

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER - III EXAMINATION - WINTER 2025

Subject Code: MC03094051

Date: 20-11-2025

Subject Name: Artificial Intelligence

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Use of simple calculators and non-programmable scientific calculators are permitted.**

	Marks
Q.1 (a) Apply the concept of knowledge-based systems to a real-world problem and illustrate their architecture and characteristics compared with traditional programs.	07
(b) Use First-order Predicate Logic to represent and explain a real-world situation, showing its syntax with suitable examples.	07
Q.2 (a) Analyze the differences between Depth-First Search (DFS) and Breadth-First Search (BFS).	07
(b) Apply the concept of self-modifying programs in PROLOG by demonstrating how a program can update its own knowledge base.	07
OR	
(b) Use Constraint Logic Programming (CLP) to solve a real-world problem and show how it extends traditional PROLOG features.	07
Q.3 (a) Demonstrate the working of Breadth-First Search (BFS) on a sample graph and write its advantages and disadvantages.	07
(b) Use a heuristic search approach to improve search efficiency for any problem. explain with example.	07
OR	
(a) Implement the A★ search algorithm to find the optimal path in a route-planning scenario.	07
(b) Apply the Minimax algorithm to evaluate moves in a two-player game situation.	07
Q.4 (a) Demonstrate how alpha-beta pruning optimizes the minimax search in game-playing AI.	07
(b) Apply the concept of conditional independence in a Bayesian Network by using example.	07
OR	
(a) Compare How does greedy search differ from other search strategies, and what are its limitations?	07
(b) Construct a Bayesian Network for a given problem and explain its main components.	07

- Q.5 (a)** Differentiate between conditional probability and material implication in probabilistic reasoning with example. **07**
- (b)** Apply the concept of reasoning with uncertainty to a real-life AI problem and explain its importance. **07**

OR

- (a)** Apply the Principle of Maximum Entropy to handle incomplete information in an AI reasoning scenario. **07**
- (b)** How knowledge can be represented graphically using a Bayesian Network. Explain with example. **07**
