

Name:.....

Roll No.....

Dr B R Ambedkar National Institute of Technology, Jalandhar

B.Tech-IT/ 8th Semester

**ITPE-063: Artificial Intelligence Concepts
Mid-Semester Examination**

Duration: 2 Hrs

Max. Marks: 30

Date: 19/03/2025

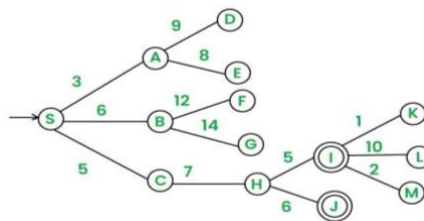
Marks Distribution & Mapping of Questions with Course Outcomes (COs)							
Question Number	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6.a</u>	<u>6.b</u>
Max. Marks	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>5</u>	<u>2.5</u>	<u>2.5</u>
CO No.	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>
Cognitive Level	<u>R</u>	<u>A</u>	<u>E</u>	<u>An</u>	<u>A</u>	<u>U</u>	<u>A</u>
Section/Chapter/Unit	<u>1</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	<u>1</u>

*Remember (R), Understand (U), Apply (A), Analyze (An), Evaluate (E), and Create (C)

Q. No.

Marks

1. Define artificial intelligence (AI). Explain how the historical foundations of AI have influenced modern AI development. Identify and describe the essential characteristics of an intelligent algorithm. 1+2+2=5
2. Define heuristic information and explain its role in search algorithms. Using the best-first search algorithm, determine the order of node exploration from S to I and calculate the total path cost. 2+3=5



3. Consider a scenario where a search algorithm is used to find the shortest route between 5 cities on a map. Describe the working principles of Depth-First Search (DFS) and Breadth-First Search (BFS) in this context. 3+2=5

Evaluate which algorithm—DFS or BFS—is more suitable for finding the shortest route on a large, complex map. Justify your answer with specific algorithm characteristics.

4. Compare and contrast Means End Analysis (MEA) with traditional search algorithms. Explain how MEA works by breaking down a complex problem into sub-goals and actions, with an example. 2+3=5

5. Given an initial state of a 8-puzzle problem and final state to be reached-

3+2=5

2	8	3
1	6	4
7		5

Initial State

1	2	3
8		4
7	6	5

Final State

Apply A* algorithm to identify the most cost-effective path to reach the final state from initial state. Consider $g(n)$ = Depth of node and $h(n)$ = Number of misplaced tiles.

Explain the advantage and limitations of A* algorithm.

6. a) Given an AI-based recommendation system (e.g., in e-commerce), identify the basic AI elements involved and explain how they work together. 2.5+2.5=5
- b) Apply your understanding of intelligent algorithms to suggest how AI could improve traffic management systems.