

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 the operational differences between hydraulic motors and actuators.	5	1	L2
	b) Describe pumping mechanisms in gear, vane, and piston type pumps.	5	1	L2
(OR)				
2.	Discuss the mechanics of hydraulic cylinder loading and its application in lever systems.	10	1	L2
<u>UNIT-II</u>				
3.	With the help of diagrams, explain the operation of rotary valves in direction control. How it is different from spool type valve	10	2	L2
(OR)				
4.	a) Distinguish between pressure relief valve pressure sequence valves?	5	2	L2
	b) Describe function, size, applications any one of the accumulators	5	2	L2
<u>UNIT-III</u>				
5.	a) Explain the principle and application of meter-in circuit for speed control in hydraulics	5	3	L2
	b) Illustrate a hydraulic circuit for plastic injection molding and discuss its main components	5	3	L3
(OR)				
6.	a) Draw a speed control circuit for hydraulic press applications	5	3	L2
	b) Write short notes on hydraulic clamping circuits for machine tool applications	5	3	L2
<u>UNIT-IV</u>				
7.	Write short notes on pneumatic direction control valves and pressure control valves.	10	4	L2
(OR)				
8.	a) Discuss the function and construction of pilot operated solenoid valve in electro-pneumatic circuits	5	4	L2
	b) What are PE converters? Illustrate their role in automation using fluid power	5	4	L2
<u>UNIT-V</u>				
9.	a) Design a basic pneumatic circuit for speed control and explain all circuit elements.	5	5	L3
	b) Brief about AND & OR Gates.	5	5	L2
(OR)				
10.	a) Elaborate the application of time delay valves	5	5	L2
	b) Elucidate pressure sequence valves and their role in pneumatic systems.	5	5	L3
<u>UNIT-VI</u>				
11.	a) Explain the troubleshooting steps for maintenance of hydraulic circuits in surface grinding machines	5	6	L4
	b) Enumerate applications of Hydraulics and Pneumatics	5	6	L2
(OR)				
12.	Explain the pneumatic circuit design for pick and place applications.	10	6	L4

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) List three common applications of Mobile Ad Hoc Networks.	5	1	1
	b) How do MANETs adapt to changes in network topology, and why is this adaptability crucial?	5	1	2
(OR)				
2.	a) Name two issues commonly encountered in Mobile Ad Hoc Networks.	5	1	2
	b) Explain the concept of self-organization in MANETs and why it's essential for their operation.	5	1	1
<u>UNIT-II</u>				
3.	a) Explain hidden terminal and exposed terminal problems?	5	2	2
	b) List three design goals that are typically considered when developing MAC protocols for Ad Hoc Wireless Networks.	5	2	2
(OR)				
4.	a) Compare and contrast the design goals of MACAW and FAMA	5	2	3
	b) What is the primary purpose of a MAC protocol in wireless networks?	5	2	2
<u>UNIT-III</u>				
5.	a) Explain the concept of scheduling mechanisms in Contention-Based MAC protocols and how they help improve network efficiency.	5	3	2
	b) Write in detail in about Table- Driven Routing protocol-WRP.	5	3	3
(OR)				
6.	a) Write in detail about Contention based MAC protocols with scheduling mechanism –DWOP.	5	3	1
	b) Describe the role of routing protocols in maintaining connectivity in Ad Hoc Wireless Networks and how they address network dynamics.	5	3	2
<u>UNIT-IV</u>				
7.	a) Name two Hybrid Routing Protocols used in wireless networks.	5	4	2
	b) What is the primary purpose of Wireless Sensor Networks (WSNs) and how does it differ from Ad Hoc Wireless Networks?	5	4	1
(OR)				
8.	a) Explain the operation of On-Demand Routing Protocols like DSR and AODV, emphasizing their route discovery and maintenance processes.	5	4	2
	b) Analyze the challenges and issues involved in designing Wireless Sensor Networks, considering factors like energy efficiency, data aggregation, and scalability.	5	4	3
<u>UNIT-V</u>				
9.	a) Compare the operation of two CSMA-based MAC Protocols used in Sensor Networks, highlighting their differences and commonalities.	5	5	3
	b) Explain the fundamental concept of Clustered Architecture in Sensor Networks.	5	5	2

(OR)

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|-----|---|----|---|---|
| 10. | In a scenario where multiple Sensor Networks need to operate in close proximity without interference, propose a MAC Protocol and explain how it would mitigate interference and ensure efficient communication. | 10 | 5 | 4 |
|-----|---|----|---|---|

UNIT-VI

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|-----|--|---|---|---|
| 11. | a) Provide an example of an attack that is specific to WSNs. | 5 | 6 | 2 |
| | b) Evaluate the effectiveness of SPINS, TinySec, and LEAP as secure protocols for WSNs, considering factors like resource efficiency and robustness against attacks. | 5 | 6 | 3 |

(OR)

- | | | | | |
|-----|--|---|---|---|
| 12. | a) Explain the importance of securing WSNs, emphasizing the critical nature of the data they collect and transmit. | 5 | 6 | 2 |
| | b) Write about Indoor Localization. | 5 | 6 | 2 |

POWER SYSTEM OPERATION AND CONTROL
(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

UNIT-I

	Marks	CO	Blooms Level
1. a) Explain the following i) heat-rate curve ii) Incremental fuel rate curve iii) incremental production cost	5	1	2
b) List the equality and inequality constraints considered in the economic dispatch problem.	5	1	2

(OR)

2. Three plants of a total capacity of 500 MW are scheduled for operation to supply a total system load of 310 MW. Evaluate the optimum load scheduling if the plants have the following cost characteristics and the limitation:

$$C_1 = 0.06 P_{G_1}^2 + 30 P_{G_1} + 10, 30 \leq P_{G_1} \leq 150$$

$$C_2 = 0.10 P_{G_2}^2 + 40 P_{G_2} + 15, 20 \leq P_{G_2} \leq 100$$

$$C_3 = 0.075 P_{G_3}^2 + 10 P_{G_3} + 20, 50 \leq P_{G_3} \leq 250$$

UNIT-II

3. Give a step-by-step procedure for computing economic allocation of power generation in a thermal system when transmission line losses are considered.

(OR)

4. Two thermal plants are interconnected and supply power to a load as shown in Fig. The following are the incremental production costs of the plants:

$$\frac{dC_1}{dP_{G_1}} = 20 + 10P_{G_1} \text{ Rs./MWh}$$

$$\frac{dC_2}{dP_{G_2}} = 15 + 10P_{G_2} \text{ Rs./MWh}$$

where p and p are expressed in p.u. in 100-MVA base. The transmission loss is given by

$$P_L = 0.1P_{G_1}^2 + 0.2P_{G_2}^2 + 0.1P_{G_1}P_{G_2} \text{ p.u.}$$

If the incremental cost of received power is 50Rs./MWh, find the optimal generation.



UNIT-III

5. What is hydrothermal scheduling? Obtain the condition for optimal scheduling of hydrothermal plants. 10 3 2
- (OR)**
6. a) What is unit commitment? What are the existing method. 5 3 2
b) Explain the procedure steps of dynamic programming solution of unit commitment. 5 3 2

UNIT-IV

7. Obtain the mathematical modelling of speed governing system with neat diagram 10 4 2
- (OR)**
8. a) A single-area system has the following data: 5 4 3
Speed regulation, $R = 4$ Hz/p.u. MW
Damping coefficient, $B = 0.1$ p.u. MW/Hz
Power system time constant, $T = 10$ s
Power system gain, $K_P = 75$ Hz/p.u. MW
When a 2% load change occurs, determine the AFRC and the static frequency error. What is the value of the steady-state frequency error if the governor is blocked?
- b) A 200-MVA synchronous generator is operated at 3,000 rpm, 50 Hz. A load of 40 MW is suddenly applied to the machine and the station valve to the turbine opens only after 0.4 s due to the time lag in the generator action. Calculate the frequency to which the generated voltage drops before the steam flow commences to increase so as to meet the new load. Given that the value of H of the generator is 5.5 kW-s per kVA of the generator energy.

UNIT-V

9. Derive the expression for Tie line power of a two area load frequency control. 10 5 2
- (OR)**
10. Two control areas of 1,000 and 2,000 MW capacities are interconnected by a tie line. The speed regulations of the two areas, respectively, are 4 Hz/p.u. MW and 2.5 Hz/p.u. MW. Consider a 2% change in load occurs for 2% change in frequency in each area. Find steady-state change in frequency and tie-line power of 10 MW change in load occurs in both areas. 10 5 3

UNIT-VI

11. Explain the shunt compensator devices TSC and TCR with relevant circuit diagram 10 6 2
- (OR)**
12. a) What is load compensation and explain its objectives in power systems. 5 6 3
b) Explain the merits and demerits of different types compensating equipments for transmission lines. 5 6 3

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 the general system of optical fiber communication and highlight its advantages over conventional communication systems.	5M	1	2
	b) Discuss Total Internal Reflection and derive the expression for acceptance angle and numerical aperture.	5M	1	3
(OR)				
2.	a) Describe the principle of Ray Theory Transmission in optical fibers with neat diagrams.	5M	1	3
	b) Differentiate between Single-mode fibers and Multi-mode fibers with examples.	5M	1	3
<u>UNIT-II</u>				
3.	a) Discuss the materials used in LEDs and their impact on optical communication performance.	5M	2	3
	b) Define External Quantum Efficiency (EQE) and discuss the factors affecting it.	5M	2	3
(OR)				
4.	a) Write a short note on power and modulation bandwidth product in optical sources.	5M	2	3
	b) Explain the principle, structure, and operation of Injection Laser Diodes (ILDs).	5M	2	2
<u>UNIT-III</u>				
5.	a) Explain the physical principle of PIN photodiode with a neat diagram.	5M	3	2
	b) Define and explain Detector response time.	5M	3	3
(OR)				
6.	a) Discuss the effect of temperature on avalanche gain in APDs.	5M	3	3
	b) Compare different photo detectors used in optical communication with advantages and limitations.	5M	3	3
<u>UNIT-IV</u>				
7.	a) Define information capacity and explain how it is determined in optical fibers.	5M	4	2
	b) Explain the concept of group delay in fiber optics.	5M	4	2
(OR)				
8.	a) Discuss Material Dispersion with suitable equations.	5M	4	3
	b) Explain the process of power launching into the fiber and its significance.	5M	4	2
<u>UNIT-V</u>				
9.	a) Explain the fundamental operation of an optical receiver.	5M	5	2
	b) Explain the receiver sensitivity and factors affecting it.	5M	5	2
(OR)				
10.	a) What are the main error sources in optical receivers? Explain in detail.	5M	5	2
	b) Describe the structure and working of a typical optical receiver with a block diagram.	5M	5	3
<u>UNIT-VI</u>				
11.	a) Discuss the different types of multiplexing techniques in optical communication.	5M	6	3
	b) Explain the concept of link power budget and derive the expression.	5M	6	2
(OR)				
12.	a) Write short notes on optical splicers and their importance in communication networks.	5M	6	2
	b) Discuss about the Point to Point Fiber Optic Link and its characteristics with an example.	5M	6	3

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

Answer ONE Question from each Unit

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	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) Draw the block diagram for satellite communication system. Explain the function of each block.	5M	CO1	BL3
	b) Discuss Kepler's Three Laws of Planetary Motion and derive the mathematical formulation of Kepler's Third Law.	5M	CO1	BL4
	(OR)			
2.	a) What are look angles? How do you determine? Explain with the help of neat diagrams.	5M	CO1	BL2
	b) Discuss the different types of launch vehicles used in satellite communications and their relative merits.	5M	CO1	BL4
	<u>UNIT-II</u>			
3.	a) Explain the role of the Telemetry, Tracking, Command, and Monitoring (TTC&M) subsystem in satellite operations.	5M	CO2	BL3
	b) A satellite at a distance of 40000km from a point on the earth's surface radiates a power of 10W from an antenna with a gain of 17dB in the direction of the observer. Find the flux density at the receiving point and the power received by an antenna at this point with an effective area of 10m ² .	5M	CO2	BL4
	(OR)			
4.	a) List the four main types of antennas used in satellites and explain the working of any two with neat diagrams.	5M	CO2	BL3
	b) Explain about communication sub system in satellite system	5M	CO2	BL4
	<u>UNIT-III</u>			
5.	a) Define G/T ratio and give its importance in satellite communication.	5M	CO3	BL2
	b) Illustrate the step-by-step procedure for preparing a satellite link budget.	5M	CO3	BL4

(OR)

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|----|----|--|----|-----|-----|
| 6. | a) | Derive the expression for overall system noise temperature at the receiving earth station. | 5M | CO3 | BL3 |
| | b) | Discuss the process of uplink analysis and design in satellite communication with suitable diagrams. | 5M | CO3 | BL4 |

UNIT-IV

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|----|----|---|----|-----|-----|
| 7. | a) | Describe the working principles of earth station receivers and explain their performance requirements | 5M | CO4 | BL2 |
| | b) | Explain about Terrestrial Interface. | 5M | CO4 | BL4 |

(OR)

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|----|----|---|----|-----|-----|
| 8. | a) | Draw the block diagram of a general earth station and explain | 5M | CO4 | BL2 |
| | b) | Examine the design features of large-aperture Earth stations and assess their effectiveness in different satellite communication scenarios. | 5M | CO4 | BL4 |

UNIT-V

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|----|----|---|----|-----|-----|
| 9. | a) | Discuss the history of GPS and the key milestones that shaped its development from military to civilian applications. | 5M | CO5 | BL3 |
| | b) | With a suitable example, explain how a GPS receiver determines its position in two dimensions (2D) using satellite signals. | 5M | CO5 | BL3 |

(OR)

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|-----|----|---|----|-----|-----|
| 10. | a) | Define and explain the concept of trilateration. How is it used in GPS to determine the position of a receiver? | 5M | CO5 | BL3 |
| | b) | Compare and contrast 2D and 3D positioning techniques in GPS, emphasizing their accuracy, satellite requirements, and applications. | 5M | CO5 | BL3 |

UNIT-VI

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|-----|----|--|----|-----|-----|
| 11. | a) | Describe the Control Segment of GPS and explain how it monitors, maintains, and updates the satellite constellation. | 5M | CO6 | BL3 |
| | b) | Write a detailed note on how GPS signal processing and coding techniques ensure accurate positioning and prevent interference. | 5M | CO6 | BL2 |

(OR)

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|-----|----|---|----|-----|-----|
| 12. | a) | Describe the structure and characteristics of GPS signals, including the carrier frequencies used and their significance. | 5M | CO6 | BL3 |
| | b) | Explain Selective Availability (SA) and discuss its purpose, impact on civilian accuracy, and eventual discontinuation. | 5M | CO6 | BL4 |

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UNIT-I

- | | | Marks | CO | Blooms Level |
|-------------|---|-------|-----|--------------|
| 1. | a) Explain Fundamental steps in Digital Image Processing with the help of diagram | 5M | CO1 | Understand |
| | b) Explain 4-connectivity, 8-connectivity and m-connectivity with an example. | 5M | CO1 | Understand |
| (OR) | | | | |
| 2. | a) What is Gray scale image and binary image? Explain how gray scale image can be converted to binary image | 5M | CO1 | Understand |
| | b) Discuss about Brightness adaption and discrimination. | 5M | CO1 | Understand |

UNIT-II

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|-------------|--|----|-----|------------|
| 3. | a) State and prove translation property of 2D DFT | 5M | CO2 | Understand |
| | b) Develop Walsh transform for $N = 4$ | 5M | CO2 | Apply |
| (OR) | | | | |
| 4. | a) Define 1D and 2D expressions of Hadmard transform and explain the properties of Hadmard transform | 5M | CO2 | Understand |
| | b) Develop Haar transform for $N=4$ | 5M | CO2 | Apply |

UNIT-III

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|----|---|----|-----|------------|
| 5. | a) What is point processing? Also explain image negatives and Contrast stretching | 5M | CO3 | Understand |
| | b) Explain how first derivative is used for image sharpening and explain various derivative filters used for image sharpening | 5M | CO3 | Understand |

(OR)

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|----|----|---|----|-----|------------|
| 6. | a) | Discuss about various smoothing filters in the frequency domain | 5M | CO3 | Understand |
| | b) | Explain about homo morphic filtering in frequency domain. | 5M | CO3 | Understand |

UNIT-IV

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|-------------|----|---|----|-----|------------|
| 7. | a) | Explain Weiner filtering with necessary equations | 5M | CO4 | Understand |
| | b) | What is inverse filtering and explain | 5M | CO4 | Understand |
| (OR) | | | | | |
| 8. | a) | Explain HSI color model | 5M | CO4 | Understand |
| | b) | What is pseudo color image processing? Explain about intensity slicing. | 5M | CO4 | Understand |

UNIT-V

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|-------------|----|---|----|-----|------------|
| 9. | a) | What is meant by image segmentation and explain the classification of Image segmentation algorithms | 5M | CO5 | Understand |
| | b) | Explain the basic formulation of Region based segmentation | 5M | CO5 | Understand |
| (OR) | | | | | |
| 10. | a) | Explain about Global Processing using Hough transform | 5M | CO5 | Understand |
| | b) | Discuss about basic adaptive thresholding | 5M | CO5 | Understand |

UNIT-VI

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|-------------|----|---|----|-----|------------|
| 11. | a) | What is the need for image compression and explain how image compression is used for various applications | 5M | CO6 | Apply |
| | b) | Explain Huffman coding with an example | 5M | CO6 | Understand |
| (OR) | | | | | |
| 12. | a) | Explain Bit plane coding. | 5M | CO6 | Understand |
| | b) | Draw and explain the block diagram of Lossy predictive coding model | 5M | CO6 | Understand |

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		Marks	CO	Blooms Level
<u>UNIT-I</u>				
1.	a) Define User Interface. Explain why UI design is important in software systems.	5	CO1	BTL-1
	b) Explain the benefits of good user interface design with examples.	5	CO1	BTL-2
(OR)				
2.	a) Write about the characteristics of Graphical User Interfaces (GUIs).	5	CO1	BTL-2
	b) Why are graphical interfaces more popular than command-based interfaces?	5	CO1	BTL-4
<u>UNIT-II</u>				
3.	a) Explain the role of human characteristics in user interface design.	5	CO1	BTL-2
	b) Describe the importance of human-computer interaction in system design.	5	CO1	BTL-1
(OR)				
4.	a) Discuss the steps involved in requirement analysis for UI design.	5	CO1	BTL-2
	b) Illustrate with an example how business functions influence interface design.	5	CO1	BTL-3
<u>UNIT-III</u>				
5.	a) Define system menus and explain their structure.	5	CO1	BTL-1
	b) Explain the principles of phrasing and selecting menu choices.	5	CO1	BTL-2
(OR)				
6.	a) Discuss the formatting of menus in UI design.	5	CO1	BTL-2
	b) Illustrate different navigation schemes with suitable examples.	5	CO1	BTL-3
<u>UNIT-IV</u>				
7.	a) Define windows and explain their characteristics.	5	CO1	BTL-1
	b) Explain the components of a window with examples.	5	CO1	BTL-2
(OR)				
8.	a) Discuss different window presentation styles.	5	CO1	BTL-2
	b) Illustrate the types of windows with examples.	5	CO1	BTL-3

UNIT-V

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|----|----|---|---|-----|-------|
| 9. | a) | Explain guidelines for writing clear text and messages. | 5 | CO1 | BTL-2 |
| | b) | Discuss device-based controls and their importance. | 5 | CO1 | BTL-2 |

(OR)

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|-----|----|---|---|-----|-------|
| 10. | a) | Define icons and their role in user interfaces. | 5 | CO1 | BTL-1 |
| | b) | Illustrate meaningful graphics with examples. | 5 | CO1 | BTL-3 |

UNIT-VI

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|-----|----|--|---|-----|-------|
| 11. | a) | Compare color usage in statistical graphics vs. web pages. | 5 | CO1 | BTL-4 |
| | b) | Analyze the consequences of poor color schemes on accessibility. | 5 | CO1 | BTL-4 |

(OR)

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|-----|----|---|---|-----|-------|
| 12. | a) | Design a color scheme for a learning management system. | 5 | CO1 | BTL-6 |
| | b) | Evaluate modern tools for choosing UI colors. | 5 | CO1 | BTL-5 |

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

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<u>UNIT-I</u>		Marks	CO	Blooms Level
1.	a) Explain the interaction of electromagnetic radiation with vegetation and water surfaces	6	CO1	Understand
	b) List any eight advantages of Remote sensing	4	CO1	Understand
(OR)				
2.	a) Explain atmospheric scattering and its types.	6	CO1	Understand
	b) Discuss atmospheric windows and their significance in remote sensing	4	CO1	Remembering
<u>UNIT-II</u>				
3.	a) Explain active and passive sensors with examples	4	CO2	Understand
	b) Explain radiometric and spectral resolutions with examples	6	CO2	Understand
(OR)				
4.	a) Differentiate sun-synchronous and geo-synchronous orbits	4	CO2	Understand
	b) Explain Band Sequential format and Band Interleaved by Line data format with a sketch.	6	CO2	Understand
<u>UNIT-III</u>				
5.	Illustrate the process of supervised image classification.	10	CO3	Apply
(OR)				
6.	Discuss various elements of visual image interpretation with examples	10	CO3	Understand
<u>UNIT-IV</u>				
7.	a) Discuss about cylindrical map projections	5	CO4	Apply
	b) Explain various data inputs in GIS	5	CO4	Understand
(OR)				
8.	a) Explain the role of Non- Spatial data in GIS with examples	6	CO4	Understand
	b) Discuss Vector data models in GIS	4	CO4	Apply
<u>UNIT-V</u>				
9.	a) Explain the importance of overlay operations in spatial analysis.	6	CO5	Understand
	b) Explain conditional expressions in overlay analysis.	4	CO5	Understand
(OR)				
10.	a) Discuss logical operators in overlay analysis.	6	CO5	Apply
	b) Explain overlay using a decision table.	4	CO5	Understand
<u>UNIT-VI</u>				
11.	Explain how RS and GIS are used for land use and land cover mapping	10	CO6	Apply
(OR)				
12.	Discuss RS and GIS applications in agriculture monitoring.	10	CO6	Apply

**Reinforcement Learning
(Common to CSE(AI&ML) & CSE (DS))****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 concept of reinforcement learning and its key elements.	5M	CO1	L2
	b) Describe an example of reinforcement learning using the Tic-Tac-Toe game.	5M	CO1	L2
	(OR)			
2.	a) Apply the incremental implementation approach to track a non-stationary k-armed bandit problem.	5M	CO1	L3
	b) Demonstrate how optimistic initial values affect the learning process in bandit algorithms.	5M	CO1	L3
	<u>UNIT-II</u>			
3.	a) Apply policy evaluation and policy improvement steps in a finite Markov decision process.	5M	CO2	L3
	b) Show the process of policy iteration in a given Markov Decision Process (MDP).	5M	CO2	L3
	(OR)			
4.	a) Analyse the efficiency differences between policy iteration and value iteration methods.	5M	CO2	L4
	b) Evaluate the impact of goals and rewards on agent behaviour in an MDP.	5M	CO2	L4
	<u>UNIT-III</u>			
5.	a) Apply Monte Carlo prediction methods to estimate the value function of a policy.	5M	CO3	L3
	b) Use Monte Carlo control to improve an action-value function without exploring starts.	5M	CO3	L3

(OR)

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|----|----|---|----|-----|----|
| 6. | a) | Analyze the effect of using discontinuing-aware importance sampling on off-policy prediction. | 5M | CO3 | L4 |
| | b) | Discuss the advantages and disadvantages of n-step TD prediction compared to 1-step TD. | 5M | CO3 | L4 |

UNIT-IV

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|----|----|--|----|-----|----|
| 7. | a) | Apply semi-gradient methods for off-policy learning with function approximation. | 5M | CO4 | L3 |
| | b) | Illustrate linear value-function geometry and its role in TD learning. | 5M | CO4 | L3 |

(OR)

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|----|----|---|----|-----|----|
| 8. | a) | Analyse the causes and implications of the deadly triad in off-policy learning. | 5M | CO4 | L4 |
| | b) | Evaluate the limitations of the Bellman error and why it is not directly learnable. | 5M | CO4 | L4 |

UNIT-V

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|----|----|--|----|-----|----|
| 9. | a) | Use the λ -return to explain the concept of eligibility traces. | 5M | CO5 | L3 |
| | b) | Apply TD(λ) to update value estimates in an online learning setting. | 5M | CO5 | L3 |

(OR)

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|-----|----|---|----|-----|----|
| 10. | a) | Analyse the effect of variable λ and γ parameters on the convergence of eligibility trace. | 5M | CO5 | L4 |
| | b) | Examine the use of Dutch traces in Monte Carlo learning and their benefits. | 5M | CO5 | L4 |

UNIT-VI

- | | | | | | |
|-----|----|---|----|-----|----|
| 11. | a) | Apply the policy gradient theorem to derive the gradient for a simple policy. | 5M | CO6 | L3 |
| | b) | Use the REINFORCE algorithm with baseline to optimize a policy. | 5M | CO6 | L3 |

(OR)

- | | | | | | |
|-----|----|--|----|-----|----|
| 12. | a) | Analyse the advantages of policy approximation over value function approximation in policy search. | 5M | CO6 | L4 |
| | b) | Evaluate the convergence properties of the REINFORCE algorithm with and without baseline. | 5M | CO6 | L4 |

**Transportation Engineering-II
(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

1. a) What is meant by wear of Rails? Enumerate the various types of Rail wear and enlist the methods by which it can be measured. 6M
- b) What is Ballast? List out different types of ballast and enumerate the requirements of Good ballast 6M

(OR)

2. a) What are the different components of permanent way and enumerate with neat sketch. 6M
- b) What is rail fastenings? List out different types rail fastenings used in track constrictions. 6M

UNIT-II

3. a) What are the difference between railway stations and yards? List out difference types of stations present Indian railways. 6M
- b) What is meant by rail joints? What are the different types of rail joints Explain any two. 6M

(OR)

4. a) Define: i) super elevation ii) Negative cant 6M
iii) Cant deficiency iv) Grade compensation on curves
- b) Compute the maximum permissible speed for the following data on a curve of high speed B.G for the following data. Degree of curve = 1.2, Amount of super elevation = 8 cm, Length of transition curve = 150 m, Maximum sanctioned speed likely to be 145 kmph. 6M

UNIT-III

5. a) What essential purposes are served by Signalling and Interlocking? What do you understand by route relay interlocking? 6M
 - b) What are the objectives of Signaling in Railways? 6M
- (OR)**
6. a) What are the different components of a stop signal? Explain with the help of a neat diagram. 6M
 - b) With a neat sketch show the details of acute angle crossing. Indicate (i) actual, (ii) theoretical rose of crossing. 6M

UNIT-IV

7. a) Explain the various Surveys to be conducted and the data to be collected for Airport site selection 6M
- b) What are the factors which influence the airport site selection? 6M

(OR)

8. a) List out Aircraft characteristics to be considered in planning an airport planning and design. 6M
- b) An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperature for the hottest month at the site are 40° C and 28° C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m. 6M

UNIT-V

9. a) Government is planning a Good Port at one Sea Shore. What are the requirements of good Port explain it to Port In-charge? 6M
- b) What are the uses of dry and wet docks? What is the role of ware houses? 6M
- (OR)**
10. a) List the navigational aids and explain their importance? 6M
- b) What are the different types of break waters? Explain any two. 6M