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Roll No.....

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Quiz 2

ITPE-063: Artificial Intelligence Concepts

Duration: 20 minutes Max. Marks: 5 Date: 05/03/2025

(Each question carries equal marks)

1	The process of exploring all possible states from a given initial state to find a solution is called <u>search</u> .
2	Which search algorithm guarantees finding the shortest path in an unweighted graph? a) Depth-First Search b) Best-First Search c) Breadth-First Search d) Hill Climbing
3	Which of the following is NOT a characteristic of the Hill Climbing algorithm? a) Uses heuristic function b) Can get stuck in local maxima c) Always finds the global optimal solution d) Moves in the direction of increasing heuristic value
4	If a problem requires 10 steps to reach the goal, and at each step, the heuristic estimate improves by 2, what is the total heuristic improvement? Answer: $10 \times 2 = \mathbf{20}$
5	Means-End Analysis works by: a) Randomly choosing actions b) Reducing the difference between the current state and goal c) Exploring all possible paths d) Ignoring heuristic values

6	<p>In a hill-climbing search, a state X has a heuristic value of $h(X) = 10$, and it moves to state Y with $h(Y) = 12$.</p> <p>However, another neighboring state Z has $h(Z) = 15$, but is two steps away.</p> <p>What happens if the algorithm follows a greedy hill-climbing strategy?</p> <p>Answer: It will move to state Y, even though Z has a better heuristic, because greedy hill climbing only considers immediate neighbors with higher heuristic values.</p>
7	<p>Given the following graph, which node will Best-First Search explore first?</p> <p>S --($h=3$)--> A --($h=2$)--> G</p> <p>S --($h=1$)--> B</p> <p>Answer: B</p>
8	<p>Consider the following graph where the numbers represent edge costs:</p> <p>S --(4)--> A --(3)--> G</p> <p>S --(2)--> B --(5)--> G</p> <p>Using Branch and Bound, find the least-cost path from S to G.</p> <p>Answer: Path = S → B → G</p> <p>Cost = 7</p>
9	<p>Which of the following statements is true about A* search?</p> <p>A) A* always finds the shortest path if the heuristic is admissible and consistent.</p> <p>B) A* guarantees an optimal path only if the heuristic is exactly correct.</p> <p>C) A* expands all nodes before reaching the goal.</p>

	D) A* is the same as Dijkstra's algorithm, regardless of the heuristic used.
10	Depth-First Search uses a ___ Stack _____ data structure, while Breadth-First Search uses a _____ Queue _____ data structure. Answer: