 = k_3 = k$ & $m_1 = m_2 = m$



b) Write a note on transverse vibrations of string (a continuous system). **07**

Q.5	**a)**	Write a note on forced vibrations with nonlinear spring forces.	**07**
	b)	Explain power spectrum & power spectral density in case of random vibrations.	**07**
Q.6	**a)**	Write a note on forced vibrations with nonlinear spring forces.	**07**
	b)	What are random vibrations? Explain the terms time averaging & expected value.	**07**
Q.7	**a)**	Explain construction & working of Frahm's reed tachometer.	**07**
	b)	Write note on Sound intensity, dB scale & sound power.	**07**

SLR-JD-53

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Industrial Instrumentation (7072103)

Day & Date: Wednesday, 15-05-2024 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 McLeod 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 elastic force measurement devices. **06**
b) Explain the Knudsun gauge with neat sketch. **06**

Q.6 **a)** Explain Real Time Parallel Analyser with neat sketch. **05**
b) Explain with neat sketch electromagnetic flow meter. **06**

Q.7 **a)** Explain with neat sketch Atomic absorption spectrometer. **05**
b) Explain the terms sound pressure level, sound power level & sound intensity level. **06**

Q.8 **Write short notes on. (Any Three)** **12**
a) Electret Microphone
b) System Analysis by Transient Testing
c) Thermisters
d) Galvanometric Recorder

SLR-JD-54

Seat No.	

Set P

F.Y. (M Tech) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL (DESIGN – ENGINEERING)
Research Methodology and IPR© (7072104)

Day & Date: Thursday, 16-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Q. No. 3 and Q. No. 6 are compulsory.
2) Solve any one question from remaining questions of each section.
3) Figures to right indicate full marks.
4) 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 is different type of error in research? Explain with suitable examples. **08**

Q.2 **a)** What is Literature review in research? Explain its importance and methods. **09**
b) What are types of data? Explain sources of data collection. **08**

Q.3 **Write short notes. (Any Three).** **18**
a) Types of research
b) Selection of samples
c) Creative problems – solving method
d) Research design

Section – II

Q.4 **a)** Explain Patents, Designs, Trade and Copyright. **09**
b) Explain Patenting under PCT. **08**

Q.5 **a)** Explain Scope of Patent Rights. **09**
b) What are Geographical Indications? Explain with suitable examples. **08**

Q.6 **Write short notes. (Any Three).** **18**
a) Procedure for grants of patents
b) Traditional knowledge Case Studies of IPR
c) IPR of Biological Systems
d) Administration of Patent System

SLR-JD-55

Seat No.		Set	P

F.Y. (M. Tech) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Computational Techniques in Design Engineering (7072106)

Day & Date: Friday, 17-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) In Section – I, Q. No. is 1 is compulsory and attempt one question from the remaining.
2) In Section – II, Q. No. is 4 is compulsory and attempt one question from the remaining.
2) Figures to the right indicate full marks.
3) Use to calculator is allowed.
4) Assume suitable data if necessary.

Section – I

Q.1 **a)** Round of the numbers 865250 and 37.46235 to for significant figures and compute Ea, Er, Ep in each case. **06**

b) Using Bessel's formula find f (7.5) from the following table. **12**

x =	7.47	7.48	7.49	7.50	7.51	7.52	7.53
F(X) =	0.193	0.195	0.198	0.201	0.203	0.206	0.208

Q.2 **a)** An experiment gave the following values. **06**

V (ft. /min.):	3500	400	500	600
T (min.):	61	26	7	2.6

It is known that v and t are connected by the relation $v = at^b$. Find the best possible values of a and b.

b) Solve the following system of equations by Gauss-Seidel method (perform four iterations). **06**

$$27x + 6y - z = 85, \quad x + y + 54z = 110, \quad 6x + 15y + 2z = 72$$

c) Explain Mathematical Modelling through linear diff. equation. **05**

Q.3 **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: **06**

T:	0	1	3	4
V:	21	15	12	10

b) Obtain using Jacobi's method, all eigen values and eigen vectors of the matrix. **06**

$$A = \begin{bmatrix} 1 & 1 & 0.5 \\ 1 & 1 & 0.25 \\ 0.5 & 0.25 & 2 \end{bmatrix}$$

c) Explain different types of errors in numerical calculations. **05**

Section – II

Q.4 **a)** Explain standard five-point formula and diagonal five-point formula with schematic diagram. **06**

b) The velocity V (km/min) of a moped which starts from rest, is given at fixed interval of time t (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

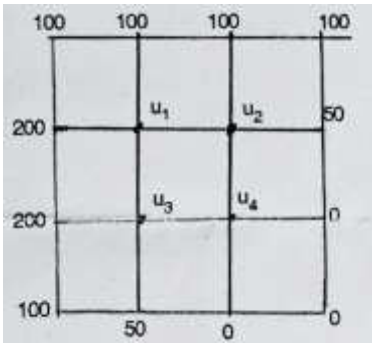
Estimate approximately the distance covered in 20 minutes; using Simpson's 1/3rd rule.

c) Evaluate $\int_{0.2}^{1.5} e^{-x^2}\,dx$ using 3-point Gaussian quadrature. **06**

Q.5 **a)** Using 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**

b) Apply Milne's method, to find a solution of the differential equation $y = x - y^2$ in the range of $0 \leq x \leq 1$ for the boundary condition $y = 0$ at $x = 0$. **11**

Q.6 **a)** For the following fig. evaluate $u(x, y)$ satisfying Laplace equation $\frac{d^2u}{dx^2} + \frac{d^2u}{dy^2} = 0$ at piotal points of the fig. (Perform five iterations). **12**



b) Solve $\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial u}{\partial t} = 0$ given that $u(0, t) = 0, u(4, t) = 0, u(x, 0) = x(4 - x)$. Assume $h = 1$. Find the value of u up to $t = 5$. **05**

SLR-JD-56

Seat No.	

Set P

F.Y. (M. Tech) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Reliability Engineering (7072107)

Day & Date: Friday, 17-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) In Section – I, Q. No. is 3 is compulsory and attempt one question from the remaining.
2) In Section – II, Q. No. is 6 is compulsory and attempt one question from the remaining.
2) Make suitable assumptions wherever necessary and state them clearly.
3) Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** Describe typical engineering failures and their causes in detail. **09**
b) What is MTTF? Derive the expression for MTTF: $MTTF = \int_0^\infty R(t)dt$ **08**

Q.2 **a)** Explain the performance measures for ungrouped Complete data. **09**
b) Explain the CFR model and the redundancy with CFR model. **08**

Q.3 **Write short notes on. (any three)** **18**
a) Burn in screening
b) Life cycle of a system
c) Exponential and Weibull Distribution
d) Bath Tub Curve

Section – II

Q.4 **a)** What is system reliability? Explain the series configuration system and Parallel configuration for evaluation of system reliability. **09**
b) What is availability? Explain in detail the measures of availability. **08**

Q.5 **a)** What is design for Reliability? Explain the failure modes, effects and criticality analysis (FMECA) in detail. **09**
b) Explain the significance of Reliability testing? Explain the reliability growth testing. **08**

Q.6 **Write short notes on. (any three)** **18**
a) Stochastic point processes
b) Network reduction and decomposition methods
c) Repair versus replacement
d) Burn in testing in Reliability

SLR-JD-57

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Mechanical System Design (7072108)

Day & Date: Friday, 17-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) In Section – I, Q. No. is 2 is compulsory and attempt two questions from the remaining.
2) In Section – II, Q. No. is 6 is compulsory and attempt two questions from the remaining.
3) Figures to the right indicates full marks.
4) Draw neat sketches wherever necessary.

Section – I

Q.1	**a)**	Explain role of engineer in mechanical system design.	**06**
	b)	Explain the term Identification and Analysis of Need.	**06**
Q.2	**a)**	What is meant by system analysis? Explain elements of system analysis.	**05**
	b)	What is meant by system modelling? Explain need for modelling.	**06**
Q.3	**a)**	Explain Goal Programming.	**06**
	b)	Explain different elements of a system.	**06**
Q.4	**a)**	Explain classification of a system in mechanical systems design.	**06**
	b)	Explain linear graph modelling concepts.	**06**

Section – II

Q.5	**a)**	Explain methods of optimization.	**06**
	b)	Explain what is meant by feasibility assessment.	**06**
Q.6	**a)**	Determine the maximum and minimum values of the function: $F(X) = 12X^5 - 45X^4 + 40X^3 + 5$	**05**
	b)	What is decision trees? Explain Steps in Decision tree analysis.	**06**
Q.7	**a)**	Explain different types of simulation models.	**06**
	b)	Given the probability that A can solve problem is 2/3 and the probability that B can solve problem is 3/5, find the probability that, i) at least one of A and B will be able to solve the problem ii) None of the two will be able to solve the problem	**06**
Q.8	**a)**	Determine the rate of periodic payment (R), the amount of annuity so that in 20 years one can get Rs. 1,00,000, payments to be made quarterly; the interest rate is 8% compounded.	**06**
	b)	What is the fundamental probability? State and prove Baye's theorem.	**06**

SLR-JD-58

Seat No.	

Set P

F.Y. (M.Tech) (Sem - I) (Old) (CBCS) Examination: March/April-2024
MECHINICAL – (DESIGN ENGINEERING)
Computer Aided Design (7072109)

Day & Date: Friday, 17-05-2024 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.
2) Question No. 6 is compulsory in section II, and solve any one question from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** What are the various CAD hardware and software? Explain hardware integration in details. **08**

b) Discuss various types of CAD systems. Comment of system considerations and various software modules. **09**

Q.2 **a)** List out various transformation used in CAD. Explain Mirror and Shear in details. **09**

b) A triangle PQR has its vertices at P(0,0), Q(4.5,0), and R(2.5,3.5). It is to be translate by 4 units in X-direction, and 2 units in Y-direction, then it is to be rotated in anticlockwise direction about the new position of point R through 60 Degree. Find the new position of the triangle. Plot the new coordinates at each stage. **08**

Q.3 **Write short notes.** **18**

a) Parametric representation of synthetic curves
b) Orthographic projection
c) Parametric representation of analytic curves

Section – II

Q.4 **a)** What is Network Operating Systems? Explain in details. **09**

b) Discuss the fundamental principles of computer communications. How do protocols play a crucial role in ensuring effective communication between devices in a network? **08**

Q.5 **a)** Explain in details the fundamentals of Solid Modelling. Also explain B-rep with an example. **09**

b) Explore the role of solid modeling in handling mechanical tolerances in designing mechanical components. Give an industrial example of it. **08**

Q.6 Write short notes. (Any Three). **18**

a) Finite Element Modeling
b) Types of simulation approaches
c) FEM System and its types
d) Need for system simulation in engineering and its key areas of application

SLR-JD-59

Seat No.	

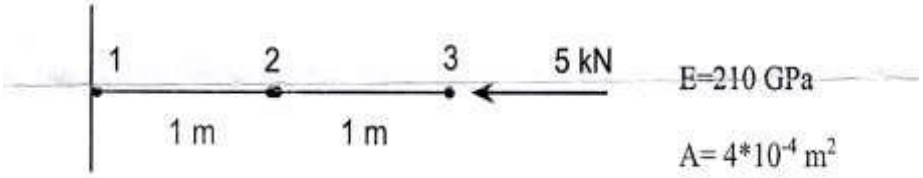
Set P

F.Y. (M. Tech.) (Sem-II) (New) (CBCS) Examination: March/April-2024
MECHANICAL (DESIGN – ENGINEERING)
Finite Element Method (MTDE201)

Day & Date: Tuesday, 21-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

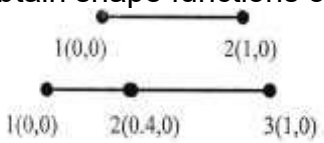
Instructions: 1) Solve any five questions.
2) Figures to the right indicates full marks.
3) Make suitable assumptions if necessary and state them clearly.

Q.1 **a)** Explain in detail the different basic steps in finite element analysis. **07**
b) Using the direct stiffness method, determine the nodal displacements, the forces in each element and the reactions. **07**



Q.2 **a)** Explain the weighted residual method. **07**
b) Briefly explain different factors affecting the accuracy of finite element analysis. **07**

Q.3 **a)** Write a note on softwares in FEA and their applications. **07**
b) Obtain shape functions of following elements. **07**



Q.4 **a)** What are the considerations in mesh refinement? Explain different mesh validity checks. **07**
b) Write a note on elements used in FEA analysis. With an example describe application of 1D, 2D and 3D elements. **07**

Q.5 **a)** Write short note on. **07**
1) Discretization
2) Convergence requirement of polynomials
b) Explain what is isoperimetric formulation. **07**

Q.6 **a)** Take an arbitrary four noded rectangle and find its shape function using the Lagrange's polynomial. **07**
b) Write a note on transient analysis using FEM with an example. **07**

Q.7 **a)** Explain how modal analysis is performed using the finite element method. **07**
b) Derive FEM formulation for one dimensional heat conduction problem with two elements of equal lengths. **07**

SLR-JD-60

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Advanced Design Engineering (MTDE202)

Day & Date: Saturday, 25-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one 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)** Design a 3-4-5 cam with following data: **10**
Dwell at 0 displacement through 90°
Rise of 30 mm in 90°
Dwall at 30 mm through 90°
Fall at 30 mm in 90°
Cam velocity is 2π rad/sec

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:** **18**
1) Types of cam with neat sketches
2) Kinematic Design of 3-4-5 and 4-5-6-7 cam
3) Hydrostatic and Elasto-hydrodynamic bearing

Section-II

Q.4	**a)**	Derive the expression: Z(t) R(t) = f(t)	**10**
	b)	Explain the methods of reducing thermal stresses.	**07**
Q.5	**a)**	Explain Design for manufacturing.	**09**
	b)	Compare between long and short hydrodynamic journal bearing.	**08**
Q.6		**Write short notes on:**	**18**
	a)	Form and Contiguity constraint	
	b)	Reliability Improvement and Testing	
	c)	Rayleigh Distribution	

SLR-JD-61

Seat No.	

Set P

F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
MECHANICAL DESIGN ENGINEERING
Industrial Product Design (MTDE203)

Day & Date: Monday, 27-05-2024 Max. Marks: 70
Time: 02:00 AM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate 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 prototype designs and rapid prototyping. **08**

Q.2 **a)** Compare requirements of industrial products with consumer products. In what way they differ from each other? **09**
b) Explain role of setting specification and market requirements in product design. **08**

Q.3 **Write Short Notes. (Any Three)** **18**
a) Ergonomic design of radial drilling machine.
b) Significance of line and form in the aesthetics of consumer product.
c) Design for Manufacturing.
d) Colour in industrial products and Selection of colours to the industrial products.

Section – II

Q.4 **a)** Discuss the various phases of new product development in detail. **09**
b) What is creativity? Explain the role of creativity in the product design with example. **08**

Q.5 **a)** Explain Break Even Analysis using Profit-volume chart. **09**
b) What is concept of design for environment? Explain the techniques to reduce environment impact. **08**

Q.6 **Write Short Notes. (Any Three)** **18**
a) Quality Function Deployment (QFD)
b) Computer Aided Industrial Design
c) Concurrent Design
d) Legal standard requirement

SLR-JD-62

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Theory and Analysis of Composite Materials (MTDE205)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
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 Strengths of an Orthotropic Lamina.	**09**
	b)	What is Stiffness? Explain Elasticity Approach to Stiffness.	**08**
Q.3		**Write Short Notes on. (Any Three)**	**18**
	a)	Basic Terminology of fiber-reinforced composite material.	
	b)	Stress-Strain Relations for Anisotropic Materials.	
	c)	Comparison of Approaches to Stiffness.	
	d)	Maximum Stress theory.	

Section – II

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

SLR-JD-63

Seat No.		Set	P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Engineering Design Optimization (MTDE206)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to right indicate full marks.
4) 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-JD-64

Seat No.		Set	P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Industrial Tribology (MTDE207)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Make suitable assumption wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.
5) Figures to right indicate full marks.

Section-I

Q.1 **a)** Explain various methods of Studying Surfaces with neat sketches. **08**
b) Explain Physical, Mechanical and Geometrical properties of Surface Layers. **09**

Q.2 **a)** Write in details about Wear of Metals and NON-metals. **08**
b) Explain role of Friction and Laws of Static Friction. How it is different from Rolling Friction. **09**

Q.3 **Write Short Notes. (Any Three)** **18**
a) Bearing Materials
b) General requirements of Bearing
c) Hydrostatic Lubrications
d) Hydrostatic Squeeze Films and its Applications

Section-II

Q.4 **a)** Explain Reynold's Equation with its advantages and limitations. Discuss Mechanics of Fluid Flow. **09**
b) Write a short note on Hydrodynamic Lubrication. Explain various theories of Lubrications. **08**

Q.5 **a)** Analysis of short bearing under Dynamic Condition. **09**
b) Explain Hydrodynamic journal bearing along with its Advantages, Disadvantages and Applications. **08**

Q.6 **Write Short Note. (Any Three)** **18**
a) Recycling and Disposal of Oils
b) SAE Classifications
c) Properties of Grease Lubricants
d) Boundary Lubrication

SLR-JD-65

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Advanced Engineering Materials (MTDE208)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1 **a)** Explain Plain Carbon Steels, Composition, Properties, and Applications. **09**
b) Explain Hardening with any two types. **08**

Q.2 **a)** Explain Manufacturing of Sintering process in detail. **09**
b) Explain types of Composite Materials. **08**

Q.3 **Write Short Notes. (Any Three)** **18**
a) Types of cast irons.
b) Manufacturing of metal powder production.
c) Effect of particle size on Mechanical properties.
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)** Explain Thermal Expansion & Surface Energy. **09**
b) Explain Types, Properties and Applications of Plastics. **08**

Q.6 **Write Short Note. (Any Three)** **18**
a) Factors affecting on Electrical Resistivity
b) Shape Memory Alloy
c) Epoxy resins and Polyurethanes.
d) Proteins and Protein Structures.

SLR-JD-66

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Engineering Fracture Mechanics (MTDE209)

Day & Date: Friday, 31.05.2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Attempt any Two questions from each section.
3) Figures to the right indicates full marks.
4) Use of Scientific calculator is allowed.
5) Assume suitable data if necessary & mention it clearly.

Section – I

Q.1	**a)**	Explain microscopic and macroscopic failure mode related to fracture mechanics.	**06**
	b)	Differentiate between ductile and brittle fracture.	**06**
	c)	Distinguish between the trans-granular and inter-granular fracture.	**06**
Q.2	**a)**	What are different mechanisms of fracture? Explain any two mechanisms with neat diagram.	**06**
	b)	Write short note on resistance curve for brittle and ductile material.	**06**
	c)	Draw and enlist the Stress Intensity Factor (SIF) for different geometry.	**05**
Q.3	**a)**	Explain the Griffith's energy balance approach to identify catastrophic failure of material of a material.	**10**
	b)	What is modified Griffith criteria (Irwin's fracture criteria)?	**08**

Section – II

Q.4	**a)**	What is significance of J- integral being path independent? What are different methods of determining J- integral? Explain any one.	**10**
	b)	Write short note on Crack tip opening displacement (CTOD).	**08**
Q.5	**a)**	Explain the plastic zone shape according to Tresca and VonMises criteria?	**09**
	b)	Write short note on fatigue crack propagation laws (Paris law)	**08**
Q.6	**a)**	Write short note on clip gauge.	**09**
	b)	Determine the plastic zone length at fracture for a mild steel with $K_{IC} = 70\ MPa\sqrt{m}$ and $6_{ys} = 450\ MPa$ for a) plane stress and b) finite thickness condition. Take $a = \sqrt{3}$.	**08**

SLR-JD-67

Seat No.	

Set P

F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Project Management (MTDE210)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section-I

Q.1 **a)** Outline and describe the main stages of project management. What are the key activities and deliverables at each stage? **09**

b) How can PERT charts be integrated with Gantt charts using Harvard Total Project Manager (HTPM)? Discuss the benefits of such integration in enhancing project planning and control. **08**

Q.2 **a)** What are the primary techniques for project cost estimation, and what are their advantages and disadvantages? **09**

b) How does accurately defining work content contribute to the overall success of a project. **08**

Q.3 **Write short notes on (Any Three)** **18**

a) Microsoft Project Utilization in Resource Allocation.
b) Creating Gantt Charts in Primavera.
c) Financial Management in Project Management Tools.
d) Project Crashing and Financial Implications.

Section-II

Q.4 **a)** Identify and describe various software tools used in project management. How do these tools assist project managers in planning, scheduling, and controlling projects? **08**

b) What is resource leveling? and why is it an essential technique in project scheduling? **09**

Q.5 **a)** Discuss the importance of requirement analysis in Systems Engineering. How does it impact the overall project management process? **09**

b) Outline the steps involved in conducting a post-project analysis. What methods can be used to gather and analyze data on project performance? **08**

Q.6 Write short notes on (Any Three) **18**

a) NPD Project Management.

b) Analysis of the methods for managing uncertainty and high-risk elements in R & D projects.

c) Hi-Tech Project Management.

d) Financial management strategies used in mega projects.

SLR-JD-68

Seat No.	

Set P

F.Y (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING
Design for Manufacture and Assembly (MTDE211)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 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 tolerance and limits for process capability. **09**
b) Describe in detail the form design for casting and forgings. **08**

Q.2 **a)** What is simplification in component design? Explain the simplification by separation and simplification by amalgamation. **09**
b) Explain the significance of Machining Considerations. Describe the design features for facilitating the keyways. **08**

Q.3 **Write short notes on (Any Three)** **18**
a) General Design Principles for Manufacturability
b) Influence of Materials on Form design
c) Design for economy
d) Form design for welded members

Section-II

Q.4 **a)** What are the casting considerations in component design? Explain any one method of redesign of castings. **09**
b) Explain the basic DFE Method in detail. **08**

Q.5 **a)** Explain the Design for recyclability and the Design for remanufacture in detail. **09**
b) What is Design for Environment? Explain the environment objectives in detail. **08**

Q.6 **Write short notes on (Any Three)** **18**
a) Group Technology Approach in Component Design
b) Design to Regulations and Standards
c) Identification of uneconomical design
d) Computer Applications for DFMA

SLR-JD-69

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Analysis and Synthesis of Mechanisms and Machine (MTDE212)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 4 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 8 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Attempt any two questions from remaining questions of each section.

Section – I

Q.1 **a)** Give examples of the following: **06**
i) Spatial Mechanisms
ii) Mechanisms with multiple degrees of freedom,
iii) Unconstrained kinematic pairs

b) Explain with neat sketch how the auxiliary point method can be applied to a mechanism with low degree of complexity. Can the auxiliary point method be also be applied to kinematically simple mechanism? Comment. **06**

Q.2 **a)** What is the significance of Ball's point? What is its use? **06**

b) Use the Bobillier construction to center of curvature of the coupler curve of the point E of the four bar mechanism as shown in fig. III (b). The dimensions are AD = AB- 60 mm, BC=CD= 25 mm. AD is the fixed link and E is the midpoint of BC. **06**

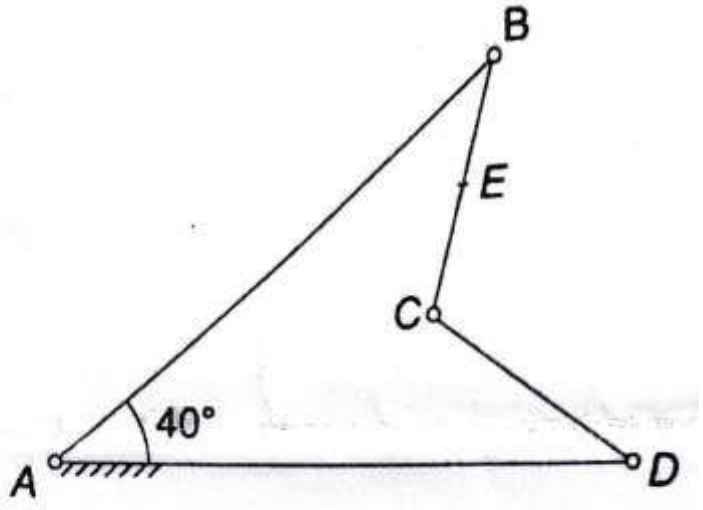


Fig. III (b)

Q.3 **a)** Explain inertia forces in linkages. **06**

b) How elastic mechanisms can be analyzed. **06**

Q.4 Plot space centrode of a connecting rod of a slider crank mechanism with 40 mm long crank and obliquity ratio 3. **11**

Section – II

Q.5 **a)** State and prove Robert-Chebychev theorem. **06**

b) Distinguish between Structural error, Graphical error and Dimensional error which exist in the mechanisms. **06**

Q.6 **a)** Explain synthesis of mechanism with examples. What do you understand by Type synthesis, Number synthesis and Dimensional synthesis. **06**

b) Derive expressions for displacement, velocity and acceleration of a four bar mechanism. **06**

Q.7 **Write a short note on:** **12**

a) Bermester points

b) Denvit-Hartenberg parameters

Q.8 Design a slider crank mechanism to coordinate three positions of the input link and the slider for the following angular and linear displacements: **11**

$\theta_{12} = 40°$ $\theta_{13} = 120°$ $S_{12} = 180\,mm$ $S_{13} = 300\,mm$

Take eccentricity of the slider as 20 mm.

SLR-JD-70

Seat No.		Set	P

F.Y. (M. Tech) (Sem - II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Finite Element Method (7072201)

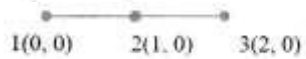
Day & Date: Tuesday, 21-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Question No.1 Section-I and Question No. 5 from section-II are compulsory.
2) Attempt any two questions from remaining question in both sections.
3) Figures to the right indicate full marks.
4) Make suitable assumptions if necessary and state them clearly.

Section – I

Q.1 **a)** Obtain shape functions of following elements. **08**

i) 

ii) 

b) Explain general procedure of finite element analysis. **07**

Q.2 **a)** Discuss one dimensional, two dimensional and three-dimensional elements and their properties. **05**

b) Explain weighted residual method and its need in FEM. **05**

Q.3 **a)** Explain One Dimensional Thermal Element. **05**

b) Explain beam element with its stiffness matrix **05**

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

a) Shape functions **05**

b) Boundary Element Method **05**

c) Finite Volume Method **05**

Section – II

Q.5 **a)** Explain modal analysis with suitable example. **08**

b) Explain transient analysis with examples. **07**

Q.6 **a)** Write natural coordinates of 1D,2D and 3D simplex elements. **05**

b) Explain Jacobian matrix of with example. **05**

Q.7 **a)** Differentiate between static and dynamic Finite element analysis with suitable example. **05**

b) Write Shape functions of 2 D quadrilateral element if € and η are coordinates for morphing. **05**

Q.8 **Write short note on (Attempt any two)**

a) Explicit Dynamic Analysis **05**

b) Shock Spectrum Analysis **05**

c) Harmonic analysis **05**

SLR-JD-71

Seat No.	

Set P

F.Y. (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL - (DESIGN ENGINEERING)
Advanced Design Engineering (7072202)

Day & Date: Saturday, 25-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one 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) Prove that a sine acceleration cam generates into a cycloidal displacement cam. **07**

Q.2 **a)** Design a 3-4-5 cam with following data: **10**
Dwell at 0 displacement through 90^0
Rise of 30 mm in 90^0
Dwell at 30 mm through 90^0
Fall at 30 mm in 90^0
Cam velocity is 2π rad/sec.

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:
1) Diameter of journal
2) Radial Clearance
3) Dimensions of Bearings
4) Minimum oil-film thickness
5) 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) Regimes of hydrodynamic lubrication.

Section-II

Q.4	**a)**	Derive the expression: Z(t) R(t) = f(t)	**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)	Reliability Improvement and Testing.	
	c)	Design for manufacturing and assembly.	

SLR-JD-72

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS)
Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Industrial Product Design (7072203)

Day & Date: Monday, 27-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Attempt any five questions from the following.
2) Figures to the right indicate full marks.
3) Support the answers by neat sketches wherever necessary.

Q.1	**a)**	Explain various type of physical models used in product design.	**07**
	b)	Explain in detail the process of concept development.	**07**
Q.2	**a)**	What are the specification requirements and rating? Give their importance in design of a consumer product.	**07**
	b)	Explain manufacturing requirements in industrial product design.	**07**
Q.3	**a)**	Explain the concept of symmetry, balance and stability.	**07**
	b)	What is psychology of seeing? Discuss its effect on product design	**07**
Q.4	**a)**	Discuss the aspect of ergonomic design of radial drilling machine.	**07**
	b)	Discuss the various phases of new product development in detail	**07**
Q.5	**a)**	How the creative ideas are generated with the help of brain storming session? How it is effectively conducted?	**07**
	b)	Explain break even analysis using Profit-volume chart.	**07**
Q.6	**a)**	What is concept of Design for environment? Explain 'Design for energy efficiency guidelines.	**07**
	b)	What is meant by concurrent design? How does concurrent design reduce time to market?	**07**

Q.7 Write short notes (any Two) **14**

a) Computer Aided Industrial Design,
b) Design for Production.
c) Quality Function Deployment (QFD)

SLR-JD-73

Seat No.		Set	P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Theory and Analysis of Composite Materials (7072206)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to right indicate full marks.
4) Make suitable assumption if necessary and state it clearly.

Section – I

Q.1 Solve the following Questions.

a) What is angle lamina? Write the elements of the transformed reduced complianse matrix for a 60° angle lamina of graphite/epoxy. **07**

b) Find the compliance and stiffness matrix for a graphite/epoxy lamina. The material properties are given as **07**
$E_1 = 181\,GPa\; E_2 = 10.3GPa\; E_3 = 10.3GPa, \nu_{12} = 0.28\; \nu_{23} = 0.60\; \nu_{13} = 0.27$
$G_{12} = 7.17\,GPa, G_{23} = 3.0GPa,\; G_{31} = 7.OOGPa,$

c) A displacement field in a body is given by **03**
$u = 10 - 5(x^2 + 6y + 7xy)$
$v = 10 - 5(yz)$
$w = 10 - 5(xy + yz^2)$
Evaluate the state of strain at $(x, y, z) = (1,2,3)$.

Q.2 Solve the following Questions.

a) Describe the elasticity approach to Stiffness with neat sketch and explain the terms associated with it. **07**

b) A glass/epoxy lamina consists of a 70% fiber volume fraction. Use properties of glass and epoxy respectively determine the **07**
i) Density of lamina
ii) Mass fractions of the glass and epoxy
iii) Volume of composite lamina if the mass of the lamina is 4 kg

c) What is elastic modulus? Evaluate the elastic moduli for orthotropic material. **03**

Q.3 Write Short Notes on the following.

a) Laminated composites **05**

b) Stress -strain relations for plane stress in an orthotropic material **05**

c) Principles of fracture mechanics **05**

d) Tsai, Wu tensor theory **03**

Section – II

Q.4 Solve the following Questions.

a) Explain strain displacement equation. Derive strain-displacement equations in composite laminates. **07**

b) A 0.010 in. thick laminate is subjected to in-plane loads. The midplane strains and curvatures are given as follows. Find the global strains at the top surface of the laminate. **05**

$$\begin{Bmatrix} \varepsilon_x^0 \\ \varepsilon_y^0 \\ \gamma_{xy}^0 \end{Bmatrix} = \begin{Bmatrix} 2751 \\ -1331 \\ -1125 \end{Bmatrix} \mu\, in/in \quad \begin{Bmatrix} \mathrm{K}_x \\ \mathrm{K}_y \\ \mathrm{K}_{xy} \end{Bmatrix} = \begin{Bmatrix} 1.965 \\ 0.2385 \\ -1.773 \end{Bmatrix} \frac{in}{in}$$

c) Which are various manufacturing processe of composite materials? Explain open and closed mould processing? **05**

Q.5 Solve the following Questions.

a) Explain in detail the pultrusion and pulforming processes of manufacturing of composite materials. **07**

b) Derive strain-displacement equations in composite laminates. **06**

c) Describe the Laminate Code. **04**

Q.6 Write Short Note on the following.

a) Detailed derivation of A and B matrices. **05**

b) Special cases of laminates. **05**

c) Injection moulding for composite manufacturing. **05**

d) Governing Equations for Vibration of Laminated Plates. **03**

SLR-JD-74

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Engineering Design Optimization (7072207)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
2) Figures to right indicate full marks.
3) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1 **a)** Explain Formulation and statement of optimization problems **09**
b) Explain single and multivariable. **08**

Q.2 **a)** Explain Standard form of linear. **09**
b) Explain Golden section method **08**

Q.3 **Write short notes on. (any three)** **18**
a) Classification of optimization problems.
b) Optimization techniques with or without constraints
c) Programming geometry of linear programming
d) Elimination methods

Section – II

Q.4 **a)** Explain Grid search method. **09**
b) Explain Random search method. **08**

Q.5 **a)** What is Sequential linear programming? Explain Concepts and methods. **09**
b) Explain Weighted sum method. **08**

Q.6 **Write short note on (any three)** **18**
a) Direct search method.
b) Genetic algorithms.
c) Effect of manufacturing errors.
d) Characteristics of mechanical systems.

SLR-JD-75

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Industrial Tribology (7072208)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
2) Make suitable assumption wherever necessary and state them clearly.
3) Draw neat diagram wherever necessary.
4) Figures to right indicate full marks.

Section-I

Q.1 **a)** Derive an expression for pressure distribution of squeeze film Lubrication Between Parallel Rectangular Plates. Estimate instantaneous load carrying capacity for Parallel Rectangular Plates. **09**

b) Explain the Hydrodynamic and Hydrostatic Bearings in detail. **08**

Q.2 **a)** What is Dry and Boundary Lubrication. Explain the Bearing Subjected to Frequent, Starts and Stops. **09**

b) What is the significance of Lubrication in Bearings? Explain the Infinitely Long and Infinitely Short (narrow) Journal Bearings. **08**

Q.3 **Write Short Notes. (Any Three)** **18**

a) Selection Criteria for Bearings
b) Applications of Journal Bearings
c) Thrust oil bearings
d) Mechanics of Fluid Flow

Section-II

Q.4 **a)** Using Ertel Grubin theory derive relation. **09**

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

b) Explain how finite difference method can be used for solution of journal motion in case of Hydrodynamic Journal Bearing. **08**

Q.5 **a)** What is Road Grip and Rolling Resistance? Explain the Tribological aspects of wheel on Rail contact. **09**

b) Explain the Tribological aspects in Drawing and Extrusion. **08**

Q.6 Write Short Note. (Any Three) **18**

a) Hertz Theory
b) Journal Centre Trajectory
c) Lubrication of Spheres
d) Tribo-characteristics of different materials

SLR-JD-76

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Advanced Engineering Materials (7072209)

Day & Date: Wednesday, 29-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to right indicate full marks.
4) Assume suitable data if necessary and mention it clearly.

Section – I

Q.1 **a)** Explain Types of Steels, Composition, Properties, and Applications. **09**
b) Explain Annealing and Normalizing. **08**

Q.2 **a)** Explain Manufacturing of Metal/ Non Metal Powders. **09**
b) Explain Classification of Composite Materials. **08**

Q.3 **Write Short Notes. (Any Three)** **18**
a) Types of Cast Irons
b) Sintering Theory and Mechanism
c) Effect of particle size on Mechanical Properties
d) Top Down Approaches

Section – II

Q.4 **a)** Explain factors affecting on Electrical Resistivity. **09**
b) Discuss Thermal Expansion & Surface Energy. **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. (Any Three)** **18**
a) Effect of Chemical Forces on Physical Properties.
b) Soft and Hard Magnetic Materials.
c) Epoxy Resins and Polyurethanes.
d) Proteins and Protein Structures.

SLR-JD-77

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Engineering Fracture Mechanics (7072210)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicates full marks.
4) Use of scientific calculator is allowed.
5) Assume suitable data if necessary & mention it clearly.

Section – I

Q.1 **a)** Explain with suitable figures opening mode, shearing mode and tearing mode. **07**

b) A plate 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 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 two materials are for M, K_{IC} =100 MPa $\sqrt{m}$ and for N, 60 MPa $\sqrt{m}$. *A* factor of safety of 1.5 is to be used. Minimum weight is important. Which of two materials should be selected? Take α = 1.1. **10**

Q.2 **a)** Explain stress intensity factor with respect to fracture mechanics. **07**

b) A 75 cm wide steel plate has central crack of length 2a = 10 cm. The plate is 5 mm thick. The plate is pulled to fracture and the fracture load is 800 KN. Determine the stress intensity factor assuming a/W as small. Also determine the value of fracture resistance. Take Young's Modulus for material as 207 GPa. **10**

Q.3 **Write Short Note on following. (Any Three)** **18**

b) Griffith Energy criteria
b) Compliance method
c) Interferometry and holography technique for determination of fracture toughness
d) Clip gauge

Section – II

Q.4 **a)** Explain different stages of fatigue crack initiation and propagation. **07**

b) An edge crack detected on a large plate is of 3.1 mm under a constant amplitude cyclic load having σ_{max} = 310 MPa and σmin = 1720 MPa. If the plate is made of a ferrite-pearlite steel and K_{IC} = 165 MPa$\sqrt{m}$. Determine **10**

i) propagation life up to failure and

ii) propagation life if the crack length a is not allowed to exceed 25 mm.

Q.5 **a)** Define J- integral. Discuss the significance and limitations of J-integral as a fracture parameter. **07**

b) An end notched specimen is made of height 2h = 2.8 mm initial crack length a = 26 mm, total length between the support 2L = 100 mm and thickness B = 25 mm. The load displacement relation under P-u record i.e. compliance C = 1.67 X 10^{-3} mm/N and critical load P_c = 1361N. Determine the critical energy release rate G_{IIC}. **10**

Q.6 **a)** Explain the plastic zone shape according to Tresca and Von Mises criteria? **10**

b) Compare creep and stress rupture test. **08**

SLR-JD-79

Seat No.	

Set P

F.Y (M. Tech.) (Sem - II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Design for Manufacture and Assembly (7072212)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Q. No.3 and Q. No. 6 are compulsory. And solve any one questions from each section.
2) Figures to the right indicates full marks.
3) Make suitable assumptions wherever necessary and state them clearly.
4) Draw neat diagram wherever necessary.

Section – I

Q.1 **a)** Explain the significance of strength and mechanical factors and mechanisms selection in the general design principles for manufacturability. **09**
b) Describe in detail the factors affecting form design. **08**

Q.2 **a)** Explain in detail the design features to facilitate for machining keyways and drills. **09**
b) Explain the datum features and tolerance stacks in process capability. **08**

Q.3 **Write short notes on (Any Three)** **18**
a) Design for clampability.
b) Form design for forgings.
c) Simplification by separation and amalgamation.
d) Effect of Material choice on Form Design.

Section – II

Q.4 **a)** Elaborate in detail about the minimizing core requirements and machined holes in casting component design **09**
b) What is Design for Environment? Explain the techniques to reduce the environmental impact? **08**

Q.5 **a)** Explain design for recyclability and design for remanufacture related to Design for Environment. **09**
b) Explain the redesign of cast members to obviate cores. **08**

Q.6 **Write short notes on (Any Three)** **18**
a) Computer Applications for DFMA.
b) Environmentally responsible product assessment.
c) Design to regulations and standards.
d) Design Guidelines in DFE.

SLR-JD-80

Seat No.		Set	P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
MECHANICAL – (DESIGN ENGINEERING)
Analysis and Synthesis of Mechanisms and Machine (7072213)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) In Section-I Q. No. 4 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 8 is compulsory. Attempt any one questions from the remaining.
2) Attempt any two questions from remaining questions of each Section.
3) Figures to right indicate full marks.

Section – I

Q.1	**a)**	Define kinematic pair and explain its classification.	**06**
	b)	What is the difference between degrees of freedom of a kinematic pair and that of a mechanism? How the two are interconnected.	**06**
Q.2	**a)**	Explain matrix method of analysis of mechanisms.	**06**
	b)	Can the matrix method be applied for analyzing the mechanisms involving springs? If YES, How? If NO, why?	**06**
Q.3	**a)**	What is the use of Bobillier's constructions? Explain all Bobillier constructions with supporting sketches.	**06**
	b)	Explain the significance of inflection circle. What is its use in kinematics?	**06**
Q.4		Differentiate between ICR and center of curvature. How the center of curvature of arbitrary point on an ellipse that is being traced using an elliptical trammel can be found out using Euler savary equation.	**11**

Section – II

Q.5	**a)**	Explain circle point curve and center point curve.	**06**
	b)	Derive Freudenstein's equation and explain its use.	**06**
Q.6	**a)**	Explain different defects possible in synthesized mechanisms.	**06**
	b)	Explain Denvit-Hartenberg parameters of spatial mechanism.	**06**
Q.7	**a)**	Explain point position reduction.	**06**
	b)	Explain Dwell mechanisms.	**06**

Q.8 Design a four link mechanism to coordinate three positions of the input and the output links for the following angular displacements:
$\theta_{12} = 60°$ $\theta_{13} = 90°$ $\Phi_{12} = 30°$ $\Phi_{13} = 50°$

SLR-JD-81

Seat No.	

Set P

S.Y (M. Tech.) (Sem -III) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Business Analytics (7072304)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section-I

Q.1 **a)** Outline the typical steps involved in the Business Analytics process. What are the main objectives at each stage of the Business Analytics process? **09**

b) Explain the concept of association rules in data mining with an example **08**

Q.2 **a)** Explain the concept of hierarchical data and how it can be visualized effectively. **09**

b) What is data aggregation and explain its significance in data analysis. **08**

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

a) Data Science in Business Analytics.
b) Curse of Dimensionality.
c) Data Exploration and Visualization.
d) Scaling up to large datasets.

Section-II

Q.4 **a)** What is a lift chart, and how can it be used to evaluate the performance of a classifier? **09**

b) Explain the differences between explanatory modeling and predictive modeling in the context of multiple linear regression. **08**

Q.5 **a)** Describe the process of constructing a classification tree. What are the key steps involved in splitting the data and forming the tree structure? **09**

b) Describe the basic principles of filter models used for feature selection in clustering **08**

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

a) Confusion Matrix
b) Reducing the Number of Predictors
c) Tree Structure
d) Clustering

SLR-JD-82

Seat No.		Set	P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Operation Research (7072305)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method. **12**
Maximize $Z = 4x - 2y$
Subject to constraints
i) $x + y \leq 14$
ii) $3x + 2y \geq 36$
iii) $2x + y \leq 24$
and $x, y \geq 0$

Q.2 **a)** Explain the primal-dual relationship. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Max $Z_x = 3x_1 + 3x_2$
Subject to
i) $2x_1 + 4x_2 \geq 40$
ii) $3x_1 + 2x_2 \geq 50$
and $x_1, x_2 \geq 0$

Q.3 **a)** Explain application of simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that on average nine customers arrive every 5 minutes and that the cashier can serve 10 in 5 minutes. Find: **08**
i) average number of customers queuing for service
ii) probability of having more than 10 customers in the system, and
iii) probability that a customer has to queue for more than 2 minutes

Section – II

Q.4 **a)** Explain the various costs associated with Inventory. **05**

b) Write short note on deterministic models with or without shortages. **04**

c) A company that operates for 50 weeks in a year is concerned about its stocks of copper cable. This costs Rs 240 a meter and there is a demand for 8,000 meters a week. Each replenishment costs Rs 1,050 for administration and Rs 1,650 for delivery, while holding costs are estimated at 25 per cent of value held a year. Determine: **08**

i) Optimal order quantity
ii) Total variable inventory cost
iii) Total inventory cost
iv) What is the gross profit if the company sells the cable for Rs 360 a meter

Q.5 **a)** Write a note on Group Replacement Policy. **04**

b) Explain Maximal flow problem with suitable example. **04**

c) The cost of a machine is Rs 6,100 and its scrap value is Rs 100. The maintenance costs found from experience are as follows: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	100	250	400	600	900	1200	1600	2000

When should the machine be replaced?

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. Activities are identified by their beginning (i) and ending (j) node numbers. **12**

Activity (i-j)	Estimated Duration(weeks)		
	Optimistic	Most Likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

1) Draw the network diagram of the activities in the project and find critical Path.

2) Find the expected duration and variance for each activity. What is the expected project length?

3) Calculate the variance and standard deviation of the project length.

4) What is probability that the project will be completed:
i) at least 4 weeks earlier than expected time.
ii) no more than 4 weeks later than expected time

Given

Z	0.50	0.67	1.00	1.33	2.00
Prob	0.3085	0.2514	0.1587	0.0918	0.0228

b) Explain the following in the context of project management: **05**
(i) Activity variance, and (ii) Project variance.

SLR-JD-83

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Cost Management of Engineering Projects (7072306)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figure to the right Indicate full marks.

Section – I

Q.1 **a)** What is different between cost and expenditure explain how selling price of the product is determined? **09**

b) Differentiate between fixed cost and variable cost with suitable example. Which cost is related to production quantity? **08**

Q.2 **a)** Explain in brief about objective of cost estimation how cost is differ from value. **09**

b) What do you mean by cost control explain the various steps involved in the process of cost control? **08**

Q.3 **Write a short note on any three.** **18**

a) Progress measurement and earned value
b) Parametric cost estimating model
c) Cost analysis
d) Time value of money

Section – II

Q.4 **a)** Explain in brief about feed forward techniques in cost management. **08**

b) Explain in brief about value management as aid to risk assessment. **09**

Q.5 **a)** Explain in brief above project value and risk with suitable example. **09**

b) What is value analysis explain in brief about earned value management for assessing project performance? **08**

Q.6 **Write a short note on any three.** **18**

a) Dimension and measures of value
b) Scope and key principle of VM
c) Lifecycle cost
d) Need for value and cost estimation in management projects.

SLR-JD-84

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
MECHANICAL– (DESIGN ENGINEERING)
Nonconventional Energy (7072307)

Day & Date: Saturday, 01-06-2024 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.
3) Assume necessary data if necessary.

Section I

Q.1 Solve Any Four. **20**

a) Enumerate the criteria based on which energy can classified.
b) What do you understand by energy conservation? Explain its various aspects.
c) Describe thermal energy storage system of solar energy.
d) What are the main advantage and limitations of a battery storage system?
e) Write a note on the growth of energy sector in India.

Q.2 Solve Any Two. **15**

a) Explain hydroelectric conventional energy source using IGCC power generation with schematic diagram.
b) What are the emerging new technologies for the energy conservation and efficiency?
c) Draw a schematic diagram of solar pond based electric power plant with cooling tower and explain its working.

Section II

Q.3 Solve Any Four. **20**

a) Explain the various method of production of hydrogen for use as energy carrier.
b) What are the factors affecting the performance of biogas digester?
c) Explain the major Application of wind power.
d) What are major advantages and disadvantages of a solar PV system?
e) Write a note on environmental effect on fuel cell.

Q.4 Solve Any Two. **15**

a) What is the importance of MPPT in an SPV system? Explain various strategies used for operation of an MPPT.
b) What is the origin of biomass energy? What is its global potential? What is the average efficiency of photosynthetic conversion of solar energy into biomass?
c) Sketch the diagram of a HAWT and explains the function of its main components.

SLR-JD-85

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Digital Design and Verification (MTEL101)

Day & Date: Monday, 13-05-2024 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 TWO of the following. **14**
- **a)** Explain in brief randomization in system verilog
- **b)** Explain the built-in data types of system verilog with example.
- **c)** Explain in brief the guidelines for choosing the storage type in System verilog.

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 following. **14**
- **a)** Explain following.
  1) IP as RTL source code
  2) 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)** Write a short note on Electro migration.
- **b)** Explain noise and crosstalk with respect to signal Integrity challenge.

Q.6 Attempt following. **14**
- **a)** What are the different categories of FPGA structures? Explain any one of them.
- **b)** Explain SRAM based FPGA in brief.

SLR-JD-86

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Advanced Digital Signal Processing (MTEL102)

Day & Date: Tuesday, 14-05-2024 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.

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.

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-JD-87

Seat No.		Set	P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Voice and Data Networks (MTEL103)

Day & Date: Wednesday, 15-05-2024 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 wherever necessary.
4) Draw neat sketches wherever necessary.

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

a) Describe different network performance issues.
b) Explain voice networks (wired and wireless) and switching.
c) Explain link layer design adaptation and link layer protocols.

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

a) Explain different Network terminology.
b) What is the difference between circuit and packet switching? Describe packet switching.
c) Explain the following retransmission mechanisms-
1) Go_back_N
2) Selective repeat protocols and their analysis

Q.3 Answer following questions.

a) Explain centralized and distributed approaches for network design. **06**
b) Explain Cross layer communication. **05**

OR

Explain data networks and its design. **05**

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

a) Explain global internet in details.
b) Draw IPv4 header format and describe it in brief.
c) What are principles of cryptography? Explain in details.

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

a) Explain concept of sub netting.
b) Explain TCP throughput analysis. Also explain quality of service in packet networks.
c) Explain authentication, integrity, key distribution and certification in network security.

Q.6 Answer following questions.

a) Explain the following terms: **06**
1) TCP and UDP
2) Congestion control
b) Explain attacks and measures in network security. **05**

OR

Explain TCP congestion control algorithm in detail. **05**

SLR-JD-88

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Machine Learning© (MTEL104)

Day & Date: Thursday, 16-05-2024 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 Decision Tree with example in brief.	**06**
	b)	Explain the Linear regression and Logistic regression in brief.	**06**
Q.2		Explain Goals and Applications of machine learning 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 key perspectives on machine learning in brief.	**06**
	b)	Explain applications of Support Vector Machines in brief.	**06**
Q.5	**a)**	Explain error backpropagation 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-JD-91

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Image and Video Processing (MTEL108)

Day & Date: Friday, 17-05-2024 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) Image restoration/degradation Model
ii) Intra frame shift invariant restoration
b) Explain histogram equalization of the image. **07**

Section – II

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

a) Explain any two method of edge detection.
b) Explain Lossless image compression including entropy coding.
c) Explain spatiotemporal change detection.
d) Write short note on video quality assessment.
e) Explain details of special feature extraction.

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-JD-92

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Digital Design and Verification (7078101)

Day & Date: Monday, 13-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) Figures to the right indicate full marks.
2) Make suitable assumptions if necessary and state it clearly.
3) Use of non-programmable calculator is allowed.

Section – I

Q.1 Attempt any two of the following: **14**
a) Explain in brief randomization in system Verilog.
b) Explain the built in data types of system Verilog with example.
c) Explain in brief the guidelines for choosing the storage type in System Verilog.

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 the following: **16**
a) Write verilog code for modeling D flip-flop. Also write the testbench for testing it.
b) Write verilog code for modeling 4 bit parallel adder. Also write the testbench for testing it.

Section – II

Q.4 Attempt the 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) Write a short note on Electro migration.
b) Explain noise and crosstalk with respect to signal Integrity challenge.

Q.6 Attempt following. **14**
a) What are the different categories of FPGA structures? Explain any one of them.
b) Explain SRAM based FPGA in brief.

SLR-JD-94

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Voice and Data Networks (7078103)

Day & Date: Wednesday, 15-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

Instructions: 1) All question are compulsory.
2) Assume suitable data wherever necessary.
3) Draw neat sketches wherever necessary.

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

a) Explain different Network terminology.
b) What is layered and layer-less communication? Describe cross layer communication briefly.
c) Explain link layer design adaptation and link layer protocols.

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 issues in design of voice and data network **06**
b) Explain Circuit switching and packet switching. **05**

OR

Describe Go_Back_N and selective repeat ARQ mechanism in details. **05**

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

a) Write note on IP protocol and addressing.
b) Write note on RED.
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. **05**
b) Describe network attacks and compare between them.

OR

Explain packet scheduling algorithms. **05**

SLR-JD-95

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Machine Learning© (7078104)

Day & Date: Thursday, 16-05-2024 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 Decision Tree with example in brief.	**06**
Q.2		Explain Supervised and Unsupervised learning with examples.	**11**
Q.3		Explain Goals and Applications of machine learning in detail.	**12**
		OR	
		Distinguish between supervised learning and unsupervised learning.	

Section – II

Q.4	**a)**	Explain Support Vector Machines and its applications.	**06**
	b)	Explain key perspectives on machine learning in brief.	**06**
Q.5	**a)**	Explain error backpropagation 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-JD-100

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Research Methodology &IPR© (MTEL201)

Day & Date: Tuesday, 21-05-2024 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 types of research design.
b) Explain importance of literature review in research.
c) Explain features of research design.

Q.2 Answer any three of the following questions. **18**
a) Briefly describe the research process.
b) Explain the techniques involved in defining a research problem.
c) Explain research report structure in detail.
d) Write a comprehensive note on the “Virtual and Digital Lab”.

Q.3 With suitable example, explain research problem formulation. **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-JD-101

Seat No.	

Set P

F.Y (M. Tech) (Semester - II) (New) (CBCS) Examination: March/April -2024
ELECTRONICS ENGINEERING
Communication Buses & Interfaces (MTEL202)

Day & Date: Saturday, 25-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All questions are compulsory.
2) All questions carry equal marks.

Q.1 Attempt Any Five. **35**

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

Q.2 Attempt Any Five. **35**

1) Write short note on PCI.
2) Explain in short configuration space.
3) What is data streaming serial communication protocol.
4) Explain descriptor types and contents.
5) Explain hardware protocols and applications.
6) Explain PCI Express.

SLR-JD-102

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
Electronics Engineering
Advanced IOT (MTEL203)

Day & Date: Monday, 27-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Draw neat sketches wherever necessary.

Q.1 Attempt Any One Question. **10**
a) Explain M2M and Peer Networking Concepts.
b) Explain Wireless Sensor Network.

Q.2 What is Fog Computing? Explain Security in Fog. **10**

Q.3 Attempt Any One Question. **15**
a) Describe IOT networks as PAN, LAN and WAN.
b) What is principles of edge/P2P networking? Explain MIST networking for IOT Communications?

Q.4 Attempt Any One Question. **10**
a) Explain smart objects as building blocks for IOT.
b) Explain operating systems requirement of IOT environment.

Q.5 Write Note on: **10**
a) mbed
b) RIOT

Q.6 Attempt Any One Question. **15**
a) Explain the following IOT applications:
i) Smart Grid sectors using IOT
ii) Healthcare sectors using IOT
b) Explain big data for IOT applications.

SLR-JD-103

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
PLC, SCADA and Distributed Control Systems (MTEL204)

Day & Date: Wednesday, 29-05-2024 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)**	Draw Architecture of PLC and explain.	**06**
	b)	What are discrete I/O modules for PLC?	**06**
Q.2		What are the expectations of Automation? What are applications of Automation? Explain any one application with Block Schematic.	**12**
Q.3	**a)**	Explain PLC counters in detail.	**11**
		OR	
	b)	Explain PLC timers in detail.	**11**

Section-II

Q.4	**a)**	Explain Human Machine Interface (HMI) used in DCS.	**06**
	b)	Explain Data Highway used in DCS.	**06**
Q.5	**a)**	What are functions of MTU and RTU used in SCADA?	**06**
	b)	What are protocols used for communication in SCADA?	**06**
Q.6	**a)**	Explain Automation of Bottle Filling Plant using PLC.	**11**
		OR	
	b)	Explain material flow using PLC.	**11**

SLR-JD-106

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - II) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
VLSI in Signal Processing (MTEL208)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

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

a) Draw the Block diagram, SFG and DFG for y(n) = ay(n-1) + bx(n-1) + cx(n).

b) Perform the retiming for the following DFG shown in fig. 1.

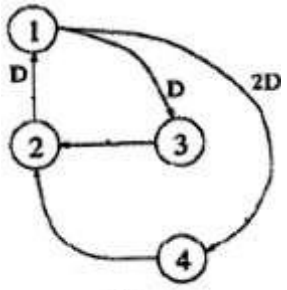


Fig. 1.

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

d) Find the loop bound & iteration bound for the DFG shown Fig. 2.

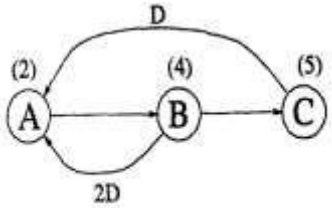


Fig. 2.

e) Write a note on retiming for register minimization.

Q.2 Solve the following Questions.

a) For DFG shown in Fig. 3, find iteration bound using MCM algorithm. **08**

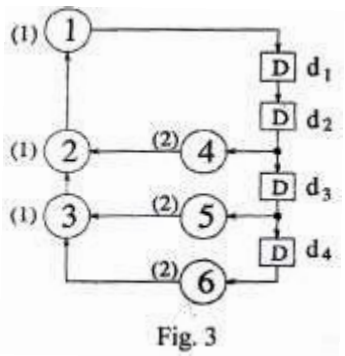


Fig. 3

b) Explain LPM algorithm. **07**

OR

c) In the SFG shown in fig 4(a) the computation time for each nod e is assumed to be lu.t.

i) Calculate critical path computation time.

ii) The critical path has been reduced to 2 u.t by inserting 3 extra delay element as shown in fig. 4(b)

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

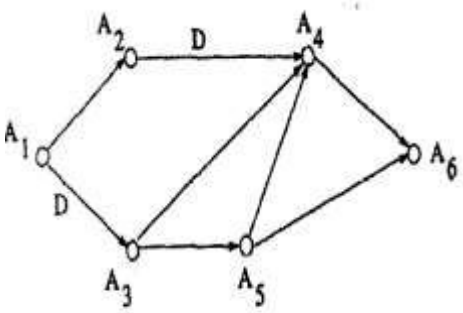


Fig. 4(a)

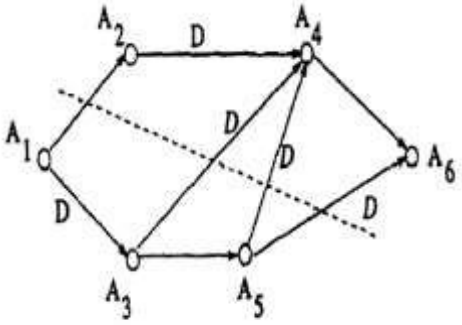


Fig. 4(b)

Section – II

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

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

b) Explain applications of unfolding.

c) Explain parallel carry save array multipliers.

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

e) Design B2 filter for FIR systolic array.

Q.4 Solve the following Questions.

a) Draw the constraint graph & use it to determine if the following system inequalities have a solution & find the solution if one exists using Floyd Warshall algorithm. **08**

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

b) Draw the circular life time chart for following with period N = 9: **07**

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

OR

c) Design W2 & dual W2 filter for FIR systolic array. **07**

SLR-JD-108

Seat No.		Set	P

F.Y. (M. Tech.) (Sem - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Research Methodology& IPR© (7078201)

Day & Date: Tuesday, 21-05-2024 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 types of research design.
- **b)** Explain importance of literature review in research.
- **c)** Explain features of research design.

Q.2 Answer any three of the following questions. **18**
- **a)** Briefly describe the research process.
- **b)** Explain the techniques involved in defining a research problem.
- **c)** Explain research report structure in detail.
- **d)** Write a comprehensive note on the “Virtual and Digital Lab”.

Q.3 With suitable example, explain research problem formulation. **05**

Section – II

Q.4 Write Short notes on **12**
- **a)** Role of probability and statistics in simulation
- **b)** Ethical issues in research
- **c)** Plagiarism

Q.5 Answer any three of the following questions. **18**
- **a)** Explain need and techniques of system simulation.
- **b)** Write about Copyright and works protected under copyright.
- **c)** Explain in brief “Geographical Indications”.
- **d)** Explain licensing and transfer of technology in patents.

Q.6 Explain Monte Carlo Simulation. **05**

SLR-JD-109

Seat No.	

Set P

F.Y. (M.Tech.) (Sem-II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Communication Buses & Interfaces (7078202)

Day & Date: Saturday, 25-05-2024 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**

a) What are features of serial communication?
b) Explain SPI with its limitations.
c) Differentiate between RS232 and RS 485.
d) Explain RS485 with its pin configuration.
e) Differentiate between I^2C and SPI.
f) Explain in short CAN frame formats.

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

a) Explain in short configuration space.
b) Explain different types of transfer in USB.
c) Explain hardware protocols and applications.
d) Explain descriptor types and contents.
e) What is data streaming serial communication protocol.
f) Explain enumeration in USB.

SLR-JD-110

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
Electronics Engineering
Advanced IOT (7078203)

Day & Date: Monday, 27-05-2024 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 wherever necessary.
4) Draw neat sketches wherever necessary.

Q.1 Attempt Any One Question: **10**
a) Explain fractal cities in IoT.
b) Explain edge resource pooling and caching in wireless sensor network.

Q.2 What is IoT? How smart cities are connected using IoT. **10**

Q.3 Attempt Any One Question: **15**
a) Explain concept of Ipv4 and Ipv6.
b) Explain MIST networking for IoT communications.

Q.4 Attempt Any One Question: **10**
a) Describe open-source hardware and embedded systems platforms for IoT.
b) Explain operating systems requirement of IoT environment.

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) Write Note on:
i) mbed
ii) Contiki operating systems

SLR-JD-111

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
PLC, SCADA and Distributed Control Systems (7078204)

Day & Date: Wednesday, 29-05-2024 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)**	Draw architecture of PLC and explain.	**06**
	b)	What are discrete I/O modules for PLC?	**06**
Q.2	**a)**	What are the expectations of automation? What are applications of automation? Explain any one application with block schematic.	**12**
Q.3	**a)**	Explain PLC counters in detail.	**11**
		OR	
	b)	Explain PLC timers in detail.	**11**

Section – II

Q.4	**a)**	Explain Human Machine Interface (HMI) used in DCS.	**06**
	b)	Explain Data Highway used in DCS.	**06**
Q.5	**a)**	What are functions of MTU and RTU used in SCADA?	**06**
	b)	What are protocols used for communication in SCADA?	**06**
Q.6	**a)**	Explain automation of bottle filling plant using PLC.	**11**
		OR	
	b)	Explain material flow using PLC.	**11**

SLR-JD-114

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (Old) (CBCS) Examination: March/April -2024
ELECTRONICS ENGINEERING
VLSI in Signal Processing (7078208)

Day & Date: Friday, 31-05-2024 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**

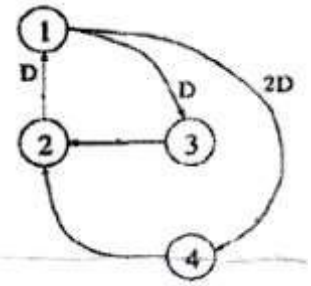
a) Draw the Block diagram, SFG and DFG for y(n)=ay(n-1)+bx(n-1)+cx(n).

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.

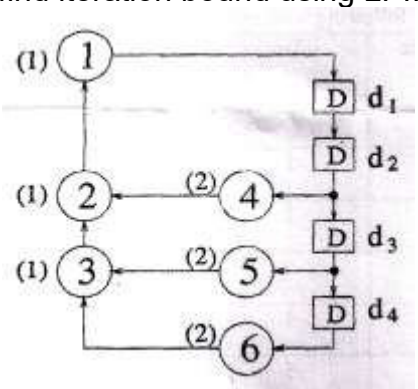
d) Draw DFG for 3 tap FIR filter.

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**

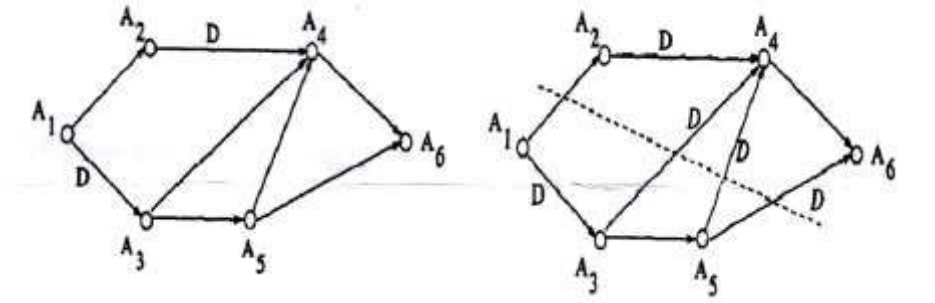


b) In the SFG shown in fig (a) the computation time for each nod e is assumed to be lu.t. **07**

i) Calculate critical path computation time.

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

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



Section – II

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

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

b) Design B1 filter for FIR systolic array.

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

d) Explain parallel carry save array multipliers.

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) State the properties of unfolding. Explain unfolding algorithm **07**

SLR-JD-116

Seat No.	

Set P

S.Y (M. Tech.) (Sem -III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Business Analytics (7078307)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section-I

Q.1 **a)** Outline the typical steps involved in the Business Analytics process. What are the main objectives at each stage of the Business Analytics process? **09**

b) Explain the concept of association rules in data mining with an example **08**

Q.2 **a)** Explain the concept of hierarchical data and how it can be visualized effectively. **09**

b) What is data aggregation and explain its significance in data analysis. **08**

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

a) Data Science in Business Analytics.
b) Curse of Dimensionality.
c) Data Exploration and Visualization.
d) Scaling up to large datasets.

Section-II

Q.4 **a)** What is a lift chart, and how can it be used to evaluate the performance of a classifier? **09**

b) Explain the differences between explanatory modeling and predictive modeling in the context of multiple linear regression. **08**

Q.5 **a)** Describe the process of constructing a classification tree. What are the key steps involved in splitting the data and forming the tree structure? **09**

b) Describe the basic principles of filter models used for feature selection in clustering **08**

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

a) Confusion Matrix
b) Reducing the Number of Predictors
c) Tree Structure
d) Clustering

SLR-JD-117

Seat No.	

Set P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Operation Research (7078308)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method. **12**
Maximize $Z = 4x - 2y$
Subject to constraints
i) $x + y \leq 14$
ii) $3x + 2y \geq 36$
iii) $2x + y \leq 24$
and $x, y \geq 0$

Q.2 **a)** Explain the primal-dual relationship. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Max $Z_x = 3x_1 + 3x_2$
Subject to
i) $2x_1 + 4x_2 \geq 40$
ii) $3x_1 + 2x_2 \geq 50$
and $x_1, x_2 \geq 0$

Q.3 **a)** Explain application of simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that on average nine customers arrive every 5 minutes and that the cashier can serve 10 in 5 minutes. Find: **08**
i) average number of customers queuing for service
ii) probability of having more than 10 customers in the system, and
iii) probability that a customer has to queue for more than 2 minutes

Section – II

Q.4 **a)** Explain the various costs associated with Inventory. **05**

b) Write short note on deterministic models with or without shortages. **04**

c) A company that operates for 50 weeks in a year is concerned about its stocks of copper cable. This costs Rs 240 a meter and there is a demand for 8,000 meters a week. Each replenishment costs Rs 1,050 for administration and Rs 1,650 for delivery, while holding costs are estimated at 25 per cent of value held a year. Determine: **08**

i) Optimal order quantity
ii) Total variable inventory cost
iii) Total inventory cost
iv) What is the gross profit if the company sells the cable for Rs 360 a meter

Q.5 **a)** Write a note on Group Replacement Policy. **04**

b) Explain Maximal flow problem with suitable example. **04**

c) The cost of a machine is Rs 6,100 and its scrap value is Rs 100. The maintenance costs found from experience are as follows: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	100	250	400	600	900	1200	1600	2000

When should the machine be replaced?

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. Activities are identified by their beginning (i) and ending (j) node numbers. **12**

Activity (i-j)	Estimated Duration(weeks)		
	Optimistic	Most Likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

1) Draw the network diagram of the activities in the project and find critical Path.

2) Find the expected duration and variance for each activity. What is the expected project length?

3) Calculate the variance and standard deviation of the project length.

4) What is probability that the project will be completed:
i) at least 4 weeks earlier than expected time.
ii) no more than 4 weeks later than expected time

Given

Z	0.50	0.67	1.00	1.33	2.00
Prob	0.3085	0.2514	0.1587	0.0918	0.0228

b) Explain the following in the context of project management: **05**
(i) Activity variance, and (ii) Project variance.

SLR-JD-118

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Cost Management of Engineering Projects (7078309)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figure to the right Indicate full marks.

Section – I

Q.1 **a)** What is different between cost and expenditure explain how selling price of the product is determined? **09**

b) Differentiate between fixed cost and variable cost with suitable example. Which cost is related to production quantity? **08**

Q.2 **a)** Explain in brief about objective of cost estimation how cost is differ from value. **09**

b) What do you mean by cost control explain the various steps involved in the process of cost control? **08**

Q.3 **Write a short note on any three.** **18**

a) Progress measurement and earned value
b) Parametric cost estimating model
c) Cost analysis
d) Time value of money

Section – II

Q.4 **a)** Explain in brief about feed forward techniques in cost management. **08**

b) Explain in brief about value management as aid to risk assessment. **09**

Q.5 **a)** Explain in brief above project value and risk with suitable example. **09**

b) What is value analysis explain in brief about earned value management for assessing project performance? **08**

Q.6 **Write a short note on any three.** **18**

a) Dimension and measures of value
b) Scope and key principle of VM
c) Lifecycle cost
d) Need for value and cost estimation in management projects.

SLR-JD-119

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS ENGINEERING
Nonconventional Energy (7078310)

Day & Date: Saturday, 01-06-2024 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.
3) Assume necessary data if necessary.

Section I

Q.1 Solve Any Four. **20**

a) Enumerate the criteria based on which energy can classified.
b) What do you understand by energy conservation? Explain its various aspects.
c) Describe thermal energy storage system of solar energy.
d) What are the main advantage and limitations of a battery storage system?
e) Write a note on the growth of energy sector in India.

Q.2 Solve Any Two. **15**

a) Explain hydroelectric conventional energy source using IGCC power generation with schematic diagram.
b) What are the emerging new technologies for the energy conservation and efficiency?
c) Draw a schematic diagram of solar pond based electric power plant with cooling tower and explain its working.

Section II

Q.3 Solve Any Four. **20**

a) Explain the various method of production of hydrogen for use as energy carrier.
b) What are the factors affecting the performance of biogas digester?
c) Explain the major Application of wind power.
d) What are major advantages and disadvantages of a solar PV system?
e) Write a note on environmental effect on fuel cell.

Q.4 Solve Any Two. **15**

a) What is the importance of MPPT in an SPV system? Explain various strategies used for operation of an MPPT.
b) What is the origin of biomass energy? What is its global potential? What is the average efficiency of photosynthetic conversion of solar energy into biomass?
c) Sketch the diagram of a HAWT and explains the function of its main components.

SLR-JD-123

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Research Methodology& IPR (MTETC101)

Day & Date: Monday, 13-05-2024 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. **20**

a) Explain some features of good design.
b) With suitable example explain applied Vs fundamental research.
c) Explain various types of research with suitable example.
d) Differentiate research methods and research methodology.
e) With suitable example explain how to write an abstract of technical report.

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

a) What is a research design? What is its significance? What is its need?
b) With suitable example explain the process for defining, formulating and selecting research problem.
c) Write a note on defining and formulating the research problem.

Section – II

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

a) Explain different methods of data collection.
b) Discuss Citation and acknowledgement in report writing in detail.
c) Explain data processing and analysis strategies with example.
d) Describe Structure and components of scientific reports.
e) Explain in brief Intellectual property rights and patent law.

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

a) Explain commercialization, copy right, royalty in detail.
b) Explain reproducibility and accountability in details.
c) Explain bibliography, references and footnotes in detail.

SLR-JD-124

Seat No.		Set	P

F.Y (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Antenna Theory & Techniques (MTETC102)

Day & Date: Tuesday, 14-05-2024 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)** Derive an array factor equation for linear array of n-isotropic point sources. **10**
- **b)** Explain End fire Array radiation pattern with mathematical expression.
- **c)** Explain about various micro strip antenna configurations.

Q.2 Solve (Any One).
- **a)** Explain transmission line model for the analysis of micros trip antenna. **07**
- **b)** Explain different feeding mechanism of micro strip antenna.

Q.3 Solve (Any Three).
- **a)** Derive the expression for Electric field intensity at a point due to two isotropic sources which has equal Amplitude and in phase to each other. **18**
- **b)** Explain Broadside Array radiation pattern with mathematical expression.
- **c)** Explain the radiation mechanism of a micro strip antenna.
- **d)** Design a rectangular micro strip patch antenna, based on the dominant mode that can be mounted on the roof of a car to be used for satellite cellular telephone. The designed center frequency is 10GHz. the dielectric constant of the substrate is 2.2 (i.e., RT/ duroid), and the thickness of the substrate is 0.1588 cm.

Section – II

Q.4 Solve (Any Two). **10**
- **a)** Explain about the aperture coupled micro strip antenna for broad band antennas.
- **b)** Explain broad banding using stacked Elements.
- **c)** Explain desirable substrate characteristics for antenna fabrication.

Q.5 Solve (Any One). **07**
- **a)** Explain Linear array design with Micro strip patches using corporate feed Arrays.
- **b)** Explain about antenna design consideration and its application for Satellite communication.

Q.6 Solve (Any Three). **18**
- **a)** Explain the effects of substrate parameters on Bandwidth.
- **b)** Write a note on composite material substrate.
- **c)** Explain series feed excitation method for micro strip antenna.
- **d)** Explain about antenna design consideration and its application for: Terrestrial mobile communication.

SLR-JD-125

Seat No.	

Set P

F.Y. (M. Tech.) (Sem- I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Embedded System (MTETC103)

Day & Date: Wednesday, 15-05-2024 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) Use of non programmable calculator is allowed.
4) Assume necessary data if necessary.

Section – I

Q.1 Solve any Two **20**

a) Explain register organization in ARM state.
b) Describe characteristics of embedded computing applications.
c) How does power management takes place in MP 11?

Q.2 Solve any Two **15**

a) Describe the challenges in embedded computing system design.
b) Explain various modes of ARM 11 core.
c) Explain the features of ARM 11 MP core processor with the help of block diagram.

Section - II

Q.3 Solve any Two **20**

a) Write a note on Task scheduling in RTOS.
b) Explain software design process and life cycle.
c) Write a note on Semaphors.

Q.4 Solve any Two **15**

a) Explain the use of pipes and filters.
b) Explain in brief interfacing components with Raspberry Pi board.
c) Explain the features of RT Linux.

SLR-JD-127

Seat No.	

Set P

F.Y. (M. Tech) (Sem - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Soft Computing Methods (MTEC106)

Day & Date: Thursday, 16-05-2024 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) What is union in Fuzzy set operation and intersection in Fuzzy operation?

b) Explain fuzzification and defuzzification.

c) 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

d) Consider fuzzy relations

$R = \begin{bmatrix} 0.4 & 0.6 \\ 0.8 & 0.7 \end{bmatrix}$ $S = \begin{bmatrix} 0.8 & 0.5 & 0.4 \\ 0.9 & 0.3 & 0.7 \end{bmatrix}$

Find the relation T=R o S using max-min.

e) What is Roulette wheel selection in GA? Explain in detail.

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

a) What are the different methods of development of membership function?

b) What are the basic Genetic Algorithm Operators/state the 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.

$$W = \text{weak stimulus} = \left\{\frac{1}{0} + \frac{0.5}{50} + \frac{0.3}{100} + \frac{0.6}{150} + \frac{0}{200}\right\} \subset X$$

$$M = \text{medium stimulus} = \left\{\frac{0.4}{0} + \frac{0.4}{50} + \frac{1}{100} + \frac{0.4}{150} + \frac{0}{200}\right\} \subset X$$

& one fuzzy set on the output universe Y,

$$S = \text{severe response} = \left\{\frac{1}{0} + \frac{0.9}{50} + \frac{0.3}{100} + \frac{0.2}{150} + \frac{0}{200}\right\} \subset Y$$

Construct the preposition: If “weak stimulus” THEN “not severe response” using fuzzy implication?

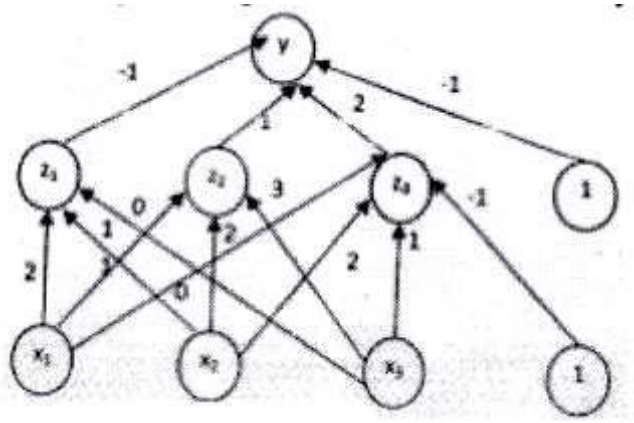
Section – II

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

a) Distinguish between artificial neuron & biological neuron.
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 about Deep Learning.
e) Draw a 3-5-1 artificial neural network.

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

a) Using the Back-propagation training algorithm, find the new weights when illustrated in below figure is presented the input pattern [0.6.0.8.0] and the target output is 0.9 use learning rate alpha =0.3 and use binary sigmoid activation function.



b) What is meant by learning? Give types of learning with examples?
c) Explain with a neat diagram the neural network architecture of multilayer feed forward network.

SLR-JD-129

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Satellite Communication (MTETC108)

Day & Date: Friday, 17-05-2024 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:
i) Elliptical orbits
ii) Molniya orbit
iii) Iridium
c) Explain Earth Station Architecture.

Section – II

Q.3 Solve any five of the following. **20**

a) Write short Notes on:
i) Teledesic
ii) 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.

SLR-JD-130

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Research Methodology &IPR (7076101)

Day & Date: Monday, 13-05-2024 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. **20**

a) Distinguish between good and bad literature review.
b) With suitable example explain different ways to classify research.
c) Explain various types of research with suitable example
d) Differentiate research methods and research methodology.
e) Explain some features of good design.

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

a) What is a research design? What is its significance? What is its need?
b) With suitable example explain the process for defining, formulating and selecting research problem.
c) With suitable engineering example explain guidelines for design of experiment.

Section – II

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

a) Discuss Citation and acknowledgement in report writing in detail.
b) Explain different methods of data collection.
c) Write a note on IPR and laws.
d) Explain characteristics of good hypothesis.
e) Explain layout, structure and Language of typical reports/thesis.

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

a) Briefly explain structure and components of scientific reports.
b) Explain commercialization, copy right, royalty in detail.
c) Explain Data Processing and Analysis strategies in data collection.

SLR-JD-131

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Antenna Design and Application (7076102)

Day & Date: Tuesday, 14-05-2024 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-JD-132

Seat No.	

Set P

F.Y. (M. Tech.) (Sem- I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Soft Computing Methods (7076103)

Day & Date: Wednesday, 15-05-2024 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) Explain about Fuzzy set operation?

b) 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:

$$A = \left\{\frac{0.15}{50} + \frac{0.25}{100} + \frac{0.5}{150} + \frac{0.7}{200}\right\} \quad B = \left\{\frac{0.2}{50} + \frac{0.3}{100} + \frac{0.6}{150} + \frac{0.65}{200}\right\}$$

Calculate the union, intersection, and the difference for the test columns.

c) Explain methods of membership value assignment- intuition and inference

d) Explain fuzzification and defuzzification.

e) What is Roulette wheel selection in GA?

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

a) What is Defuzzification? Explain different defuzzification method with an example.

b) What are the basic Genetic Algorithm Operators/state the operators of Genetic Algorithm?

c) Consider two fuzzy sets A & B: find Complement, Union, Intersection, Difference & DeMorgan's law.

$$A = \left\{\frac{0.4}{2} + \frac{0.2}{3} + \frac{0.62}{4} + \frac{0.32}{5} + \frac{0.86}{6}\right\} \quad B = \left\{\frac{0.55}{2} + \frac{0.8}{3} + \frac{0.67}{4} + \frac{0.87}{5} + \frac{0.93}{6}\right\}$$

Section – II

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

a) Compare and contrast Human brain and Neural network.

b) Distinguish between supervised learning and unsupervised learning?

c) Explain Convolutional Neural Network.

d) What is Neural Network Architecture?

e) Draw a 5-7-2 artificial neural network.

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

a) Write a short note on Deep learning technique and its success stories.

b) Describe the structure of back propagation neural network and derive the learning rule for the back propagation algorithm

c) Write a short note on Fuzzy-Genetic hybrids.

SLR-JD-133

Seat No.	

Set P

F.Y. (M. Tech) (Sem-I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Network System (7076104)

Day & Date: Thursday, 16-05-2024 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 frame relay & Packet switching.
b) Write a short note on Domain Name Resolution.
c) Explain official & unofficial internet.
d) What is MPLS? Explain the concept in detail.
e) What is the inverse mapping? Explain with the help of example.

Q.2 Solve any Two. **15**

a) Explain the concepts of catching in DNS.
b) Write a short note on ATM.
c) Illustrate the architecture of MPLS.

Section – II

Q.3 Solve any Four. **20**

a) What is NGN? Explain in brief.
b) Which are the parameters related with QOS in networking?
c) Elaborate 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) Write a case study for MPLS.
c) Explain various device network related to smart devices.

SLR-JD-135

Seat No.	

Set P

F.Y (M. Tech.) (Sem - I) (New/Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Embedded System (7076107)

Day & Date: Friday, 17-05-2024 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 with examples various data types used in embedded software in 'C' language. How microcontrollers are identified as 8bit/16bit microcontrollers?
c) How does power management takes place in MP 11?

Q.2 Solve any Two **14**

a) Describe the challenges in embedded computing system design.
b) Explain ARM 11 with block diagram. State features of ARM 11.
c) Draw and explanation memory structure of ARM 11 in detail.

Section – II

Q.3 Solve any Two

a) Explain task management and time management in μcos ii RTOS. **20**
b) Explain software design process and life cycle.
c) Write a program to toggle two LED using Raspberry Pi. Also write short note on LCD interfacing with Raspberry Pi with connection diagram.

Q.4 Solve any Two **16**

a) Explain POSIX threads, mutex management and semaphore management.
b) Explain in detail interfacing components on Raspberry Pi board.
c) Explain the concept of various queues, stack and optimization of memory needs used in embedded system.

SLR-JD-137

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (New) (CBCS) Examination:March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Light Wave Communication (MTETC201)

Day & Date: Tuesday, 21-05-2024 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 Solve any Four. **20**

a) Explain the working principle of LASER.
b) Explain the detection principle of optical detector. What are different types optical detectors?
c) Explain the different losses in optical fiber.
d) With the help of block diagram explain the major blocks in optical receiver.
e) Explain the structure of semiconductor injection LASER & its characteristics.

Q.2 Solve any Two. **15**

a) Explain the different types of fibers.
b) What are different types of LED? Explain any 2 types.
c) Explain the performance characteristics of optical detectors.

Section – II

Q.3 Solve any Four. **20**

a) Describe the use of active & passive elements in WDM System.
b) Explain angular dispersive devices.
c) Explain WDM & DWDM concept.
d) Explain the Regenerator spacing, Degeneration & Allowances in optical fibers.
e) Explain BER & Cross connect in long haul transmission system.

Q.4 Solve any Two. **15**

a) Explain the structure of transmitter & receiver in long haul system design.
b) Explain the optical multiplex / Demultiplexers.
c) Explain the parameters considered in designing of systems for long haul high band width application.

SLR-JD-138

Seat No.	

Set P

F.Y (M. Tech) (Semester - II) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
RF & Microwave Engineering (MTETC202)

Day & Date: Saturday, 25-05-2024 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) Assumes suitable data if required.

Section – I

Q.1 Solve Any Two Questions. **10**

a) Explain Two Port Network parameters.
b) Design a resistive tee network using ABCD Parameters.
c) Explain the working principal of Schotky diode.

Q.2 Solve Any One Question. **07**

a) Draw Equivalent circuit of a reverse-biased varactor diode and explain.
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):
i) S_{11} = 0.894 < -60.6, S_{21} = 3.122 < 123.6, S_{12} = 0.020 < 62.4, S_{22} = 0.781 < -27.6
ii) Determine the stability of this transistor using the K-Δ test and the μ test, and
iii) 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 construction and working of Gunn Diode.
c) Explain the construction and working of IMMPAT Diode.
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 the process of filter design by image parameter method.
c) Explain the process of filter design by insertion loss method.

Q.5 Solve Any One Questions. **07**

a) Explain how impedance and frequency scaling is performed with respect to filter transformation.

b) Explain kuroda's identity.

Q.6 Attempt Any Three Questions. **18**

a) Write a note on Richards's transformation for filter implementation.

b) Explain the characteristics of material used for the manufacturing of monolithic micro wave integrated circuits.

c) State the image parameters for T and π network of filter design.

d) List MMIC fabrication Techniques and explain.

SLR-JD-139

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced IoT (MTETC203)

Day & Date: Monday, 27-05-2024 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.
3) Use of Non programmable calculator is allowed.
4) Assume necessary data if necessary.

Section – I

Q.1 Solve Any Two. **20**

a) Explain various applications of IoT in various domains.
b) What is HOT? Describe Phases of Industrial Revolutions with examples.
c) Describe Industry 4.0: Globalization and Emerging Issue.

Q.2 Solve Any Two. **14**

a) Explain smart factories concept in detail as an application of industrial IOT.
b) Explain peripherals associated with Cortex M-3 in detail.
c) Describe memory mapping associated with Cortex M-3 in detail.

Section – II

Q.3 Solve Any Two. **20**

a) Describe architecture of Zigbee. State characteristics, limitations and applications of Zigbee.
b) Explain working Principle of Wi-Fi. State applications of Wi-Fi
c) Write a note on MQTT protocol.

Q.4 Solve Any Two. **16**

a) Explain cloud performance matrices in detail. Explain concept of API's.
b) State various IOT Cloud platforms. Explain various performance metrics for cloud platforms in IoT.
c) Explain RFID with necessary diagram. State types of tags used in RFID. Describe working of any one tag.

SLR-JD-140

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination:March/April 2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Cryptography and Network Security (MTETC207)

Day & Date: Saturday, 01-06-2024 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) Assume necessary data if required.

Section – I

Q.1 Solve Any Four. **20**
- **a)** Explain the OSI Security Architecture.
- **b)** What is the difference between a block cipher and a stream cipher?
- **c)** What are the principal elements of a public-key infrastructure?
- **d)** Explain a model for network security.
- **e)** Explain strengths of DES.

Q.2 Solve Any Two. **15**
- **a)** List and briefly define categories of passive and active security attacks.
- **b)** What is Triple DES Algorithm? Explain with diagram.
- **c)** Discuss implementation of RSA algorithm with suitable example.

Section – II

Q.3 Solve Any Four.
- **a)** Write a short note on MAC. **20**
- **b)** Explain MD5 algorithm.
- **c)** Draw and explain general process of transmission & reception of PGP messages.
- **d)** Explain hash function.
- **e)** Draw & explain secure socket layer architecture.

Q.4 Solve Any Two. **15**
- **a)** Write a note on S/MIME
- **b)** Explain secure hash algorithm.
- **c)** Explain different services provided by PGP.

SLR-JD-142

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Advanced Internet of Things (7076201)

Day & Date: Tuesday, 21-05-2024 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) Design a circuit with C code to turn on LED when switch is pressed using LPC1768 microcontroller. State features of LPC1768.
b) Describe Register structure of Cortex M 3 in detail.
c) What is IOT? What are the different components of IOT system?

Q.2 Solve any TWO. **14**

a) What are different types of Instructions of ARM CORTEX processor? Explain with the help of its examples.
b) Interface Stepper motor to rotate in clockwise direction using LPC1768 microcontroller. Draw connection diagram and write appropriate code also.
c) Describe various Operating Modes of Cortex M-3 with State diagram.

Section II

Q.3 Solve any TWO. **20**

a) Describe architecture of Wi-Fi. State characteristics, limitations and applications of Wi-Fi.
b) Explain COAP Transactions, COAP Methods and COAP features in detail.
c) Write a note on Application Programming Interface (API).

Q.4 Solve any TWO. **16**

a) What is MQTT? Describe its features. Compare MQTT with COAP.
b) State various IOT Cloud platforms. Explain various performance metrics for cloud platforms in IoT.
c) Draw and explain architecture of Zigbee. State types of topologies supported by Zegbee.

SLR-JD-143

Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
RF Circuit Design (7076202)

Day & Date: Saturday, 25-05-2024 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) Derive the expression for current gain and Voltage gain in terms of S parameters for two port Network.
c) Explain Two Port Network parameters.

Q.2 Solve Any One Question. **07**

a) Explain the working principal of Schotky diode and Varactor diode.
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 a balanced amplifier using 90^0 hybrid couplers.
b) Explain about different diodes like Gunn Diode. IMPATT diodes.
c) Derive the equations for constant-noise figure circles and show how they are used in transistor amplifier design.
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) Draw oscillator design flowchart and explain in brief.
b) Explain $K-\beta$ diagram and wave velocities.
c) Explain the process of filter design by image parameter method.

Q.5 Solve Any One Questions. **07**

a) Explain nonlinear active model for oscillator.
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-JD-144

Seat No.	

Set P

F.Y. (M.Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Artificial Intelligence & Machine Learning (7076203)

Day & Date: Monday, 27-05-2024 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-programmable calculator is allowed.
4) Assume necessary data if necessary.

Section – I

Q.1 Solve any four **20**

a) What can Ai do today?
b) What is a rational agent?
c) List the criteria to measure the performance of different search strategies.
d) Write down the properties of Breadth-First Search?
e) What properties must a game have for minimax to be applicable?

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

a) Give PEAS description for different agent types.
b) Define Depth-first-search and explain it with algorithm.
c) What are the four different kinds of agent programs? Explain each of them in detail?

Section – II

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

a) Explain briefly about Supervised Learning structure?
b) Explain Decision Trees.
c) What is Principal Component analysis?
d) Discuss some similarity measures that can be used in cluster analysis.
e) Explain about EM algorithm.

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

a) What is the difference between hierarchical clustering and non-hierarchical clustering?
b) What is the role of kernels in SVM? State the different types of Kernel used in SVM.
c) What is machine learning? Discuss about learning and machine learning. Choose various types of machine learning.

SLR-JD-145

Seat No.	

Set P

F.Y. (M. Tech) (Semester - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Cryptography and Network Security (7076204)

Day & Date: Wednesday, 29-05-2024 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 Solve Any Four. **20**

a) Explain the concept Steganography.
b) Explain RC5 algorithm in detail.
c) Explain strengths of DES.
d) Explain different types of key Management.
e) Write a note on Substitution techniques.

Q.2 Solve Any Two. **15**

a) Write a note on triple DES.
b) Discuss implementation of Diffe -Hellman key exchange with example.
c) Explain a model for network security.

Section – II

Q.3 Solve Any Four. **20**

a) Explain digital signature.
b) Write a note on intrusion.
c) Discuss secure hash algorithm.
d) Write a note on Kerberos.
e) Write a note on firewall.

Q.4 Solve Any Two. **15**

a) Draw neat diagram for X.509 certificate. Explain each field of certificate.
b) Explain architecture of IPSec.
c) Explain MD5 algorithm in detail.

SLR-JD-148

Seat No.	

Set P

F.Y (M. Tech.) (Sem - II) (Old) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Automation and Industrial Robotics (7076208)

Day & Date: Friday, 31-05-2024 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 necessary data if necessary.

Section – I

Q.1 Solve Any Three. **21**

a) What are the different automated manufacturing systems?
b) Show different wiring symbols for PLC.
c) Explain the Concepts of Unit cost of production.
d) Explain in detail Operation Sequence.

Q.2 Solve Any Two. **14**

a) What is the USA's principle in automation?
b) Write a short note Communication Protocols.
c) What are the key features of SCADA system?

Section – II

Q.3 Solve Any Three. **21**

a) Explain the Hydrostatic circuits.
b) Explain in detail the basic architecture of the robot controller.
c) Explain in detail Intelligent Control of Robot.
d) Write a short note on application of robots in Investment Casting.

Q.4 Solve the following Questions. **14**

a) Write a short note on.
i) Types of Controller
ii) Program memory
b) Write a short note on
i) Sensors for Joint angle
ii) Force and Torque

SLR-JD-149

Seat No.	

Set P

S.Y (M. Tech.) (Sem -III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Business Analytics (7076307)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section-I

Q.1 **a)** Outline the typical steps involved in the Business Analytics process. What are the main objectives at each stage of the Business Analytics process? **09**

b) Explain the concept of association rules in data mining with an example **08**

Q.2 **a)** Explain the concept of hierarchical data and how it can be visualized effectively. **09**

b) What is data aggregation and explain its significance in data analysis. **08**

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

a) Data Science in Business Analytics.
b) Curse of Dimensionality.
c) Data Exploration and Visualization.
d) Scaling up to large datasets.

Section-II

Q.4 **a)** What is a lift chart, and how can it be used to evaluate the performance of a classifier? **09**

b) Explain the differences between explanatory modeling and predictive modeling in the context of multiple linear regression. **08**

Q.5 **a)** Describe the process of constructing a classification tree. What are the key steps involved in splitting the data and forming the tree structure? **09**

b) Describe the basic principles of filter models used for feature selection in clustering **08**

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

a) Confusion Matrix
b) Reducing the Number of Predictors
c) Tree Structure
d) Clustering

SLR-JD-150

Seat No.	

Set P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Operation Research (7076308)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method. **12**
Maximize $Z = 4x - 2y$
Subject to constraints
i) $x + y \leq 14$
ii) $3x + 2y \geq 36$
iii) $2x + y \leq 24$
and $x, y \geq 0$

Q.2 **a)** Explain the primal-dual relationship. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Max $Z_x = 3x_1 + 3x_2$
Subject to
i) $2x_1 + 4x_2 \geq 40$
ii) $3x_1 + 2x_2 \geq 50$
and $x_1, x_2 \geq 0$

Q.3 **a)** Explain application of simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that on average nine customers arrive every 5 minutes and that the cashier can serve 10 in 5 minutes. Find: **08**
i) average number of customers queuing for service
ii) probability of having more than 10 customers in the system, and
iii) probability that a customer has to queue for more than 2 minutes

Section – II

Q.4 **a)** Explain the various costs associated with Inventory. **05**

b) Write short note on deterministic models with or without shortages. **04**

c) A company that operates for 50 weeks in a year is concerned about its stocks of copper cable. This costs Rs 240 a meter and there is a demand for 8,000 meters a week. Each replenishment costs Rs 1,050 for administration and Rs 1,650 for delivery, while holding costs are estimated at 25 per cent of value held a year. Determine: **08**

i) Optimal order quantity
ii) Total variable inventory cost
iii) Total inventory cost
iv) What is the gross profit if the company sells the cable for Rs 360 a meter

Q.5 **a)** Write a note on Group Replacement Policy. **04**

b) Explain Maximal flow problem with suitable example. **04**

c) The cost of a machine is Rs 6,100 and its scrap value is Rs 100. The maintenance costs found from experience are as follows: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	100	250	400	600	900	1200	1600	2000

When should the machine be replaced?

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. Activities are identified by their beginning (i) and ending (j) node numbers. **12**

Activity (i-j)	Estimated Duration(weeks)		
	Optimistic	Most Likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

1) Draw the network diagram of the activities in the project and find critical Path.

2) Find the expected duration and variance for each activity. What is the expected project length?

3) Calculate the variance and standard deviation of the project length.

4) What is probability that the project will be completed:
i) at least 4 weeks earlier than expected time.
ii) no more than 4 weeks later than expected time

Given

Z	0.50	0.67	1.00	1.33	2.00
Prob	0.3085	0.2514	0.1587	0.0918	0.0228

b) Explain the following in the context of project management: **05**
(i) Activity variance, and (ii) Project variance.

SLR-JD-151

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Cost Management of Engineering Projects (7076309)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figure to the right Indicate full marks.

Section – I

Q.1 **a)** What is different between cost and expenditure explain how selling price of the product is determined? **09**

b) Differentiate between fixed cost and variable cost with suitable example. Which cost is related to production quantity? **08**

Q.2 **a)** Explain in brief about objective of cost estimation how cost is differ from value. **09**

b) What do you mean by cost control explain the various steps involved in the process of cost control? **08**

Q.3 **Write a short note on any three.** **18**

a) Progress measurement and earned value
b) Parametric cost estimating model
c) Cost analysis
d) Time value of money

Section – II

Q.4 **a)** Explain in brief about feed forward techniques in cost management. **08**

b) Explain in brief about value management as aid to risk assessment. **09**

Q.5 **a)** Explain in brief above project value and risk with suitable example. **09**

b) What is value analysis explain in brief about earned value management for assessing project performance? **08**

Q.6 **Write a short note on any three.** **18**

a) Dimension and measures of value
b) Scope and key principle of VM
c) Lifecycle cost
d) Need for value and cost estimation in management projects.

SLR-JD-152

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Nonconventional Energy (7076310)

Day & Date: Saturday, 01-06-2024 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.
3) Assume necessary data if necessary.

Section I

Q.1 Solve Any Four. **20**

a) Enumerate the criteria based on which energy can classified.
b) What do you understand by energy conservation? Explain its various aspects.
c) Describe thermal energy storage system of solar energy.
d) What are the main advantage and limitations of a battery storage system?
e) Write a note on the growth of energy sector in India.

Q.2 Solve Any Two. **15**

a) Explain hydroelectric conventional energy source using IGCC power generation with schematic diagram.
b) What are the emerging new technologies for the energy conservation and efficiency?
c) Draw a schematic diagram of solar pond based electric power plant with cooling tower and explain its working.

Section II

Q.3 Solve Any Four. **20**

a) Explain the various method of production of hydrogen for use as energy carrier.
b) What are the factors affecting the performance of biogas digester?
c) Explain the major Application of wind power.
d) What are major advantages and disadvantages of a solar PV system?
e) Write a note on environmental effect on fuel cell.

Q.4 Solve Any Two. **15**

a) What is the importance of MPPT in an SPV system? Explain various strategies used for operation of an MPPT.
b) What is the origin of biomass energy? What is its global potential? What is the average efficiency of photosynthetic conversion of solar energy into biomass?
c) Sketch the diagram of a HAWT and explains the function of its main components.

SLR-JD-156

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Applied Algorithms (MTCSE101)

Day & Date: Monday, 13-05-2024 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 Answer both questions. **15**
- **a)** Describe amortized analysis and its application in analysing the efficiency of algorithms.
- **b)** Explain the substitution method for solving recurrence relations.

Q.2 Answer any one question. **10**
- **a)** Explain the working of Prim's algorithm for finding the minimum spanning tree.
- **b)** Provide an example and demonstrate the step-by-step execution of the Bellman-Ford algorithm.

Q.3 Answer any one question. **10**
- **a)** Provide an example of matrix-chain multiplication and illustrate the step-by-step process.
- **b)** Describe the 8-queen problem and its constraints.

Section – II

Q.4 Answer both questions. **15**
- **a)** Explain The time complexity of the intersection algorithms.
- **b)** Describe the Graham scan algorithm for solving the convex hull problem.

Q.5 Answer any one question. **10**
- **a)** Explain the concept of NP-completeness in computational complexity.
- **b)** Describe an approximation algorithm for solving the vertex-cover problem.

Q.6 Answer any one question. **10**
- **a)** Explain the Chinese Remainder Theorem and its applications.
- **b)** Explain the Rabin-Karp algorithm for string matching.

SLR-JD-157

Seat No.	

Set P

F.Y (M. Tech.) (Sem- I) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Theory of Computation (MTCSE102)

Day & Date: Tuesday, 14-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section-I

Q.1 Attempt any Five. **25**

a) Differentiate between the two types of FA.
b) Explain CFG and its corresponding CFL for L={$a^n c a^n$ | n>=0}.
c) Explain TM with its tuples in detail.
d) Explain the Halting problem with example.
e) Write a short note on TM and computers.
f) Design a PDA for the language of palindromes.

Q.2 Attempt any One. **10**

a) Design a TM for L= {$a^n b^n c^n$ | n>=0}.
b) Explain decidable problem with respect to CFL.

Section – II

Q.3 Attempt any Five. **25**

a) Explain TM undecidable languages with example.
b) Explain PCP in detail.
c) Explain recursive function with example.
d) Explain intractable problems with example and show how to reduce them.
e) Explain theory of optimization.
f) Explain the tractable decision problem.

Q.4 Attempt any One. **10**

a) Map between reducability and undecidable problems and prove it with example.
b) Explain primitive recursive function with example.

SLR-JD-158

Seat No.	

Set P

F.Y. (M. Tech.) (Sem- I) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Data Mining (MTCSE103)

Day & Date: Wednesday, 15-05-2024 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 indicates full marks.
3) Assume necessary data if necessary.

Section – I

Q.1	Describe the typical architecture of a data warehouse.	**07**
Q.2	Explain in detail Online Analytical Processing (OLAP).	**07**
Q.3	Explain why data modeling is important in the context of data warehousing.	**07**
Q.4	What is classification in data mining? Explain with example.	**07**
Q.5	Write a short note on association rule mining.	**07**
Q.6	Define Knowledge Discovery in Data Mining (KDD) and explain its key components.	**07**
Q.7	Explain in detail data warehousing optimization.	**07**

Section – II

Q.8	Explain with the help of example Attribute-Oriented Induction for Data Characterization.	**07**
Q.9	What are the applications of data mining? Explain in detail any three.	**07**
Q.10	Write a short note on temporal mining.	**07**
Q.11	Explain in detail web structure mining.	**07**
Q.12	Describe architectures of data mining systems.	**07**
Q.13	Explain in detail indexing of multimedia material.	**07**
Q.14	Write a short note on discriminating between classes.	**07**

SLR-JD-159

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Machine Learning© (MTCSE104)

Day & Date: Thursday, 16-05-2024 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 Attempt any Three. **15**

a) Elaborate on the concept of training data, concept representation and function approximation in machine learning.
b) Explain the difference between Supervised and Unsupervised Learning techniques in machine learning.
c) Define Linear Regression and discuss the significance of Model Specification in this context.
d) Explain in detail Bayesian linear regression.
e) Explain searching for simple trees and computational complexity w.r.t 'Decision trees'

Q.2 Attempt any Two. **10**

a) Describe the significance of selecting the best splitting attribute in decision trees with respective entropy and information gain.
b) What is Machine learning and describe the goals and application of machine learning.
c) Describe the process of Model Fitting in Logistic Regression.

Q.3 Attempt any Two. **10**

a) Differentiate between Generative and Discriminative Classifiers.
b) Define unsupervised Learning and provide an example illustrating its application in machine learning.
c) Elaborate on the challenges of overfitting and handling noisy data in decision trees. Explain the concept of pruning.

Section – II

Q.4 Attempt any Three. **15**

a) Elaborate on Affinity Propagation as a clustering algorithm.
b) List out Future Trends in Machine Learning.
c) Explain the functionality of feed-forward network functions in neural networks.
d) Explain the use of machine learning for Recommending Products and Movies.
e) Describe the principles of Relevance Vector Machines.

Q.5 Attempt any Two. **10**

a) Explain the concept of Regularization in Neural Networks. Discuss the role of regularization techniques in preventing overfitting.

b) Explain the use of machine learning for image classification application.

c) Discuss the key perspectives on Machine Learning and Explain the key results achieved in Machine Learning.

Q.6 Attempt any Two. **10**

a) Elaborate on the concept of Error Backpropagation in neural networks.

b) How does machine learning play role in scoring opinions and sentiments applications?

c) Define Support Vector Machines (SVM) and explain the concept of Maximum Margin Classifiers.

SLR-JD-160

Seat No.		Set	P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Natural Language Processing (MTCSE106)

Day & Date: Friday, 17-05-2024 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)** Differentiate between ML and NLP. **14**
- **b)** Explain Steps of NLP in detail.
- **c)** Explain morphological diversity of Indian languages.

Q.2 Solve any two. **14**
- **a)** What is WSD? Explain different types of ambiguities and approaches to WSD.
- **b)** Explain different measures of word-net similarity.
- **c)** Explain Morphology Paradigm in detail.

Q.3 Solve any one.
- **a)** Explain training issues in detail. **07**
- **b)** Write a short note on Probabilistic parsing.

Section – II

Q.4 Solve any two. **14**
- **a)** Explain Graphical Models for Sequence Labeling in NLP.
- **b)** Explain place and manner of articulation in detail.
- **c)** Explain POS tagging in detail.

Q.5 Solve any two. **14**
- **a)** Explain HMM and speech recognition.
- **b)** Explain semantic role extraction.
- **c)** Explain Speech synthesis in detail.

Q.6 Solve any one. **07**
- **a)** Explain Text entailment in detail.
- **b)** Explain cross lingual information retrieval.

SLR-JD-163

Seat No.	

Set P

F.Y (M. Tech.) (Semester - I) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Object Oriented Software Engineering (MTCSE109)

Day & Date: Friday, 17-05-2024 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) Define Object, class, Relationships, Inheritance and polymorphism.
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 Code Architecture View.

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. Assume necessary data. **10**

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 Patterns for Distributed Computing.
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) Explain Access Control Patterns.
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-JD-164

Seat No.	

Set P

F.Y. (M.Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Applied Algorithms (7079101)

Day & Date: Monday, 13-05-2024 Max. Marks: 70
Time: 09:00 AM To 12:00 PM

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

Section – I

Q.1 Answer both 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 Answer any one question. **10**
a) What is Amortized Analysis? List and discuss various methods.
b) With the help of suitable example, explain in detail Prim's algorithm.

Q.3 Answer any one question. **10**
a) With the help of suitable example, explain in detail Ford-Fulkerson algorithm.
b) Discuss in detail Matrix Chain Multiplication Method. Use suitable example.

Section – II

Q.4 Answer both questions. **15**
a) List and explain Line Segment Properties.
b) Discuss NP-Completeness and Reducibility.
c) Discuss Number Theoretic Notion.

Q.5 Answer any one question. **10**
a) With the help of suitable example, explain in detail Jarvis March Algorithm.
b) With the help of suitable example, explain in detail Rabin-Karp Algorithm.

Q.6 Answer any one question. **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-JD-165

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Theory of Computation (7079102)

Day & Date: Tuesday, 14-05-2024 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.

Section – I

Q.1 Attempt any Five. **25**

a) Differentiate between the two types of FA.
b) Explain CFG and its corresponding CFL for L={$a^n ca^n$ | n>=0}.
c) Explain TM with its tuples in detail.
d) Explain the Halting problem with example.
e) Write a short note on TM and computers.
f) Design a PDA for the language of palindromes.

Q.2 Attempt any One. **10**

a) Design a TM for L= {$a^n b^n c^n$ | n>=0}.
b) Explain decidable problem with respect to CFL.

Section – II

Q.3 Attempt any Five. **25**

a) Explain TM undecidable languages with example.
b) Explain PCP in detail.
c) Explain recursive function with example.
d) Explain intractable problems with example and show how to reduce them.
e) Explain theory of optimization.
f) Explain the tractable decision problem.

Q.5 Attempt any One. **10**

a) Map between reducability and undecidable problems and prove it with example.
b) Explain primitive recursive function with example.

SLR-JD-166

Seat No.	

Set P

F.Y. (M.Tech.) (Sem-I) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Data Mining (7079103)

Day & Date: Wednesday, 15-05-2024 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 Explain in detail association rule mining. **07**

Q.2 Write a short note on decision tree algorithm. **07**

Q.3 Explain in detail KDD environment. **07**

Q.4 Define clustering. State the difference between clustering and classification. **07**

Q.5 What is classification in data mining? Explain with example. **07**

Q.6 Write a short note on modeling transaction. **07**

Q.7 Describe types of OLAP server. **07**

Section – II

Q.8 Explain in detail mining descriptive statistical measures in large database. **07**

Q.9 Write a short note on multimedia data mining. **07**

Q.10 What is web content mining? Explain in detail. **07**

Q.11 Write a short note on temporal mining. **07**

Q.12 Write a short note on designing GUI based on a data mining query language. **07**

Q.13 What are the applications of data mining? Explain in detail any three. **07**

Q.14 Describe architectures of data mining systems. **07**

SLR-JD-167

Seat No.	

Set P

F.Y. (M. Tech.) (Sem - I) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Machine Learning© (7079104)

Day & Date: Thursday, 16-05-2024 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 Attempt any Three. **15**

a) Define Unsupervised Learning and provide an example illustrating its application in machine learning.
b) List and elaborate on different Linear Regression models.
c) Explain in detail Bayesian linear regression.
d) Explain how concepts are represented as decision trees in machine learning. Explain the recursive induction of decision tree.
e) Differentiate between Generative and Discriminative Classifiers.

Q.2 Attempt any Two. **10**

a) Elaborate the concept of training data, concept representation and function approximation in machine learning
b) Describe the process of Model Fitting in Logistic Regression.
c) Elaborate Occam's razor principle and its relevance in avoiding overfitting.

Q.3 Attempt any Two. **10**

a) Illustrate Bagging and Boosting methods.
b) Explain the concept of online learning and stochastic optimization.
c) Explain Maximum Likelihood Estimation with least squares method.

Section – II

Q.4 Attempt any Three. **15**

a) Elaborate on Affinity Propagation as a clustering algorithm.
b) Describe the principles of Relevance Vector Machines.
c) Explain the concept of Regularization in Neural Networks. Discuss the role of regularization techniques in preventing overfitting.
d) What is clustering and explain Clustering datapoints and features.
e) Discuss the Dirichlet process mixture models in the context of clustering algorithms.

Q.5 Attempt any Two. **10**

a) List the different types of Clustering. Illustrate one of these.
b) Define Support Vector Machines (SVM) and explain the concept of Maximum Margin Classifiers.
c) Define the term “Deep Neural Network” and illustrate.

Q.6 Attempt any Two. **10**

a) Explain the functionality of feed-forward network functions in neural networks.

b) List and illustrate the applications of Deep learning.

c) Discuss the key perspectives on Machine Learning and Explain the key results achieved in Machine Learning.

SLR-JD-172

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Internet of Things (MTCSE202)

Day & Date: Saturday, 25-05-2024 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 Solve Any Three of the following. **21**
- **a)** List and explain characteristics of IoT?
- **b)** Explain in detail Bluetooth Low Energy beacons.
- **c)** Describe 6LoWPAN in detail.
- **d)** Explain Prototyping for Physical design.

Q.2 Solve the following. **14**
- **a)** Compare between Wi-Fi, Bluetooth and ZigBee.
- **b)** Explain Layer/Stack architecture in IoT.

Section – II

Q.3 Solve Any Three of the following. **21**
- **a)** Explain the use of Raspberry Pi in IoT?
- **b)** Differentiate between Open sourced and Licensed Database.
- **c)** Explain application of IoT in smart city.
- **d)** Describe CISCO M2M platform?

Q.4 Solve the following. **14**
- **a)** Explain challenges to implement IoT technology in agriculture sector.
- **b)** Demonstrate how to use the GPIO Zero library to read the state of a button connected to the Raspberry Pi.

SLR-JD-173

Seat No.	

Set P

F.Y (M. Tech) (Semester - II) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Internet Routing Algorithm (MTCSE203)

Day & Date: Monday, 27-05-2024 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) Wherever required draw diagrams and assume data.

Section – I

Q.1 Write Answer to Any Two Questions: **10**

a) What is the significance of twisting in twisted pair cable?

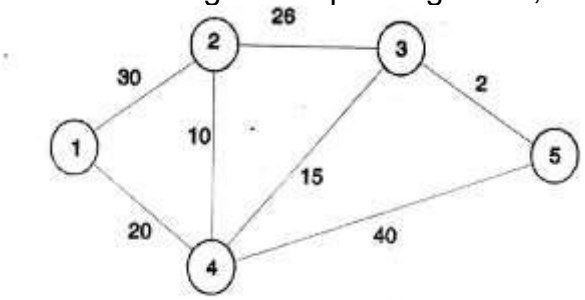
b) Which IPv4 address blocks are reserved for current usage? Why is it necessary to reserve some addresses from an address space rather than making all of them available?

c) What is a link state advertisement? What are different types of LSAs?

Q.2 Write Answer to Any Two Questions: **10**

a) Draw the functional view of Router architecture and state three functions of the 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 main differences between RIPv1 and RIPv2?

Q.3 a) What are the different states in the BGP finite state machine? **10**

b) What are the different BGP timers? **05**

Section – II

Q.4 Write Answer to Any Two Questions. **10**

a) Explain the concept of link-state Routing Protocol.

b) What is the relation between an AS and an ISP?

c) What is packet processing? Explain fast path versus slow path.

Q.5 Write Answer to Any Two Questions. **10**

a) What are the basic requirements of Longest Prefix matching algorithm?

b) For a given IP address, how would you find out its home AS number?

c) Illustrate search and update operations in a binary trie with example.

Q.6 **a)** Describe basic framework of distance vector protocol. **10**

b) With diagram, explain shared nothing architecture of routers. **05**

SLR-JD-174

Seat No.	

Set P

F.Y (M. Tech.) (Sem -II) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Deep Learning (MTCSE205)

Day & Date: Wednesday, 29-05-2024 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) Assume suitable data if necessary and mention it clearly.

Section-I

Q.1 Solve any three.
- **a)** Why Deep Leaming? Where Machine Learning Fails? **15**
- **b)** Explain loss and different types of loss functions?
- **c)** Write a note on a hidden unit?
- **d)** Why is regularization important in Deep Learning?

Q.2 Solve any two.
- **a)** What are the Challenges in NN optimization? **10**
- **b)** What is Batch Normalization?
- **c)** What is Back propagation in deep neural network?

Q.3 Solve any two.
- **a)** Write a note on chain rule? **10**
- **b)** Explain Deep Feed Forward Neural Network?
- **c)** Write Note on Gradient Based Learning?

Section-II

Q.4 Solve any three. **15**
- **a)** Explain how to calculate computational parameters in CNN layers?
- **b)** Why Sequence Modeling?
- **c)** Explain Architecture and Working of Deep Autoencoders?
- **d)** Explain GAN?

Q.5 Solve any two. **10**
- **a)** What is a regularized Autoencoder?
- **b)** Explain Long Short-Term Memory (LSTM)?
- **c)** What are the applications of CNN?

Q.6 Solve any two. **10**
- **a)** Explain any one application of Sequence Modeling?
- **b)** What is a Variational Autoencoder?
- **c)** Explain Architecture of GAN?

SLR-JD-175

Seat No.	

Set P

F.Y (M. Tech.) (Sem -II) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Advanced Cloud Computing (MTCSE206)

Day & Date: Wednesday, 29-05-2024 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 Three of the Following. **21**

a) Explain various deployment model of cloud computing.
b) What are web services explain with its functionality
c) Explain storage as service mechanism along with its issues in cloud computing.
d) Compare cloud computing with traditional computing model.

Q.2 Solve the following. **14**

a) Define community cloud along with architecture. Explain its use in healthcare sector.
b) What is Virtualization. Explain approaches of Virtualization.

Section – II

Q.3 Solve Any Three of the following. **21**

a) Explain Authentication models in cloud computing.
b) Explain the mechanism to handle large scale data in cloud environment.
c) Explain Service Management in cloud computing.
d) Explain Service Oriented Architecture (SOA) along with its components.

Q.4 Solve the following. **14**

a) Explain Google App Engine, platform as service along with its features.
b) What are various data privacy and security issues generated in cloud environment?

SLR-JD-180

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Real Time Operating System (MTCSE211)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

Instructions: 1) Question 1 & 5 are compulsory.
2) Attempt any two questions from question 2 to 4 from section I.
3) Attempt any two questions from question 6 to 8 from section II.
4) Figures to the right indicate marks to a question.

Section – I

Q.1 Explain various hard, firm and soft real time systems? **07**

Q.2 **a)** Explain various memory access and layout issues? **07**
b) Explain Von Neumann architecture with enhanced system bus. **07**

Q.3 **a)** What is function of Pseudokernels explain the following concept with respect to Pseudokernels. **07**
1) Polled loop.
2) Polled loop with delay.
b) Describe coding standards for Real Time operating systems. **07**

Q.4 **a)** Memory Management Issues. **07**
b) Explain Selection Criteria and a Metric for Commercial Real-Time Operating System. **07**

Section – II

Q.5 Explain the process of requirement engineering. **07**

Q.6 **a)** List and explain standard requirement classes in detail? **07**
b) Explain various internal and external qualities of real time systems. **07**

Q.7 **a)** Explain software requirement specification as per IEEE Std 830-1998. **07**
b) Explain Queuing Theory with its application. **07**

Q.8 **a)** Explain procedural design approach: Parnas Partitioning. **07**
b) Explain various memory areas affecting on total memory utilization **07**

SLR-JD-181

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Advances in Database Systems (MTCSE212)

Day & Date: Friday, 31-05-2024 Max. Marks: 70
Time: 02:00 PM To 05:00 PM

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

Section – I

Q.1 **a)** Explain different types of fragmentations with example. **05**
b) Explain locking protocols used in distributed environment. **10**

Q.2 **a)** Explain important decisions made during physical design and database tuning. **05**
b) Describe six high-level guidelines for index selection. **05**

Q.3 **a)** Explain how global queries are transformed to distributed queries. **05**
b) Why is database tuning important? **05**

Q.4 **a)** Explain various Transaction Processing monitor architectures. **05**
b) Explain transaction workflow with suitable example. **05**

Section – II

Q.5 **a)** Explain Structure of XML Data with example. **05**
b) Explain XML DOM & SAX Interfaces. **05**
c) Give the DTD or XML Schema for an XML representation of the following nested- relational schema: **05**
Emp = (ename, ChildrenSet setof (Children), SkillsSet setof (Skills))
Children = (name, Birthday)
Birthday = (day, month, year)
Skills = (type, ExamsSet setof (Exams))
Exams = (year, city)

Q.6 **a)** Explain Real-Time Transaction Systems. **05**
b) Explain various Multimedia Data Formats. **05**

Q.7 **a)** Explain any one indexing structure to index spatial data **05**
b) Explain various spatial queries with example. **05**

Q.8 **a)** Explain different types of nodes and their functions in Hadoop. **05**
b) Explain features of CouchDB. **05**

SLR-JD-182

Seat No.	

Set P

F.Y. (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Research Methodology& IPR© (7079201)

Day & Date: Tuesday, 21-05-2024 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)** Write detailed notes on data collection and data analysis.
- **b)** Explain objectives of research.
- **c)** Explain assortment and identification of the problem.

Q.2 Solve any two. **14**
- **a)** Mention differences between survey and experiments.
- **b)** What is the need of Report writing and presentation of results?
- **c)** Explain how to write technical paper.

Q.3 Solve any one. **07**
- **a)** Describe evaluation of report in detail.
- **b)** Describe Information Communication Technology in detail.

Section – II

Q.4 Solve any two. **14**
- **a)** Explain in detail role of probability and statistics in simulation.
- **b)** Explain technological research, innovation, patenting and development.
- **c)** Explain Monte Carlo simulation in detail.

Q.5 Solve any two. **14**
- **a)** Explain the process of patenting and development in detail.
- **b)** Explain Mathematical modeling in terms of need, techniques and classification.
- **c)** Write a note on techniques of simulation.

Q.6 Solve any one. **07**
- **a)** Write a note on licensing and transfer of technology.
- **b)** Explain in detail scope of patent rights.

SLR-JD-183

Seat No.	

Set P

F.Y. (M.Tech) (Sem- II) (Old) (CBCS) Examination : March/April-2024
COMPUTER SCIENCE & ENGINEERING
Internet of Things (7079202)

Day & Date: Saturday, 25-05-2024 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 any two. **14**
- **a)** What is prototyping embedded devices in IOT? Explain in detail.
- **b)** Explain in detail: Communication in IOT.
- **c)** Describe in detail: IEEE 802.11 WiFi used for IoT.

Q.2 Attempt any two. **14**
- **a)** What is prototyping for physical design in IoT? Explain in detail.
- **b)** Explain in detail Bluetooth Low Energy used for in IoT?
- **c)** Describe ZigBee smart in IOT.

Q.3 Write a note on: Networking in IoT. **07**

Section – II

Q.4 Attempt any two. **14**
- **a)** What are Raspberry Pi Interfaces in IOT? Explain in detail.
- **b)** Write a note on: Available M2M cloud platform.
- **c)** Describe smart cities using IOT.

Q.5 Attempt any two. **14**
- **a)** Write a note on: programming in IOT.
- **b)** Explain in detail Cloud based IoT platforms.
- **c)** What is Omega NovoTech in IOT? Explain.

Q.6 How is IoT used in environment? Explain. **07**

SLR-JD-184

Seat No.	

Set P

F.Y (M. Tech) (Semester - II) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Internet Routing Algorithm (7079203)

Day & Date: Monday, 27-05-2024 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) Wherever required draw diagrams and assume data.

Section – I

Q.1 Write answer to any two questions: **10**

a) Given the IP Address of a host and the netmask Explain how the network address is determined.

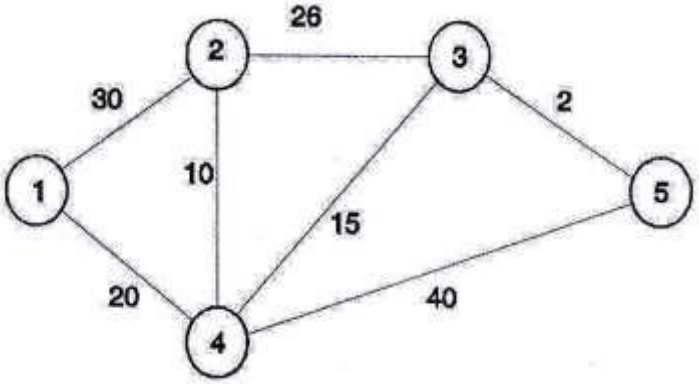
b) Which IPv4 address blocks are reserved for current usage? Why is it necessary to reserve some addresses from an address space rather than making all of them available?

c) What are the main differences between shortest path routing and widest path routing?

Q.2 Write answer to any two questions: **10**

a) Draw the functional view of Router architecture and state three functions of the 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) List five differences between a distance vector protocol and a link state protocol.?

Q.3 a) What are the different states in the BGP finite state machine? **10**

b) What are the different BGP timers? **05**

Section – II

Q.4 Write answer to any two questions. **10**

a) What are the main differences between RIPv1 and RIPv2?

b) What is the relation between an AS and an ISP?

c) What is packet processing? Explain fast path versus slow path.

Q.5 Write answer to any two questions. **10**

a) What are the basic requirements of Longest Prefix matching algorithm?

b) For a given IP address, how would you find out its home AS number?

c) Illustrate search and update operations in a binary trie with example

Q.6 a) Describe basic framework of distance vector protocol. **10**

b) With diagram, explain shared nothing architecture of routers. **05**

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Seat No.	

Set P

F.Y (M. Tech.) (Sem- II) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Reinforcement Learning (7079205)

Day & Date: Wednesday, 29-05-2024 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 questions. **10**

a) Explain the key concepts of Reinforcement Learning. How does it differ from other machine learning methods?

b) Describe real-world examples where Reinforcement Learning has proven successful.

c) What are the critical elements of Reinforcement Learning? What roles do they play in the learning process?

Q.2 Solve Any three Questions **15**

a) What is the k-armed Bandit Problem? Explain how it relates to Reinforcement Learning.

b) Discuss action-value methods in Reinforcement Learning. How is incremental implementation achieved?

c) Describe the Agent-Environment Interface. How do goals and rewards fit into this interface?

d) Define returns in Reinforcement Learning. What is the Unified Notation for Episodic and Continuing Tasks?

Q.3 Solve Any two of the following **10**

a) What are Value Functions, and what role do Policies play in Finite Markov Decision Processes?

b) Define Returns and Episodes in Reinforcement Learning. Discuss the significance of Unified Notation for Episodic and Continuing Tasks in Finite Markov Decision Processes.

c) Define the Agent-Environment Interface and explain how Goals and Rewards function in Reinforcement Learning.

Section-II

Q.4 Solve any three of the following **15**

a) What are Monte Carlo Methods, and how do they contribute to Reinforcement Learning?

b) What is Value Iteration, and how does it differ from Policy Iteration in Dynamic Programming?

c) Explain Policy Evaluation and discuss the concept of Policy Improvement in Dynamic Programming.

d) Describe Asynchronous Dynamic Programming and its significance in Reinforcement Learning.

Q.5 Solve any two of the following **10**

a) Describe the Sarsa algorithm and its role in On-policy TD Control. What is the difference between On-policy and Off-policy TD Control?

b) What is TD Prediction? Discuss its advantages in Temporal-Difference Learning.

c) Discuss the role of models in planning and learning. Explain the concept of models in the context of Reinforcement Learning.

Q.6 Solve any two of the following **10**

a) Explain the Dyna architecture. How does it integrate planning, acting, and learning in Reinforcement Learning?

b) Discuss how personalized web services can benefit from Reinforcement Learning. What is thermal soaring, and how is it related to Reinforcement Learning?

c) Describe Watson's Daily-Double Wagering system and how it impacts the performance of Reinforcement Learning algorithms. What role does optimizing memory control play in Reinforcement Learning?

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Set P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April 2024
COMPUTER SCIENCE & ENGINEERING
Advanced Cloud Computing (7079206)

Day & Date: Wednesday, 29-05-2024 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 Solve Any Three of the following. **21**

a) What are characteristics of Cloud Computing?
b) Differentiate between Cloud Computing and Cluster Computing.
c) What are Web Services explain with its Functionality.
d) Explain various trends in Computing.

Q.2 Solve the following. **14**

a) Explain various Deployment Model of Cloud Computing.
b) Explain storage as a service mechanism of Cloud Computing.

Section – II

Q.3 Solve Any Three of the following. **21**

a) Define cloud Platform as a service. List and explain Advantages and Disadvantages of PaaS.
b) Explain the term Cloud Scalability and Fault Tolerance.
c) Why Data Privacy and Security issues generated in Cloud Environment.
d) What is Azure? What are various services Microsoft Azure provides?

Q.4 Solve the following. **14**

a) Explain Service Management in Cloud Computing.
b) Explain Service Oriented Architecture (SOA) along with its components.

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Seat No.		Set	P

F.Y. (M. Tech.) (Semester - II)(Old) (CBCS) Examination:March/April-2024
COMPUTER SCIENCE & ENGINEERING
Infrastructure Management (7079210)

Day & Date: Friday, 31-05-2024 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) How Internet has grown from its inception to today's state.
b) Explain current business demands and IT system issues arising out of them.
c) How various IT system management patterns have eveolved over time?

Q.2 Attempt any one of the following questions. **10**
a) How customer requirements are determined while preparing for infrastructure management?
b) How costing is done in service delivery process?

Q.3 Attempt any one of the following questions. **10**
a) How system components are identified to manage data?
b) How availabilty is managed in service delivery process?

Section – II

Q.4 Attempt the following questions. **15**
a) What do you understand by Service desk? List and explain its functionality.
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 technology change management is handled in infrastructure sectors?
b) What do you understand by Identity management? Discuss in detail.

Q.6 Attempt any one of the following questions. **10**
a) How various changes faced in managing infrastructure are tackeled? Explain in detail.
b) What do you understand by access management? What are different access rights and how do they protect data and applications?

SLR-JD-191

Seat No.		Set	P

F.Y (M. Tech.) (Semester - II) (Old) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Real Time Operating System (7079211)

Day & Date: Friday, 31-05-2024 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 List the various discipline which affect design of real time systems and explain various practical issues. **07**

Q.2 **a)** Illustrate the priority-ceiling protocol with diagram. **07**
b) Explain task control block model for implementing commercial real -time operating system. **07**

Q.3 **a)** Explain Exception Handling in Details with example. **07**
b) Describe coding standards for Real Time operating system. **07**

Q.4 **a)** Explain automatic code generation procedure. **07**
b) Explain Application of Real Time Systems. **07**

Section – II

Q.5 Explain the total memory utilization of real-time system. **07**

Q.6 **a)** Explain Statecharts in detail. **07**
b) Explain Petri nets with example. **07**

Q.7 **a)** Explain the qualities of real time software. **07**
b) Explain Parnas Partitioning Technique. **07**

Q.8 **a)** Explain the term P, NP, NP Hard problems. **07**
b) Explain the following laws. **07**
i) Gustafson's Law
ii) Amdahl's Law

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Set P

S.Y (M. Tech.) (Sem -III) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Business Analytics (7079308)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Make suitable assumptions wherever necessary and state them clearly.
5) Draw neat diagram wherever necessary.

Section-I

Q.1 **a)** Outline the typical steps involved in the Business Analytics process. What are the main objectives at each stage of the Business Analytics process? **09**

b) Explain the concept of association rules in data mining with an example **08**

Q.2 **a)** Explain the concept of hierarchical data and how it can be visualized effectively. **09**

b) What is data aggregation and explain its significance in data analysis. **08**

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

a) Data Science in Business Analytics.
b) Curse of Dimensionality.
c) Data Exploration and Visualization.
d) Scaling up to large datasets.

Section-II

Q.4 **a)** What is a lift chart, and how can it be used to evaluate the performance of a classifier? **09**

b) Explain the differences between explanatory modeling and predictive modeling in the context of multiple linear regression. **08**

Q.5 **a)** Describe the process of constructing a classification tree. What are the key steps involved in splitting the data and forming the tree structure? **09**

b) Describe the basic principles of filter models used for feature selection in clustering **08**

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

a) Confusion Matrix
b) Reducing the Number of Predictors
c) Tree Structure
d) Clustering

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Set P

S.Y. (M. Tech) (Sem - III) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Operation Research (7079309)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 5 is compulsory. Attempt any one questions from the remaining.
3) Figures to the right indicate full marks.
4) Assume necessary suitable data, if required.

Section – I

Q.1 **a)** Explain scope of Operations Research with suitable examples. **05**

b) Determine the Optimal solution to the following LPP using Simples method. **12**
Maximize $Z = 4x - 2y$
Subject to constraints
i) $x + y \leq 14$
ii) $3x + 2y \geq 36$
iii) $2x + y \leq 24$
and $x, y \geq 0$

Q.2 **a)** Explain the primal-dual relationship. **05**

b) Determine the Optimal solution to the dual of the following LPP. **12**
Max $Z_x = 3x_1 + 3x_2$
Subject to
i) $2x_1 + 4x_2 \geq 40$
ii) $3x_1 + 2x_2 \geq 50$
and $x_1, x_2 \geq 0$

Q.3 **a)** Explain application of simulation technique. **05**

b) What are the characteristics of the Queuing System? **05**

c) Consider a self-service store with one cashier. Assume Poisson arrivals and exponential service times. Suppose that on average nine customers arrive every 5 minutes and that the cashier can serve 10 in 5 minutes. Find: **08**
i) average number of customers queuing for service
ii) probability of having more than 10 customers in the system, and
iii) probability that a customer has to queue for more than 2 minutes

Section – II

Q.4 **a)** Explain the various costs associated with Inventory. **05**

b) Write short note on deterministic models with or without shortages. **04**

c) A company that operates for 50 weeks in a year is concerned about its stocks of copper cable. This costs Rs 240 a meter and there is a demand for 8,000 meters a week. Each replenishment costs Rs 1,050 for administration and Rs 1,650 for delivery, while holding costs are estimated at 25 per cent of value held a year. Determine: **08**

i) Optimal order quantity
ii) Total variable inventory cost
iii) Total inventory cost
iv) What is the gross profit if the company sells the cable for Rs 360 a meter

Q.5 **a)** Write a note on Group Replacement Policy. **04**

b) Explain Maximal flow problem with suitable example. **04**

c) The cost of a machine is Rs 6,100 and its scrap value is Rs 100. The maintenance costs found from experience are as follows: **10**

Year	1	2	3	4	5	6	7	8
Maintenance cost (Rs)	100	250	400	600	900	1200	1600	2000

When should the machine be replaced?

Q.6 **a)** A small project involves 7 activities, and their time estimates are listed in the following table. Activities are identified by their beginning (i) and ending (j) node numbers. **12**

Activity (i-j)	Estimated Duration(weeks)		
	Optimistic	Most Likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

1) Draw the network diagram of the activities in the project and find critical Path.

2) Find the expected duration and variance for each activity. What is the expected project length?

3) Calculate the variance and standard deviation of the project length.

4) What is probability that the project will be completed:
i) at least 4 weeks earlier than expected time.
ii) no more than 4 weeks later than expected time

Given

Z	0.50	0.67	1.00	1.33	2.00
Prob	0.3085	0.2514	0.1587	0.0918	0.0228

b) Explain the following in the context of project management: **05**
(i) Activity variance, and (ii) Project variance.

SLR-JD-195

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Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Cost Management of Engineering Projects (7079310)

Day & Date: Saturday, 01-06-2024 Max. Marks: 70
Time: 03:00 PM To 06:00 PM

Instructions: 1) In Section-I Q. No. 3 is compulsory. Attempt any one question from the remaining.
2) In Section-II Q. No. 6 is compulsory. Attempt any one questions from the remaining.
3) Figure to the right Indicate full marks.

Section – I

Q.1 **a)** What is different between cost and expenditure explain how selling price of the product is determined? **09**

b) Differentiate between fixed cost and variable cost with suitable example. Which cost is related to production quantity? **08**

Q.2 **a)** Explain in brief about objective of cost estimation how cost is differ from value. **09**

b) What do you mean by cost control explain the various steps involved in the process of cost control? **08**

Q.3 **Write a short note on any three.** **18**

a) Progress measurement and earned value
b) Parametric cost estimating model
c) Cost analysis
d) Time value of money

Section – II

Q.4 **a)** Explain in brief about feed forward techniques in cost management. **08**

b) Explain in brief about value management as aid to risk assessment. **09**

Q.5 **a)** Explain in brief above project value and risk with suitable example. **09**

b) What is value analysis explain in brief about earned value management for assessing project performance? **08**

Q.6 **Write a short note on any three.** **18**

a) Dimension and measures of value
b) Scope and key principle of VM
c) Lifecycle cost
d) Need for value and cost estimation in management projects.

SLR-JD-196

Seat No.	

Set P

S.Y. (M. Tech.) (Sem - III) (New) (CBCS) Examination: March/April-2024
COMPUTER SCIENCE & ENGINEERING
Nonconventional Energy (7079311)

Day & Date: Saturday, 01-06-2024 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.
3) Assume necessary data if necessary.

Section I

Q.1 Solve Any Four. **20**

a) Enumerate the criteria based on which energy can classified.
b) What do you understand by energy conservation? Explain its various aspects.
c) Describe thermal energy storage system of solar energy.
d) What are the main advantage and limitations of a battery storage system?
e) Write a note on the growth of energy sector in India.

Q.2 Solve Any Two. **15**

a) Explain hydroelectric conventional energy source using IGCC power generation with schematic diagram.
b) What are the emerging new technologies for the energy conservation and efficiency?
c) Draw a schematic diagram of solar pond based electric power plant with cooling tower and explain its working.

Section II

Q.3 Solve Any Four. **20**

a) Explain the various method of production of hydrogen for use as energy carrier.
b) What are the factors affecting the performance of biogas digester?
c) Explain the major Application of wind power.
d) What are major advantages and disadvantages of a solar PV system?
e) Write a note on environmental effect on fuel cell.

Q.4 Solve Any Two. **15**

a) What is the importance of MPPT in an SPV system? Explain various strategies used for operation of an MPPT.
b) What is the origin of biomass energy? What is its global potential? What is the average efficiency of photosynthetic conversion of solar energy into biomass?
c) Sketch the diagram of a HAWT and explains the function of its main components.

SLR-JD-201

Seat No.		Set	P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination:March/April-2024
COMPUTER SCIENCE & ENGINEERING
Research Methodology & IPR© (MTCSE201)

Day & Date: Tuesday, 21-05-2024 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) Wherever required draw diagrams and assume data.

Section – I

Q.1 Write answers to any three questions. **15**

a) Explain the literature review. What are the sources of literature?
b) What is research? Explain different types of research.
c) Why one should publish his research work. How you will find right journal for publication of your research?
d) Explain the importance and methods of the literature survey.

Q.2 Write answers to any two questions. **10**

a) With suitable example explain applied Vs fundamental research.
b) With suitable engineering example explain Monte Carlo simulation.
c) For a hypothetical engineering Research Project Report, write a 'Conclusion'. Explain its salient features.

Q.3 Attempt the following. **10**

a) Discuss various sections of a typical project report.
b) What is the necessity of defining a research problem? Explain.

Section – II

Q.4 Attempt any three questions. **15**

a) Explain the role of patents and Industrial design in technology transfer.
b) With suitable example explain how to write an abstract of technical report.
c) With suitable example explain strategy for experimentation.
d) Write short note on Need of simulation in research.

Q.5 Attempt any two questions. **10**

a) Explain the role of probability and statistics in simulation.
b) Explain in detail the various procedures in chronological order, for patent filing in the Indian context.
c) With suitable examples discuss ethical practices to be followed in research.

Q.6 Attempt the following. **10**

a) What is mathematical modeling? Why it is required in research? What are its features?
b) Discuss any five characteristics of mathematical modeling.

SLR-JD-202

Seat No.	

Set P

F.Y (M. Tech.) (Semester - II) (New) (CBCS) Examination: Mar/Apr-2024
ELECTRONICS & TELECOMMUNICATION ENGINEERING
Wireless Communication Systems (MTETC205)

Day & Date: Wednesday, 29-05-2024 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) Assume necessary data if necessary.

Section – I

Q.1 Solve any FOUR. **20**

a) Discuss the concept of Wireless Local Loop (WLL).
b) Explain frequency re-use ratio.
c) Explain the concept of large-scale path loss in wireless communication systems.
d) How does the microcell zone concept improve the system capacity.
e) Explain the concept of a cellular system in wireless communication.

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

a) Explain a few techniques used to improve the coverage and capacity of cellular systems.
b) Explain the differences between indoor and outdoor propagation models in wireless communication.
c) Analyze the concept of
i) Repeaters for range extension.
ii) Microcell zone concept

Section – II

Q.3 Solve any FOUR. **20**

a) Describe the architecture of a typical LTE network.
b) Provide an overview of CDMA2000 cellular technology.
c) Describe the operation of TDMA.
d) Describe the architecture of the GSM system.
e) Evaluate the potential impact of 5G technology on various industries.

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

a) Compare the deployment challenges associated with 4G LTE and 5G technology, including spectrum allocation, infrastructure requirements, and regulatory considerations.
b) What is OFDM? Derive the expression for implementation of transceivers in OFDM.
c) Describe the concept of soft handoff in CDMA. How does soft handoff improve call quality and reliability in CDMA networks compared to hard handoff?