Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (CSE) (Sem.–6)

ARTIFICIAL INTELLIGENCE

Subject Code : BTCS-602-18

M.Code : 79250

Date of Examination : 21-11-2025

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) What is an intelligent agent in AI? Give an example.

b) What is direct utility estimation?

c) What is the difference between open list and closed list in search algorithms?

d) What is the main objective of the A* algorithm in artificial intelligence?

e) What is Bayes' Theorem? State its mathematical expression.

f) Expand HMM and state its main purpose in probabilistic reasoning.

g) What is a Markov Decision Process (MDP)?

h) What is the main difference between value iteration and policy iteration?

i) What is Reinforcement Learning (RL)?

j) Differentiate between active and passive reinforcement learning.

SECTION-B

2. Explain the evolution and history of Artificial Intelligence from its early beginnings to the modern era of machine learning and neural networks.

3. Describe the concept of heuristic search. Explain how Best-First Search makes use of heuristics to find an optimal path?

4. Describe the structure and components of a Bayesian Network. How is knowledge represented in it?

5. Discuss utility theory and explain how utility functions are used to represent preferences under uncertainty?

6. Describe the process of Adaptive Dynamic Programming (ADP) in reinforcement learning. How does it improve the learning process?

SECTION-C

7. Explain with suitable diagrams how tree and graph search techniques are used to explore the state space in AI problem-solving?

8. Explain in detail the working of Depth-First Search (DFS) and Breadth-First Search (BFS) algorithms. Compare their advantages and limitations.

9. Explain the concept of a Hidden Markov Model (HMM). Discuss its main components and how it is used in temporal reasoning?