

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | | Marks | CO | Blooms Level |
|----|--|-------|-----|--------------|
| 1. | a) What is the difference between Refrigeration & Air Conditioning? | 5 M | CO1 | Remembering |
| | b) What is refrigeration? Explain the term 'Tonne of refrigeration'. | 5 M | CO1 | Remembering |

(OR)

- | | | | | |
|----|--|------|-----|----------|
| 2. | A refrigerating system operates on the reversed Carnot cycle. The higher temperature of the refrigerant in the system is 35°C and the lower temperature is – 15°C. The capacity is to be 12 tonnes. Neglect all losses. Determine:
(i) Co-efficient of performance.
(ii) Heat rejected from the system. (in kJ/min)
(iii) Power required. (in kW) | 10 M | CO1 | Applying |
|----|--|------|-----|----------|

UNIT-II

- | | | | | |
|----|---|----|-----|---------------|
| 3. | a) Explain the function of capillary tube in a vapour compression refrigeration system. | 5M | CO2 | Understanding |
| | b) Define primary refrigerant and discuss desirable properties of primary refrigerants. | 5M | CO2 | Understanding |

(OR)

- | | | | | |
|----|---|------|-----|----------|
| 4. | In a standard vapour compression refrigeration cycle, operating between an evaporator temperature of – 10°C and a condenser temperature of 40°C, the enthalpy of the refrigerant, Freon-12, at the end of compression is 220 kJ/kg. Show the cycle diagram on T-s plane. Calculate: (i) The C.O.P. of the cycle. (ii) The refrigerating capacity and the compressor power assuming a refrigerant flow rate of 1 kg/min. ou may use the Freon-12 property table given below: | 10 M | CO2 | Applying |
|----|---|------|-----|----------|

$t(^{\circ}\text{C})$	$p(\text{MPa})$	$h_f(\text{kJ/kg})$	$h_g(\text{kJ/kg})$
-10	0.2191	26.85	183.1
40	0.9607	74.53	203.1

UNIT-III

- | | | | | |
|----|--|-----|-----|---------------|
| 5. | a) With a neat sketch demonstrate the working of vapour absorption refrigeration system and derive its COP. | 5 M | CO3 | Understanding |
| | b) List the advantages vapour absorption refrigeration systems over vapour compression refrigeration system. | 5 M | CO3 | Understanding |

(OR)

- | | | | | |
|----|--|------|-----|---------------|
| 6. | Draw a neat diagram of lithium bromide water absorption system and explain its working in major field of applications of this system | 10 M | CO3 | Understanding |
|----|--|------|-----|---------------|

UNIT-IV

7. a) Derive an equation of COP for Bell-Coleman Air-refrigerator show different processes on P-V and T-S Diagram 5 M CO4 Understanding
b) Describe briefly an aircraft refrigeration system. 5 M CO4 Understanding
(OR)
8. Explain Boot strap evaporative cooling air refrigeration system. Draw its schematic and represent the processes on T-S diagram. Write down the equations for calculating mass flow rate, power and COP of the system. 10 M CO4 Understanding

UNIT-V

9. a) Explain the working principle of vortex tube. 5 M CO5 Understanding
b) List the advantages and disadvantages of a steam jet refrigeration system. 5 M CO5 Understanding
(OR)
10. List out the merits and demerits of thermo-electric refrigeration system over other refrigeration system. What are the fields of its applications? 10 M CO5 Understanding

UNIT-VI

11. Explain in brief the factors which affecting the comfort condition. 10 M CO6 Understanding
(OR)
12. a) Explain the unitary and central air conditioning system. 5 M CO6 Understanding
b) It is desired to maintain a hall at 23°C dry bulb temperature and 60% relative humidity. The outdoor conditions of air are 42°C dry bulb temperature and 21% relative humidity. Suggest an air conditioning system and explain its working. Represent the process on the psychrometric chart and express equation for capacity of equipment used. 5 M CO6 Applying

Time: 3 Hours

Max Marks: 60

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<u>UNIT-I</u>		Marks	CO	Blooms Level
1.	Give the classification of Robots based on the configuration with necessary figures and draw its work volume	10	[CO1]	Remembering
(OR)				
2.	Give the classification of mechanical gripper and explain any one gripper with suitable illustrations	10	[CO1]	Remembering
<u>UNIT-II</u>				
3.	Explain the working principle of a vision sensor and list any four industrial applications where it is used	10	[CO2]	Remembering
(OR)				
4.	Write short notes on pneumatic and hydraulic actuators. Explain working principle with suitable illustrations	10	[CO2]	Remembering
<u>UNIT-III</u>				
5.	Explain about representation of translation and rotation about an axis with a neat sketch	10	[CO3]	Remembering
(OR)				
6.	A point p $(7,3,1)^T$ is attached to a frame F_{noa} and is subjected to the following transformations. Find the coordinates of the point relative to the reference frame at the conclusion of transformation (i) Rotation of 90° about the z-axis, (ii) Followed by a rotation of 90° about the y-axis, (iii) Followed by a translation of $[4,-3,7]$.	10	[CO3]	Applying
<u>UNIT-IV</u>				
7.	The trajectory of a particular joint is specified as follows: Path points in degrees: 10, 35, 25, 10. The duration of these three segments should be 2, 1, 3 seconds, respectively. The magnitude of the default acceleration to use at all blend points is $50 \text{ degrees/second}^2$. Calculate all segment velocities, blend times, and linear times.	10	[CO4]	Applying
(OR)				
8.	Explain about Iterative Newton-Euler Dynamic formulation with suitable equations	10	[CO4]	Remembering
<u>UNIT-V</u>				
9.	Explain the levels of robot programming	10	[CO5]	Remembering
(OR)				
10.	Write a short note on Explicit robot programming languages	10	[CO5]	Remembering
<u>UNIT-VI</u>				
11.	Explain the industrial robot applications in various manufacturing sectors	10	[CO6]	Applying
(OR)				
12.	Explain about Robot centered cell, In-line cell and Mobile robot cell	10	[CO6]	Remembering

Time: 3 Hours**Max Marks: 60**

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1. Explain the fundamental steps in digital image processing which can be applied to images.	(OR)	10M	1	L2
2. What is pixel? And explain basic relationship between pixels in image processing.		10M	1	L2
	<u>UNIT-II</u>			
3. Explain about Smoothing Spatial Filters in detail.	(OR)	10M	2	L2
4. What are the advantages of adaptive filters? Explain about adaptive median filter.		10M	2	L2
	<u>UNIT-III</u>			
5. Explain about Run-Length Coding with an example.	(OR)	10M	3	L2
6. Explain two-band subband coding and decoding system.		10M	3	L2
	<u>UNIT-IV</u>			
7. Write short notes on some basic morphology algorithms.	(OR)	10M	4	L2
8. Explain about erosion operation.		10M	4	L2
	<u>UNIT-V</u>			
9. Discuss about Roberts, Prewitt and Sobel edge detectors.	(OR)	10M	5	L2
10. Define image segmentation. Give classification. Explain region based Segmentation.		10M	5	L2
	<u>UNIT-VI</u>			
11. What is Pseudocolor image processing? Explain.	(OR)	10M	6	L2
12. Explain about color image smoothing.		10M	6	L2

**ADVANCED CONTROL SYSTEMS
(ELECTRICAL AND ELECTRONICS ENGINEERING)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

- | | <u>UNIT-I</u> | Marks | CO | Blooms Level |
|-------|--|-------|----|--------------|
| 1. | Use diagonalization of matrix A to determine the time response of the system.
$\dot{X} = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix} X + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ and $y = [6 \quad 1]X$, given that $x(0) = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ | 10 | 1 | K3 |
| | (OR) | | | |
| 2. a) | The transfer function of a system is given by $Y(s)/U(s) = \frac{(s+3)}{(s+1)(s+2)}$. Obtain the state model in canonical form. | 7 | 1 | K3 |
| b) | Diagonalize the system matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -24 & -26 & -9 \end{bmatrix}$ | 3 | 1 | K2 |
| | <u>UNIT-II</u> | | | |
| 3. a) | Obtain the state transition matrix in the form e^{At} and determine the time response for the system $\dot{X} = AX$, where $A = \begin{bmatrix} 0 & 1 \\ -2 & 0 \end{bmatrix}$ and $x_1(0)=1; x_2(0)=1$. | 8 | 2 | K2 |
| b) | Explain the Laplace Transform method of solving State Equation. | 2 | 2 | K2 |
| | (OR) | | | |
| 4. | Comment on the controllability and observability of the system having following coefficient matrices.
$A = \begin{bmatrix} -1 & -2 & -1 \\ 0 & -1 & 1 \\ 1 & 0 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 2 \\ 1 \\ 1 \end{bmatrix}$, $C = [1 \quad 0 \quad 1]$ and $D = 0$ | 10 | 2 | K3 |
| | <u>UNIT-III</u> | | | |
| 5. | A single input system is described by the following state equation
$\dot{X} = \begin{bmatrix} -1 & 0 & 0 \\ 1 & -2 & 0 \\ 2 & 1 & -3 \end{bmatrix} X + \begin{bmatrix} 10 \\ 1 \\ 0 \end{bmatrix} u$
Design a state feedback controller which will give closed loop poles at $-1 \pm j2, -6$. | 10 | 3 | K3 |
| | (OR) | | | |
| 6. a) | Consider a plant described by the following state model
$A = \begin{bmatrix} 0.5 & 1 & 0 \\ -1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 \\ 1 \\ 2 \end{bmatrix}$, $C = [1 \quad 0 \quad 0]$, $D = [0]$.
Design an observer which places the observer poles at $-0.5 \pm j1, -1$. | 8 | 3 | K3 |
| b) | Explain the effect of feedback on Observability? | 2 | 3 | K2 |

UNIT-IV

7. a) Explain the sufficient conditions of stability of non linear autonomous system? 5 4 K2
b) Show that the following quadratic form is Positive Definite. 5 4 K2
 $Q(x_1, x_2) = 6x_1^2 + 4x_2^2 + x_3^2 + 2x_1x_2 - 2x_2x_3 - 4x_1x_2$
(OR)
8. Show that the equilibrium state at the origin of a linear autonomous Continuous - time system represented by $\dot{x}(t) = Ax(t)$ is asymptotically stable, if and only if for any given positive definite matrix Q there exists a symmetric positive definite matrix P that satisfies the relation $A^T P + PA = -Q$ 10 4 K3

UNIT-V

9. a) Linear feedback by itself copes up with parameter changes, then why are we going for adaptive controllers? 5 5 K3
b) Explain briefly the series and parallel schemes of Adaptive control? 5 5 K2
(OR)
10. Explain the Model reference adaptive control (MRAC) approach in deriving a suitable control law? 10 5 K3

UNIT-VI

11. What do you mean by minimum energy problem? Explain with the help of an example how you will find necessary conditions for optimal control. 10 6 K3
(OR)
12. Explain the formulation of optimum control problem in detail. 10 6 K3

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

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All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	(a) Draw the block diagram of Man Instrument system and explain.	5	1	L2
	(b) Explain the Resting and Action potentials.	5	1	L2
	(OR)			
2.	(a) Classify the Electrodes and describe the structural properties, their applications.	10	1	L2
	<u>UNIT-II</u>			
3.	Illustrate the Function of cardiovascular system with a detail description.	10	2	L2
	(OR)			
4.	(a) Describe the various Heart valves involved in the Heart pump mechanism.	5	2	L2
	(b) Write a short note on the non-invasive Blood Pressure measuring technique.	5	2	L2
	<u>UNIT-III</u>			
5.	(a) Explain the Unipolar Limb Lead System.	5	3	L2
	(b) Explain Bipolar Limb Lead System.	5	3	L2
	(OR)			
6.	Compare the merits and demerits of Various Methods of Blood Flow Measurement.	10	3	L2
	<u>UNIT-IV</u>			
7.	(a) Describe the Intensive care monitoring and their parameters.	5	4	L2
	(b) Elaborate the Working function of defibrillator and identify the components used.	5	4	L3
	(OR)			
8.	Interpret the Respiratory Volumes and Capacities with help of Graph and explain each measuring parameters of Lung.	10	4	L3
	<u>UNIT-V</u>			
9.	(a) Explain the basic blocks of Biotelemetry with help of suitable diagram.	5	5	L2
	(b) Identify the various frequencies utilised for Biotelemetry.	5	5	L3
	(OR)			
10.	Illustrate the Biotelemetry to monitor the remote patient ECG and other vital signs.	10	5	L3
	<u>UNIT-VI</u>			
11.	Explain the Physiological effects of electric shock with suitable diagrams.	10	6	L2
	(OR)			
12.	(a) List out and explain the methods for prevention of electric Hazards.	5	6	L2
	(b) Write a short note on Electromagnet interference on wearable electronics of a heart patients.	5	6	L2

**III B.Tech II Semester Supplementary Examinations, August, 2023
TELECOMMUNICATION SWITCHING SYSTEMS & NETWORKS
(ELECTRONICS AND COMMUNICATION ENGINEERING)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

- | | <u>UNIT-I</u> | Marks | CO | Blooms Level |
|-------|--|-------|-----|---------------|
| 1. a) | Explain the working principle of cross bar switch with a neat diagram | [5M] | CO1 | Understanding |
| b) | Explain the elements of switching systems | [5M] | CO1 | Understanding |
| | (OR) | | | |
| 2. a) | Describe the classification of switching systems | [5M] | CO1 | Understanding |
| b) | Explain the basics of a switching systems | [5M] | CO1 | Understanding |
| | <u>UNIT-II</u> | Marks | CO | Blooms Level |
| 3. | Explain different approaches in stored SPC | [10M] | CO2 | Evaluating |
| | (OR) | | | |
| 4. a) | What is the significance of SPC and explain the differences between Centralized and Distributed SPC? | [6M] | CO2 | Understanding |
| b) | Compare Combination Switching with Electronic Space switching and Time Division Switching? | [4M] | CO2 | Applying |
| | <u>UNIT-III</u> | Marks | CO | Blooms Level |
| 5. a) | Draw and explain time division switching in detail. | [5M] | CO3 | Understanding |
| b) | What are the differences between input and output controlled Time division space switch techniques. | [5M] | CO3 | Understanding |
| | (OR) | | | |
| 6. a) | Explain Cyclic control in synchronism | [5M] | CO3 | Understanding |
| b) | Describe time multiplexed space switch | [5M] | CO3 | Understanding |
| | <u>UNIT-IV</u> | Marks | CO | Blooms Level |
| 7. a) | With examples explain the national and international numbering plans | [5M] | CO4 | Understanding |
| b) | What is subscriber loop system? | [5M] | CO4 | Understanding |
| | (OR) | | | |
| 8. a) | Explain about the traffic load and grade of service | [5M] | CO4 | Understanding |
| b) | Write short notes on In channel signaling scheme. | [5M] | CO4 | Understanding |
| | <u>UNIT-V</u> | Marks | CO | Blooms Level |
| 9. | Explain layers, sub systems and ISO OSI reference model | [10M] | CO5 | Evaluating |
| | (OR) | | | |
| 10. | Describe various types of data transmission techniques | [10M] | CO5 | Understanding |
| | <u>UNIT-VI</u> | Marks | CO | Blooms Level |
| 11. | Explain three typical switching techniques available for digital traffic. | [10M] | CO6 | Understanding |
| | (OR) | | | |
| 12. | Explain about network and protocol architecture ISDN in detail. | [10M] | CO6 | Understanding |

Time: 3 Hours**Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-IMarks CO Blooms
Level

1. Explain about IoT protocols stack using a neat sketch of IoT protocols abstraction.

(10M) CO1 K2

(OR)

2. Describe an example of IoT service that uses publish – subscribe communication model and web socket based communication.

(10M) CO1 K2

UNIT-II

3. Compare and contrast between SDN and NVF of IoT.

(10M) CO2 K2

(OR)

4. Describe the generic approach of IoT device management with NETCONF-YANG.

(10M) CO1 K2

UNIT-III

5. Describe the steps involved in IoT system design methodology.

(10M) CO3 K2

(OR)

6. a Illustrate creating classes in Python with examples.
b Differentiate between lists and tuples.

(5M) CO3 K2

(5M) CO3 K2

UNIT-IV

7. Explain the python web application framework- Django in detail.

(10M) CO4 K2

(OR)

8. Explain the Xively Cloud for IoT.

(10M) CO4 K2

UNIT-V

9. a Discuss the differences between structured and unstructured data.

(5M) CO5 K2

- b Explain Data in Motion Versus Data at Rest.

(5M) CO5 K2

(OR)

10. Explain briefly about Hadoop Distributed File System (HDFS)

(10M) CO5 K2

UNIT-VI

11. Write note on: Wearable - Smart Cities- Smart Home – Smart HealthCare- Agriculture - Smart Grid.

(10M) CO6 K2

(OR)

12. Design any few smart applications for Home automation.

(10M) CO6 K2

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

- | | Marks | CO | Blooms Level |
|--|-------|-----|--------------|
| 1. a) Draw the cross section of cantilever retaining wall and indicate various salient parts. | 2 | CO1 | Understand |
| b) Design suitable counterfort retaining wall to support a level backfill, 7.5 m high above the ground level on the toe side. Assume good soil for foundation at a depth of 1.5 m below the ground level with a safe bearing capacity of 170 kN/m ² . Further assume the backfill to comprise granular soil with a unit weight of 16 kN/m ³ and an angle of shearing resistance of 30°. Assume the coefficient of friction between soil and concrete to be 0.5. Use M-25 and Fe-415. | 8 | CO1 | Evaluate |

(OR)

- | | | | |
|---|---|-----|------------|
| 2. a) Sketch the critical section for bending moment in foundations as per IS 456. | 2 | CO1 | Understand |
| b) Design a combined footing supporting two columns of size 400 mm × 400 mm and 350 mm × 350 mm carries load of 600 kN & 800 kN respectively. The soil bearing capacity is 120 kN/m ² , assume necessary data. | 8 | CO1 | Evaluate |

UNIT-II

- | | | | |
|---|---|------|------------|
| 3. a) What are permissible stresses in concrete for strength calculations in case of water tanks. | 2 | CO 2 | Understand |
| b) Design a circular water tank with flexible connection at base for a capacity of 4,00,000 liters. The tank rests on a firm level ground. The height of tank including a free board of 200 mm should not exceed 3.5 m. The tank is open at top. Use M-20 concrete and Fe- 415 steel. | 8 | CO2 | Evaluate |

(OR)

- | | | | |
|---|---|------|------------|
| 4. a) What are the different types of water tanks based on their placement. | 2 | CO 2 | Understand |
| b) Design an open rectangular tank 6.6 x 4.2 x 3.3 m deep. The tank rests on firm ground. Assume M-20 concrete and Fe-415 grade steel | 8 | CO2 | Evaluate |

UNIT-III

- | | | | |
|--|---|------|------------|
| 5. a) What are the characteristics of yield lines in R.C Slabs? | 2 | CO 3 | Understand |
| b) A traffic control post 2 m in diameter is supported centrally by a reinforced concrete column, 30 cm in diameter. Design the circular slab for a super-imposed load of 1500 N/m ² . Use M-20 and Fe 415 steel. | 8 | CO3 | Evaluate |

(OR)

- | | | | | |
|-------|---|---|------|------------|
| 6. a) | What are the types of flat slabs? | 2 | CO 3 | Understand |
| b) | Design an interior panel of a flat slab with panel size 5 m x 5 m supported by columns of diameter of 450 mm. Provide suitable drop and column head. Take a live load of 3 kN/m ² . Use M20 concrete and Fe 415 steel. | 8 | CO3 | Evaluate |

UNIT-IV

- | | | | | |
|-------|---|---|------|------------|
| 7. a) | When are pile foundations preferred? | 2 | CO 4 | Understand |
| b) | The foundation for a structure comprising six piles of square cross section have to support a service load of 3600 kN. The piles are driven through a hard stratum and bear on hard rock. Design the reinforcements in the pile, assuming the pile to be 6 m long. Use M-20 and Fe-415. Sketch the details of reinforcements in the pile. | 8 | CO4 | Evaluate |

(OR)

- | | | | | |
|-------|--|---|-----|------------|
| 8. a) | When under-reamed compaction piles are best suited? | 2 | CO4 | Understand |
| b) | Design a pile cap for a group of three files spaced 1.2 m apart. The piles are 300 mm diameter, and the column transmits a factored load of 1500 kN and is of size 400 mm x 400 mm. Safe load on single pile is found to be 500 kN. Adopt M-20 grade concrete and Fe-415 grade HYSD bars. Sketch the details of reinforcement. | 8 | CO4 | Evaluate |

UNIT-V

- | | | | | |
|-------|---|---|-----|------------|
| 9. a) | Discuss factors that affect the ductility of structural members? | 2 | CO5 | Understand |
| b) | Explain the methods analysing multi story buildings subjected to lateral loads. | 8 | CO5 | Evaluate |

(OR)

- | | | | | |
|--------|--|---|-----|------------|
| 10. a) | Explain the beam to girder joint structural connections in relation to the detailing requirements for improving ductility. | 2 | CO5 | Understand |
| b) | Roofing system of an industrial shed consists of trusses spaced at 6 m apart. The span of roof truss is 18 m and rise is 3 m. The level of eaves is 7 m above the ground. Assume suitable configuration of truss. The shed is situated on flat terrain with sparsely populated buildings. The shed has less than 20% permeability. Prepare structural layout of industrial steel shed with suitable configuration. Determine the wind forces on the truss. Location Chennai. | 8 | CO5 | Evaluate |

UNIT-VI

- | | | | | |
|--------|---|---|-----|------------|
| 11. a) | Explain different types of loadings as per IRC. | 2 | CO6 | Understand |
| b) | A reinforced concrete simply supported slab forms the deck of a road bridge, having the following data: (i) Clear span = 6 m. (ii) Carriage way -2 Lane. (iii) Width of kerb= 500 mm on either side (iv)Width of bearing= 400 mm; (v) Materials = M25 grade concrete and Fe 415 steel. (vi) Type of loading IRC class AA tracked vehicle. Design the deck slab. | 8 | CO6 | Evaluate |

(OR)

- | | | | | |
|--------|---|---|-----|------------|
| 12. a) | Explain the longitudinal forces acting on bridges. | 2 | CO6 | Understand |
| b) | Write a note on the importance of impact factor in the design of bridges? | 8 | CO6 | Evaluate |

ROBOTICS**(PROFESSIONAL ELECTIVE-I)
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 60**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Classify the robots based on Control system and Explain. 6M
b) What is the importance of Automation in industry? Explain 6M
- (OR)
2. a) Discuss in detail about Magnetic Gripper. List out its advantages 6M
b) Explain Pneumatic actuators system with neat sketch 6M

UNIT-II

3. a) For the pick and place type of robot, the gripper is initially at location (60, 50, 80) 9M
and the following movements are in sequence.
i) Rotation about x-axis by 90° .
ii) Translation along z by 30 units.
Find the position of gripper with respect to the original system by using transformation matrix method.
b) Write homogenous transformation matrices for rotation in 3D. 3M
- (OR)
4. Explain the implementation of DH Convention for a links coordinate system and joint parameters. 12M

UNIT-III

5. Explain the use of a P-Degree polynomial as interpolation function 12M
- (OR)
6. a) Explain Singularities in the revolute joints. 6M
b) Discuss the Jacobian matrix of a planar two link revolute jointed manipulator 6M

UNIT-IV

7. a) Discuss in detail the types of Encoders with neat sketches. 8M
b) Define proximity sensor and range sensors with examples 4M
- (OR)
8. a) Discuss the programming methods used in robots mentioning their specific field of application. 6M
b) List the Speed control commands used in VAL II programming and describe its functions. 6M

UNIT-V

9. Write short notes on the following obstacle avoidance of graph based approaches 12M
(i) Visibility graph (ii) Varonol diagram (iii) Cell decomposition
- (OR)
10. a) Describe the features of robot in material handling and list out its advantages. 6M
b) Briefly explain the role of robot in machine loading applications 6M

AR18

CODE: 18ECE321

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech II Semester Supplementary Examinations, August, 2023

TELECOMMUNICATION SWITCHING SYSTEMS & NETWORKS

(Professional Elective – II)

(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Illustrate in detail about simple telephone communication with neat diagrams? 6M
b) Discuss in brief about switching network configurations? 6M
- (OR)**
2. a) Discuss in detail about various elements of switching system? 6M
b) Explain about 6×6 cross bar switch configurations? 6M

UNIT-II

3. a) Write about Stored program control SPC in detail? 6M
b) Discuss in brief about the two stage networks? 6M
- (OR)**
4. a) Illustrate the operation of Time division space switching? 6M
b) Distinguish between time division time switching and time multiplexed time switching? 6M

UNIT-III

5. a) Summarise in detail about DTMF dialling? 6M
b) Explain about charging plan for telecommunication services? 6M
- (OR)**
6. a) Interpret in detail about in channel signalling techniques? 6M
b) Discuss briefly about various network traffic load parameters? 6M

UNIT-IV

7. a) Elaborate in detail about layered network architecture? 6M
b) Discuss about various data communication circuit arrangements? 6M
- (OR)**
8. a) Tabulate the differences between connection oriented and connectionless protocols? 6M
b) Analyse various topologies and transmission modes of a data communication network? 6M

UNIT-V

9. a) Analyse about different types of public switched data networks? 6M
b) Distinguish between circuit switching and packet switching. 6M
- (OR)**
10. a) Describe the operation of broadband ISDN configuration with neat diagrams? 6M
b) Write about connections and interfacing units of ISDN? 6M

AR18

CODE: 18CST314

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B.Tech II Semester Supplementary Examinations, August, 2023

Data Mining

(Common to CSE & IT Branches)

Time: 3 Hours

Max Marks: 60

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) Describe data mining tasks. 6M
b) Discuss in detail about the major issues in Data Mining and its functionalities 6M
(OR)
2. a) Why data pre-processed is needed? Explain it. 6M
b) Explain in detail about various data cleansing techniques. 6M

UNIT-II

3. a) Define cuboid. Explain about lattice of cuboids with suitable example. 6M
b) Differentiate ROLAP, MOLAP, and HOLAP. 6M
(OR)
4. a) Explain about different types of data used for data mining. 6M
b) Explain the concept of star schema used in Data Warehouse Design with an example. 6M

UNIT-III

5. a) Define association rule. Write and explain Apriori algorithm with a suitable example 6M
b) Explain the procedure to generate association rules from frequent itemsets. 6M
(OR)
6. a) Explain about Closed itemsets, support and count. 6M
b) Explain how to find frequent itemsets using FP-Growth algorithm. 6M

UNIT-IV

7. a) What is the difference between Classification and prediction? 6M
b) Write and explain decision tree induction algorithm. 6M
(OR)
8. Define Regression. Discuss in detail about various regression techniques. 12M

UNIT-V

9. a) What is a cluster? Discuss in detail Partition-based clustering techniques. 6M
b) Explain the DBSCAN clustering techniques. 6M
(OR)
10. a) Discuss about different data types used in cluster analysis. 6M
b) What is an outlier? Describe various outlier handling methods. 6M

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UNIT-I

1. Design the stem of the counterfort retaining wall if the height of the wall above the ground level is 6.0m. SBC of the soil is 150kN/m^2 . Angle of internal friction is 30° . Density of soil is 18kN/m^3 . Spacing of counterfort 3.5m c/c. Take coefficient of friction between soil and concrete as 0.5. Adopt M20 and Fe:500 steel. Check the stability 12M

(OR)

2. Design a cantilever retaining wall to retain earth with a backfill sloped at 20° to the horizontal. The top of the wall is 5m above the ground level, and the foundation depth may be taken as 1.3 m below ground level, with a safe bearing capacity of 140 kN/m^2 . Assume that the backfill has a unit weight of 17kN/m^3 and an angle of shearing resistance of 35° . Further, assume a coefficient of friction between soil and concrete, $\mu = 0.5$. Use M 20 concrete and Fe 415 steel. 12M

UNIT-II

3. A cylindrical tank of capacity 6,00,000 liters is resting on good unyielding ground. The depth of tank is limited to 5m. A free board of 300 mm may be provided. The wall and the base slab are cast integrally. Design the tank using M20 concrete and Fe:415 grade steel . Draw the following 12M
 - i) Plan at base
 - ii) Cross section through centre of tank.

(OR)

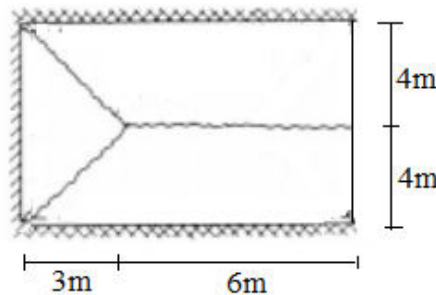
4. Design a rectangular tank 6 x 4 x 2m rests on firm ground. Use M25 grade concrete and Fe:415 steel reinforcement 12M

UNIT-III

5. A simply supported rectangular slab of size 5mX6m and is 12M
iso-tropically reinforced with 10mm dia@200mm c/c both
ways at an average depth of 110mm. The overall depth of
slab is 130mm. Estimate safe permissible load on the slab
using yield line theory. Use M20 concrete and Fe415 grade
steel

(OR)

6. Calculate the collapse load for the slab supported as shown in 12M
figure, the moment capacities are equal in both directions, the
negative moment is 70% of positive moment capacity, take
positive moment capacity is 20kN-m.



UNIT-IV

7. A R.C column 400mm x 400mm carrying a load of 1200kN 12M
is supported on three piles 400mm x 400mm in section. The
centre to centre distance between the piles is 1.5m. Design a
suitable pile cap. Use M25 concrete and Fe:415 steel.

(OR)

8. Design a pile under a column transmitting an axial load of 12M
800kN. The pile is to be driven to a hard stratum available at
a depth of 10m. Use M25 concrete and Fe:500 steel.

UNIT-V

9. What is ductility of RC members, explain the importance 12M
and factors influencing the ductility of RC members

(OR)

10. Explain the Indian standard codal provisions for the 12M
earthquake resistant design of structures

**Pre-stressed Concrete
(CIVIL ENGINEERING)****Time: 3 Hours****Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. a) What are advantages of prestressed concrete structures than R.C.C 7M
b) Differentiate pre tensioning and post tensioning 7M
- (OR)
2. a) What is the need for high strength concrete and high tensile steel 7M
b) Explain the method of Hoyer's long line system of pre tensioned. 7M

UNIT-II

3. A prestressed concrete beam 250mm wide 350mm deep has a span of 14M
10m. The beam is prestressed by steel wires of area 350mm^2 provided at uniform eccentricity of 50mm with an initial prestress of 1200N/mm^2 . Determine the percentage loss of stress in the wires.
a) If the beam is Pre tensioned beam
b) If the beam is post tensioned beam
Shrinkage of concrete $= 300 \times 10^{-6}$ for Pre tensioned beam
Shrinkage of concrete $= 215 \times 10^{-6}$ for Post tensioned beam
Creep coefficient $= 1.6$ Relaxation of steel stress $= 5\%$ of the initial stress
Anchorage slip $= 1.10\text{mm}$; Friction coefficient of wave effect $= K = 0.0015/\text{m}$.

(OR)

4. a) Explain the concept of pressure line. 5M
b) A PSC beam of section 120 mm wide by 300 mm deep is used over an effective span of 6 m to support a udl of 4 kN/m which includes the self weight of beam. The beam is prestressed by straight cable carrying a force of 180 kN and located at an eccentricity of 50 mm. Determine location of thrust line in the beam and plot the position at quarter and central span sections. 9M

UNIT-III

5. A prestressed beam has symmetrical I-section in which the depth of each flange is one-fifth of the overall depth and the web is thin enough to be neglected in bending calculations. At the point of maximum bending moment, the prestressing force is located at the center of the bottom flange and the total loss of prestress is 20%. If there is to be no tensile stress in the concrete at any time, show that the dead load must be at least one-seventh of the live load 14M

(OR)

6. a) Explain what is meant by bursting tension .also sketch the variation of stresses in the end block. 7M
- b) A prestressing force of 300 kN is transmitted through a distribution plate 120mm wide and 120 mm deep, the center of which is located at 80mm bottom of an end block having a section 120 mm wide &300 mm deep. Design the end block as per IS 1343 -1980.show reinforcement details 7M

UNIT-IV

7. A precast pre-tensioned beam of rectangular section has a breadth of 100 mm and a depth of 200 mm. the beam with an effective span of 6 m, is prestressed by tendons with their centroids coinciding with the bottom kern. The initial force in the tendons is 150 kN. The loss of prestress may be assumed to be 20 percent. The beam is incorporated in composite T- beam by casting a top flange of breadth 400 mm and thickness 40mm. if the composite beam supports a live load of 8 KN/m², calculate the resultant stresses developed in the precast and in situ cast concrete assuming the pre-tensioned beam as: (a) unpropped, and (b) propped during casting of the slab. Assume the same modulus of elasticity of concrete in precast beam and in situ cast slab 14M

(OR)

8. A composite T- beam is made up of a pre-tensioned rib of 100 mm wide and 200 mm deep, and a cast in situ slab 400 mm wide and 40 mm thick having a modulus of elasticity of 32 kN/mm². If the differential shrinkage is 100×10^{-6} units, determine the shrinkage stresses developed in the shrinkage stresses developed in the precast and cast in situ units. 14M

UNIT-V

9. a) List the various factors that influence on deflection of a prestressed concrete member 7M
- b) A PSC beam with a cross sectional area of 32000mm² and radius of gyration of 70mm is prestressed by a parabolic cable carrying an effective prestress of 900Mpa, the span of the beam is 8m.The cable consists of 6 wires of 7mm diameter wires, has an eccentricity of 50mm at center and zero at support, Estimate the central deflection of the beam 7M

(OR)

10. A prestressed concrete beam of rectangular section 300mm wide and 500mm deep is prestressed by 2 post-tensioned cables of area 600mm² each .Initially stressed to1600N/mm².The cables are located at a constant eccentricity of 100mm throughout the length of the beam having a span of 10m.The modulus of elasticity of steel and concrete is 210 and 38 kN/mm² . 14M
- a) Neglecting all losses, find the deflection at the centre of span when it is supporting its own weight.
- b) Allowing for 20% loss in prestress, find the final deflection at the centre of span when it carries an imposed load of 18kN/m