



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:II
Class:PG-I	Program:MCA
Branch Code:M.C.A.	Pattern:2022
Name of Course:Elective I: A : Artificial Intelligence	Course Code:MCA222003A
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1a) What is an Agent Environment? Discuss the different types of environments (e.g., fully observable vs. partially observable, deterministic vs. stochastic). Provide examples from real-life AI systems. (6) CO1

Question No. 2

- 2a) Apply **Breadth-First Search (BFS)** to the following graph to find the shortest path from **S to G**. Show OPEN/CLOSED list updates and final output. (6) CO2

S → A, B

A → C, D

B → D, E

C → G

D → G

E → G

Question No. 3

- 3a) Apply knowledge-based agent architecture to design an intelligent medical diagnosis system. Explain how percepts, knowledge base, and inference contribute to decision-making. (8) CO3

OR

- 3b) Apply First - Order Logic to represent the following statements and derive one conclusion using inference rules: (8) CO3

- "All teachers are educated."
- "Some teachers are researchers."
- "All researchers publish papers."

Show logical reasoning to conclude a valid statement.

- 3c) Given a constraint satisfaction problem of Exam Scheduling (subjects vs. students), formulate variables, domains, and constraints. Solve with constraint propagation. (8) CO3

OR

- 3d) Explain how non-monotonic reasoning resolves knowledge update conflicts. Illustrate using a scenario where conclusions change when new evidence is added (e.g., bird–penguin example). (8) CO3

Question No. 4

- 4a) Apply forward state-space search to solve the Blocks World planning problem where Block A must be stacked on Block B, and Block B on Block C. Define initial and goal states and show all intermediate planning steps. (8) CO4

OR

- 4b) Compare supervised, unsupervised, and reinforcement learning by applying each to suitable real-life case studies such as spam detection, customer segmentation, and game playing. (8) CO4

- 4c) Describe the basic components of an Artificial Neural Network (ANN) and explain their respective roles. (8) CO4

OR

- 4d) Describe Non linear Planning using Constraint Posting. Explain how constraints help in reducing dependency between tasks (8) CO4

Question No. 5

- 5a) Explain the different steps involved in Natural Language Processing (NLP) with a suitable block diagram. (8) CO5

OR

- 5b) Discuss discourse and pragmatic processing in NLP with suitable examples showing context handling. (8) CO5

- 5c) Create an Expert System block diagram for Medical Diagnosis and explain flow of reasoning using an example (fever, cold, etc.). (8) CO5

OR

- 5d) Explain the major components of an Expert System: knowledge base, inference engine, user interface, etc. (8) CO5

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