

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

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a. Explain about how 3D primitives are projected onto the image plane.	5	CO1	K2
	b. State and explain basic geometric translations with example.	5	CO1	K2
(OR)				
2.	Illustrate about geometric primitives to describe 3D shapes.	10	CO1	K2
<u>UNIT-II</u>				
3.	a. Discuss about Harris corner detector.	5	CO2	K2
	b. Explain about how feature matching done from other images with in the threshold.	5	CO2	K2
(OR)				
4.	Explain the difference between an edge and a contour in image processing.	10	CO2	K2
<u>UNIT-III</u>				
5.	a. Illustrate the role of triangulation in image processing, particularly in the context of image representation and compression?	5	CO3	K2
	b. Briefly explain application of video stabilization.	5	CO3	K2
(OR)				
6.	a. What do you mean by bundle adjustment? Explain with a suitable example.	5	CO3	K2
	b. Explain about dense motion estimation and write its application.	5	CO3	K2
<u>UNIT-IV</u>				
7.	a. What is motion model and explain about two dim motion model for image stitching?	5	CO4	K2
	b. What is photometric calibration and explain in detail about block diagram of image sensing pipeline.	5	CO4	K2
(OR)				
8.	Explain about block diagram showing the various sources of noise as well as the typical digital post-processing steps.	10	CO4	K2
<u>UNIT-V</u>				
9.	Explain how do Shape from X techniques contribute to augmented reality applications?	10	CO5	K2
(OR)				
10.	a. Explain about point-based representation of 3D models.	5	CO5	K2
	b. Briefly explain about the application of 3D photography.	5	CO5	K2
<u>UNIT-VI</u>				
11.	What is image-based rendering? Briefly explain about view dependent texture maps.	10	CO6	K2
(OR)				
12.	a. Briefly explain about Unstructured Lumigraph.	5	CO6	K2
	b. Illustrate about Depth compensation in the Lumigraph.	5	CO6	K2

(CIVIL 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

- | | Marks | CO | Blooms Level |
|--|-------|------|--------------|
| 1. a) Draw the cross section of counterfort retaining wall and indicate various salient parts. | 2 | CO 1 | Understand |
| b) Design a cantilever retaining wall (T type) to retain earth for a height of 4 m. The backfill is horizontal. The density of soil is 18 kN/m^3 . Safe bearing capacity of soil is 200 kN/m^2 . Take the co-efficient of friction between concrete and soil as 0.6. The angle of repose is 30° . Use M-20 concrete and Fe-415 steel. | 8 | CO1 | Evaluate |

(OR)

- | | | | |
|--|---|------|------------|
| 2. a) Sketch the critical section for shear force in foundations as per IS 456. | 2 | CO 1 | Understand |
| b) Design a combined footing supporting two columns of size $450 \text{ mm} \times 450 \text{ mm}$ and $400 \text{ mm} \times 400 \text{ mm}$ carries load of 1000 kN & 1200 kN respectively. The soil bearing capacity is 180 kN/m^2 , assume necessary data. | 8 | CO1 | Evaluate |

UNIT-II

- | | | | |
|--|---|------|------------|
| 3. a) What are permissible stresses in concrete for resistance to cracking in case of water tanks. | 2 | CO 2 | Understand |
| b) Design an open circular water tank resting on firm ground with flexible base for 350 kilo litres capacity. Adopt M20 concrete and Fe 415 steel. | 8 | CO2 | Evaluate |

(OR)

- | | | | |
|---|---|------|------------|
| 4. a) What are permissible stresses in steel in case of water tanks | 2 | CO 2 | Understand |
| b) Design a rectangular water tank $5 \text{ m} \times 4 \text{ m}$ with depth of storage 3 m , resting on ground and whose walls are rigidly joined at vertical and horizontal edges. Assume M20 concrete and Fe415 grade steel. | 8 | CO2 | Evaluate |

UNIT-III

- | | | | |
|---|---|------|------------|
| 5. a) What are the assumptions and limitations of yield line theory. | 2 | CO 3 | Understand |
| b) A traffic control post 3 m in diameter is supported centrally by a reinforced concrete column, 35 cm in diameter. Design the circular slab for a super-imposed load of 1700 N/m^2 . Use M-20 and Fe 250 steel. | 8 | CO3 | Evaluate |

(OR)

- | | | | | |
|-------|---|---|------|------------|
| 6. a) | What are the advantages and disadvantages of a flat slab? | 2 | CO 3 | Understand |
| b) | Design an interior panel of a flat slab with panel size 6m x 6m supported by columns of diameter of 500 mm. Provide suitable drop and column head. Take a live load of 4 KN/m ² . Use M20 concrete and Fe 415 steel. | 8 | CO3 | Evaluate |

UNIT-IV

- | | | | | |
|-------|--|---|------|------------|
| 7. a) | Design a pile cap for a group of two piles spaced 1.5 m apart. | 2 | CO 4 | Understand |
| b) | The piles are 400 mm diameter and the column transmits a factored load of 1000 kN and is of size 500 mm × 500 mm. Adopt M-20 grade concrete and Fe-415 grade HYSD bars. Sketch the details of reinforcement. | 8 | CO4 | Evaluate |

(OR)

- | | | | | |
|-------|--|---|-----|------------|
| 8. a) | Based on function how are the piles classified. | 2 | CO4 | Understand |
| b) | Design a circular pile under a column transmitting a load of 1000 kN. The pile is driven through hard strata at a depth of 8 m. Use M-20 & Fe-415. | 8 | CO4 | Evaluate |

UNIT-V

- | | | | | |
|-------|--|---|-----|------------|
| 9. a) | Explain the following Beam column joint structural connections in relation to the detailing requirements for improving ductility. | 2 | CO5 | Understand |
| b) | A block of ten storeyed flats in Delhi has its lower most columns 500 mm x 700 mm in size. In order to use the ground floor for car parking the lower columns are made free standing. Comment on the considerations to be given for detailing of these free-standing columns. Assume M-20 and Fe-415. Assume height of free bay is 4m. | 8 | CO5 | Evaluate |

(OR)

- | | | | | |
|--------|---|---|-----|------------|
| 10. a) | List the steps involved in computing design wind pressure for a structure located in specific area. | 2 | CO5 | Understand |
| b) | Explain the substitute frame method of analysing multi story buildings. | 8 | CO5 | Evaluate |

UNIT-VI

- | | | | | |
|--------|---|---|-----|------------|
| 11. a) | Explain different types of bridges. | 2 | CO6 | Understand |
| b) | Design a deck slab of a culvert over a span of 4.5 m, carries class A loading as per IRC. Clear width of roadways – 6 m with kerbs 600 mm wide. Use M-20 & Fe-415. Assume necessary data. | 8 | CO6 | Evaluate |

(OR)

- | | | | | |
|--------|--|---|-----|------------|
| 12. a) | Explain loadings as per IRC. | 2 | CO6 | Understand |
| b) | Design a slab culvert over a span of 5 m, carries class AA loading as per IRC. Clear width of roadways – 7m with kerbs 600 mm. Use M-20 & Fe-415. Assume necessary data. | 8 | CO6 | Evaluate |

**III B. Tech II Semester Supplementary Examinations, July, 2025
BIOMEDICAL INSTRUMENTATION
(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

		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	Illustrate the function of neuron and explain Action potential is propagated with help of neuron membrane.	10	1	L2
(OR)				
2. (a)	Explain the Resting potential and action potential with help of Graph.	5	1	L2
(b)	Describe the theory of electrodes with suitable diagram	5	1	L2
<u>UNIT-II</u>				
3.	Draw the sketch of Heart Anatomy and Explain functionality of cardiovascular system.	10	2	L2
(OR)				
4. (a)	Discuss the parameters effects the Blood pressure.	5	2	L2
(b)	Explain the functionality of Heart with help of Heart sounds.	5	2	L2
<u>UNIT-III</u>				
5.	Describe the 12 Lead ECG system and their Graph.	10	3	L3
(OR)				
6. (a)	Explain the Augmented Lead system and represent their Graphs.	5	3	L2
(b)	Interpret the working of Blood flow measurement using Magnetic induction.	5	3	L3
<u>UNIT-IV</u>				
7.	Identify the Vital Sign monitoring devices utilised in ICU and Justify the importance of each major equipment.	10	4	L3
(OR)				
8.	Classify the Pacemaker and explain the functionality of each with suitable diagram.	10	4	L3
<u>UNIT-V</u>				
9.	Compare the various technology (Wired & Wireless) used in biotelemetry to transmit the data.	10	5	L2
(OR)				
10. (a)	Draw the Block diagram of Biotelemetry and describe each block.	5	5	L2
(b)	List out and explain the Application of telemetry in patient care.	5	5	L2
<u>UNIT-VI</u>				
11.	Compare the effects of the Micro shock and Macro shocks	10	6	L2
(OR)				
12.	Describe the sources of Electromagnetic Interferences in Medical devices and explain its preventive shielding	10	6	L2

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. Give the derivation of Transfer function of generalized state model. Obtain the Transfer function for a system having state model

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & -3 \\ 4 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 3 \\ 5 \end{bmatrix} u \quad \text{and} \quad Y = \begin{bmatrix} 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

(OR)

2. What do you mean by diagonalization? Diagonalize the given system matrix

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}$$

UNIT-II

3. Explain the procedure of test for controllability and observability of a system by Gilberts and Kalman tests.

(OR)

4. Find state transition matrix, check the controllability & observability of the system having the state equation $\dot{X} = AX + BU$ & $Y = CX + DU$ where,

$$A = \begin{bmatrix} 1 & 0 \\ -2 & -3 \end{bmatrix}, \quad B = \begin{bmatrix} 1 \\ 0 \end{bmatrix}, \quad C = \begin{bmatrix} 1 & 1 \end{bmatrix}, \quad D = 0$$

UNIT-III

5. Explain the design of state feedback control through pole placement in detail?

(OR)

6. What do you mean by a full order state observer? Design a full order state observer. The desired eigen values for the observer matrix are $\mu_1 = -5$ and $\mu_2 = -5$ 10M CO3 L3

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 1 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

$$y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

UNIT-IV

7. Describe the stability in the sense of Lyapunov. Discuss in detail the direct method of Lyapunov for linear continuous time autonomous system. 10M CO4 L2

(OR)

8. Explain the construction of liapunov functions using variable gradient method. 10M CO4 L4

UNIT-V

9. What is gain scheduling in adaptive control? Discuss its working principle and applications in the aerospace and automotive industries. 10M CO5 L4

(OR)

10. Compare and contrast series adaptive control and parallel adaptive control with suitable examples. 10M CO5 L4

UNIT-VI

11. Discuss the minimum time problem in optimal control. Derive the performance index and explain its applications. 10M CO6 L3

(OR)

12. Describe the output regulator problem and how it differs from the state regulator problem. Discuss the Tracking problem in optimal control. 10M CO6 L4

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 Explain different types of Intelligence. | 5M | CO1 | K2 |
| | b Explain any one uninformed search strategy with an example. Explain its advantages and disadvantages. | 5M | CO1 | K2 |

(OR)

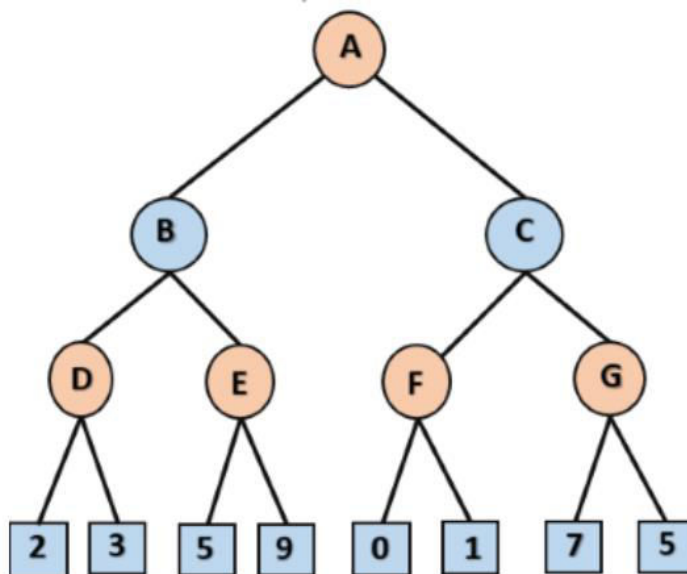
- | | | | | |
|----|---|----|-----|----|
| 2. | a Define the state space for water jug problem. Differentiate between Depth First and Breadth First Search. | 5M | CO1 | K2 |
| | b Apply heuristic function for 8-puzzle problem and find the different scenarios of Hill Climbing. | 5M | CO1 | K2 |

UNIT-II

- | | | | | |
|----|--|----|-----|----|
| 3. | a Define the three components of Constraint Satisfaction Problem (CSP). Explain CSP for graph colouring problem. | 5M | CO2 | K2 |
| | b Explain the steps for Resolution. For the following given statements
a) John likes all kind of food.
b) Apple and vegetable are food
c) Anything anyone eats and not killed is food.
d) Anil eats peanuts and still alive
e) Harry eats everything that Anil eats.
Prove by resolution that:
f) John likes peanuts. | 5M | CO2 | K3 |

(OR)

- | | | | | |
|----|---|----|-----|----|
| 4. | a Apply Alpha-Beta Pruning for the following graph. Explain Step-by-Step process. | 5M | CO2 | K3 |
|----|---|----|-----|----|



- | | | | | |
|---|---|----|-----|----|
| b | How to compare two predicate statements are equivalent or not. Explain the algorithm for Unification. | 5M | CO2 | K2 |
|---|---|----|-----|----|

UNIT-III

5. a Consider Peter as an entity. Peter is an engineer as a profession, and his age is 25, he lives in city London, and the country is England. Represent the above using Frame Systems. 5M CO3 K2
- b Explain about Ontologies and Semantic web for knowledge representation. 5M CO3 K2

(OR)

6. Explain various techniques of knowledge representation in detail. Explain each representation with an example. Also list its advantages and disadvantages. 10M CO3 K2

UNIT-IV

7. a Define Machine Learning. Explain any two applications of Machine learning in detail. 5M CO4 K2
- b Differentiate between traditional programming and machine learning. 5M CO4 K2

(OR)

8. a Draw and explain the steps to create machine learning model. 5M CO4 K2
- b Identify the Task, Experience and Performance measure for the following applications: 5M CO4 K2
- i) House Price Prediction
 - ii) Digit Recognition
 - iii) Checkers Problem

UNIT-V

9. a Write notes on 5M CO5 K2
- i) Bayes Theorem
 - ii) Naïve Bayes classifier
- b What are issues in decision tree learning? How are they overcome? 5M CO5 K2

(OR)

10. Construct a decision tree for the following data: 10M CO5 K3

Age	Competition	Type	Class (profit)
Old	Yes	Software	Down
Old	No	Software	Down
Old	No	Hardware	Down
Mid	Yes	Software	Down
Mid	Yes	Hardware	Down
Mid	No	Hardware	Up
Mid	No	Software	Up
New	Yes	Software	Up
New	No	Hardware	Up
New	No	Software	Up

UNIT-VI

11. a Construct a neural network for OR operation. Draw the neural network diagram. Assume randomly weights for the input neurons and check the OR operation. 5M CO6 K3
- b What is the role of activation function. Explain various activation functions in detail. 5M CO6 K2

(OR)

12. a Explain the architecture of feed forward and feed backward neural networks. 5M CO6 K2
- b What are the characteristics of an artificial neural networks. Explain the different types of layers in an ANN. 5M 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-IMarks CO Blooms
Level

1. (a) Define unit of refrigeration and COP. 4 M CO1 K1
(b) Explain how refrigerator differs from a heat pump with diagrams. 6 M CO1 K2

(OR)

2. What are the industrial applications of refrigeration? 10 M CO1 K1

UNIT-II

3. A refrigeration plant of 100 tons capacity uses R22 as refrigerant. The condensing and evaporating pressures are 11.82 bar and 1.64 bar. The refrigerant enters the condenser dry saturated and leaves the condenser sub cooled by 10 C. Actual COP is 70% of the theoretical. Find (a) Theoretical and actual COP (b) Mass flow rate in kg/s (c) compressor power. Take the following properties of R22

Pressure (bar)	Temperature (C)	Enthalpy hf (kJ/kg)	Enthalpy hg (kJ/kg)	Entropy sf (kJ/kg. K)	Entropy sg (kJ/kg. K)
1.64	- 30	116.1	393.1	0.869	1.803
11.82	+ 30	236.7	414.5	1.125	1.712

C_p (vapour) = 0.55 kJ/kg. K, C_p (liquid) = 1.19 kJ/kg. K.

(OR)

4. Summarize about the properties that are desirable for an ideal refrigerant. 10 M CO2 K2

UNIT-III

5. (a) Explain the working of lithium bromide water absorption refrigeration system with a neat compact diagram. 6 M CO3 K2
(b) List out the major fields of applications for lithium bromide water absorption refrigeration system. 4 M CO3 K1

(OR)

- | | | | | |
|----|---|------|-----|----|
| 6. | Explain the working of principal components in a three fluid vapour absorption system with the help of a block diagram. | 10 M | CO3 | K2 |
|----|---|------|-----|----|

UNIT-IV

- | | | | | |
|----|---|------|-----|----|
| 7. | An aircraft refrigeration plant has to handle a cabin load of 30 tonnes. The atmospheric temperature is 17°C . The atmospheric air is compressed to a pressure of 0.95 bar and temperature of 30°C due to ram action. This air is then further compressed in a compressor to 4.75 bar, cooled in a heat exchanger to 67°C , expanded in a turbine to 1 bar pressure and supplied to the cabin. The air leaves the cabin at a temperature of 27°C . The isentropic efficiencies of both compressor and turbine are 0.9. Calculate the mass of air circulated per minute and the C.O.P. For air, $c_p = 1.004 \text{ kJ/kg K}$ and $c_p / c_v = \gamma = 1.4$. | 10 M | CO4 | K3 |
|----|---|------|-----|----|

(OR)

- | | | | | |
|----|---|-----|-----|----|
| 8. | (a) What are the conditions for liquefaction of gases? | 4 M | CO4 | K1 |
| | (b) Illustrate Linde's apparatus for liquefaction of gas. | 6 M | CO4 | K2 |

UNIT-V

- | | | | | |
|----|--|-----|-----|----|
| 9. | (a) Explain the working principle of thermo electric refrigeration system. | 6 M | CO5 | K2 |
| | (b) Compare the working of different components of thermo electric refrigeration system with the working of different components of vapour compression system. | 4 M | CO5 | K2 |

(OR)

- | | | | | |
|----|---|-----|-----|----|
| 10 | (a) What are the advantages of pulse tube refrigeration over other refrigeration systems? | 5 M | CO5 | K1 |
| | (b) What are the fields of applications for pulse tube refrigeration? | 5 M | CO5 | K1 |

UNIT-VI

- | | | | | |
|----|---|-----|-----|----|
| 11 | (a) What is the need for ventilation and infiltration? | 4 M | CO6 | K1 |
| | (b) What are the requirements of industrial air conditioning? | 6 M | CO6 | K1 |

(OR)

- | | | | | |
|----|---|-----|-----|----|
| 12 | (a) Illustrate psychometric process of summer air conditioning system for hot and dry conditions. | 4 M | CO6 | K2 |
| | (b) Demonstrate working of summer air conditioning system for hot and humid conditions. | 6 M | CO6 | K2 |

AR18

CODE: 18ECE321

SET-1

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

III B.Tech II Semester Supplementary Examinations, July, 2025

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) | Explain the various switching network configurations with neat diagrams | 6M |
| b) | Explain the principles of crossbar switching | 6M |
| (OR) | | |
| 2. a) | Explain in detail the basic elements of the switching systems | 6M |
| b) | Explain the evolution of telecommunications | 6M |

UNIT-II

- | | | |
|-------------|--|-----|
| 3. | Explain different approaches in stored SPC | 12M |
| (OR) | | |
| 4. | Describe clearly about distributed SPC with necessary diagrams | 12M |

UNIT-III

- | | | |
|-------------|---|-----|
| 5. | Compare in channel signalling and common channel signalling | 12M |
| (OR) | | |
| 6. | Explain the charging plan, numbering plan and transmission plan in Telecommunication networks | 12M |

UNIT-IV

- | | | |
|-------------|--|----|
| 7. a) | Describe data communication circuit configurations. | 6M |
| b) | Explain layered network architecture. | 6M |
| (OR) | | |
| 8. a) | Define open system interconnection. Name and explain functions of each of the Layers of the OSI model. | 6M |
| b) | Distinguish between connection-less service and connection-oriented service. | 6M |

UNIT-V

- | | | |
|-------------|---|-----|
| 9. | Compare circuit switching and packet switching networks | 12M |
| (OR) | | |
| 10. | Explain the functions and architecture of ISDN networks | 12M |