



CBCS SCHEME - Make-Up Exam

BAD402

Fourth Semester B.E/B.Tech. Degree Examination, June/July 2025 Artificial Intelligence

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks, L: Bloom's level, C: Course outcomes.

| Module - 1 | | | M | L | C |
|------------|----|---|----|----|-----|
| 1 | a. | Define Artificial Intelligence (AI). Explain the historical development of AI. | 10 | L2 | CO1 |
| | b. | Explore the relationship between rationality and decision making in AI systems. | 10 | L2 | CO1 |

OR

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|---|----|---|----|----------|-----|
| 2 | a. | Define Intelligent agents and explain PEAS specification of intelligent agents. | 10 | L1 L2 | CO2 |
| | b. | Differentiate between simple reflex agents, model-based agents, goal based agents and utility based agents. | 10 | L2 | CO2 |

Module - 2

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|---|----|--|----|----|-----|
| 3 | a. | Explain in detail step by step illustration of how breadth first search works. | 10 | L2 | CO1 |
| | b. | Define five components of a problem. Write a complete state space for a vacuum cleaner to clean 2 squares P and Q. Q is to the right of P. | 10 | L3 | CO2 |

OR

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|---|----|---|----|----|-----|
| 4 | a. | Explain the key principles of depth-first search as an uninformed search strategy. | 10 | L2 | CO1 |
| | b. | Define DFS. Write the DFS with pruning for this graph with source node = 8 and goal = 3. Full steps to be written for full marks. | 10 | L3 | CO2 |

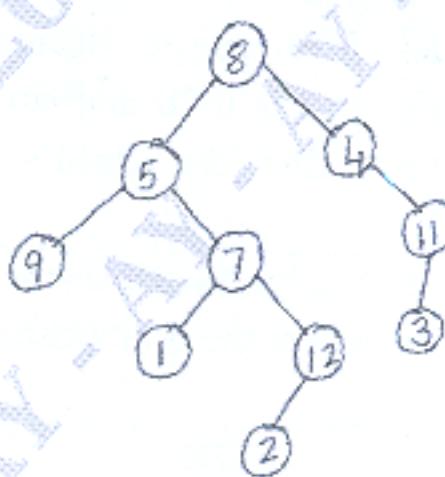


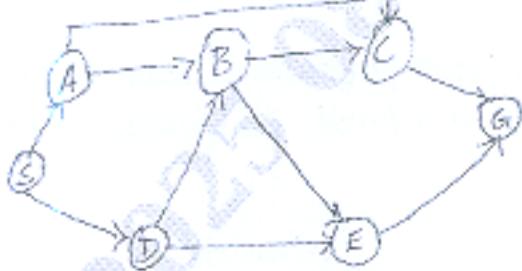
Fig. Q4 (b)

Module - 3

| | | | | | |
|---|----|--|----|----|-----|
| 5 | a. | Explain the role of heuristics in informed search strategies. How do heuristics contribute to finding optimal solutions? | 10 | L2 | CO1 |
|---|----|--|----|----|-----|

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| | b. | Explain the A* search algorithm, emphasizing the role of heuristic functions in its operation. | 10 | L2 | CO1 |
|--|----|--|----|----|-----|

OR

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|---|----|---|----|----|-----|
| 6 | a. | Apply the Greedy best first search to find the solution path from S to G. Write all steps as well as open and closed lists for full marks. S(h = 7), A(h = 9), B(h = 4), C(h = 2), D(h = 5), E(h = 3), G(h = 0) | 10 | L3 | CO2 |
| | b. |  Fig. Q6 (a) | 10 | L2 | CO1 |

Module - 4

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|---|----|--|----|----|-----|
| 7 | a. | Compare and contrast propositional inference with first order logic inference. What additional capabilities does FOL inference offer? | 10 | L4 | CO3 |
| | b. | Explain various ambiguities in Natural Language Processing with examples and summarize in the form of a table about formal languages and their onto logical and epistemological commitments. | 10 | L3 | CO2 |

OR

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|---|----|---|----|----|-----|
| 8 | a. | “Everyone who loves all animals is loved by someone”. Illustrate the procedure by translating the sentence in the form of First order resolution. | 10 | L4 | CO3 |
| | b. | Write the algorithm for backward chaining and prove Tree for finding criminal (waste) using backward chaining. | 10 | L3 | CO2 |

Module - 5

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|---|----|---|----|----|-----|
| 9 | a. | Write the representation of Bayes Theorem. In a class, 70% children were full sick due to viral fever and 30% due to Bacterial fever. The probability of observing temperature for viral is 0.78 and for Bacterial is 0.31. If a child develops high temperature, find the child's probability of having viral infection. | 10 | L3 | CO2 |
| | b. | Explain the concept of full joint distributions in the context of uncertain knowledge. How does it represent the relationships between variables? | 10 | L2 | CO2 |

OR

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|----|----|---|----|----|-----|
| 10 | a. | Explain marginalization and normalization with a full joint distribution of (toothache, catch, cavity). | 10 | L2 | CO1 |
| | b. | Explain ES (Expert System) shell that simplify the process of creating a knowledge base of Expert System. | 10 | L2 | CO1 |
