Quiz-I: Set-C

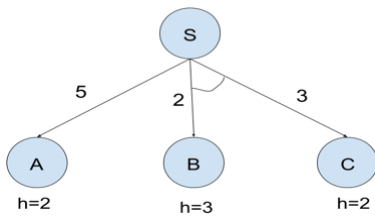**Roll Number:**   **Name:**   **Group:**

Thapar Institute of Engineering and Technology, Patiala
Department of Computer Science

UG: Semester IV   **UCS411: Artificial Intelligence**
04 March 2024
Time: 15 mins; M. Marks: 15   Faculties: ABJ, SAK, SOL, SMR, JNE, PYL

Q1. Which of the following statement is correct about Stochastic Algorithms?		
A.	Provide optimal solutions for NP complete problems based on probability or random numbers and can accept a bad move.	D
B.	Provide optimal solutions for NP complete problems based on probability or random numbers but cannot accept a bad move.	
C.	Provide near optimal solutions for NP complete problems based on probability or random numbers but cannot accept a bad move.	
D.	Provide near optimal solutions for NP complete problems based on probability or random numbers and can accept a bad move.	

Q2. Which of the following statements are true in case of A* algorithm?		
A.	A* algorithm is always complete and optimal.	C
B.	A* algorithm is complete and optimal for negative path costs as well.	
C.	A* algorithm is complete and optimal for positive path costs and admissible heuristic functions.	
D.	A* algorithm is complete and optimal for positive path costs and any heuristic function.	

Q3. Mark the algorithm that always finds the shortest path from start state to goal state in any search space.		
A.	BFS	D
B.	DFS	
C.	DFS-ID	
D.	Both BFS and DFS-ID	

Q4. Consider the following AO graph. Which is the best path opted by the AO* algorithm?		
A.	S->A with path cost 10	D
B.	S->B and C with path cost 10	
C.	S->B and C with path cost 7	
D.	S->A with path cost 7	

Q5. Fill in the blank:		
Which genetic operator is used for diversification ------------------		

Q6. Fill in the blank:		
The time complexity of Beam search algorithm is of the order ---		

Q7. Fill in the blank:		
In the basic Turing Test, -------- number of the terminals is/are operated by humans, and the remaining -------- terminal is/are operated by a computer.		

Q8. Fill in the blank:The data structure used in the MinMax algorithm ------------------------		

Q9. What will be the value of local heuristic function for the following state of block world problem?

Please Note: Local Heuristic:
+1 for each block that is resting on the thing it is supposed to be resting on.
-1 for each block that is resting on a wrong thing.

A.	2	D
B.	1	
C.	-1	
D.	0	

Q10. In a Water Jug Problem scenario, if Jug A has a capacity of 5 liters and Jug B has a capacity of 3 liters, What is the minimum number of water pours required from jug A to B or B to A to measure exactly 1 liter of water in any jug?

A.	2	A
B.	3	
C.	4	
D.	5	

Q11. A budget airline company operates 3 planes and employs 5 cabin crews. Only one crew can operate on any plane on a single day, and each crew cannot work for more than two days in a row. The company uses all planes every day. A Genetic Algorithm is used to work out the best combination of crews on any particular day. Suggest what chromosome could represent an individual in this algorithm?

A.	chromosome of 3 genes	A
B.	chromosome of 6 genes	
C.	chromosome of 7 genes	
D.	chromosome of 5 genes	

Q12. Consider a delivery drone that delivers packages to customers efficiently while optimizing factors like delivery time, energy consumption, and customer satisfaction. It is an example of ------------ agent.

A.	Model-Based	C
B.	Simple Reflex	
C.	Utility-Based	
D.	Goal-Based	

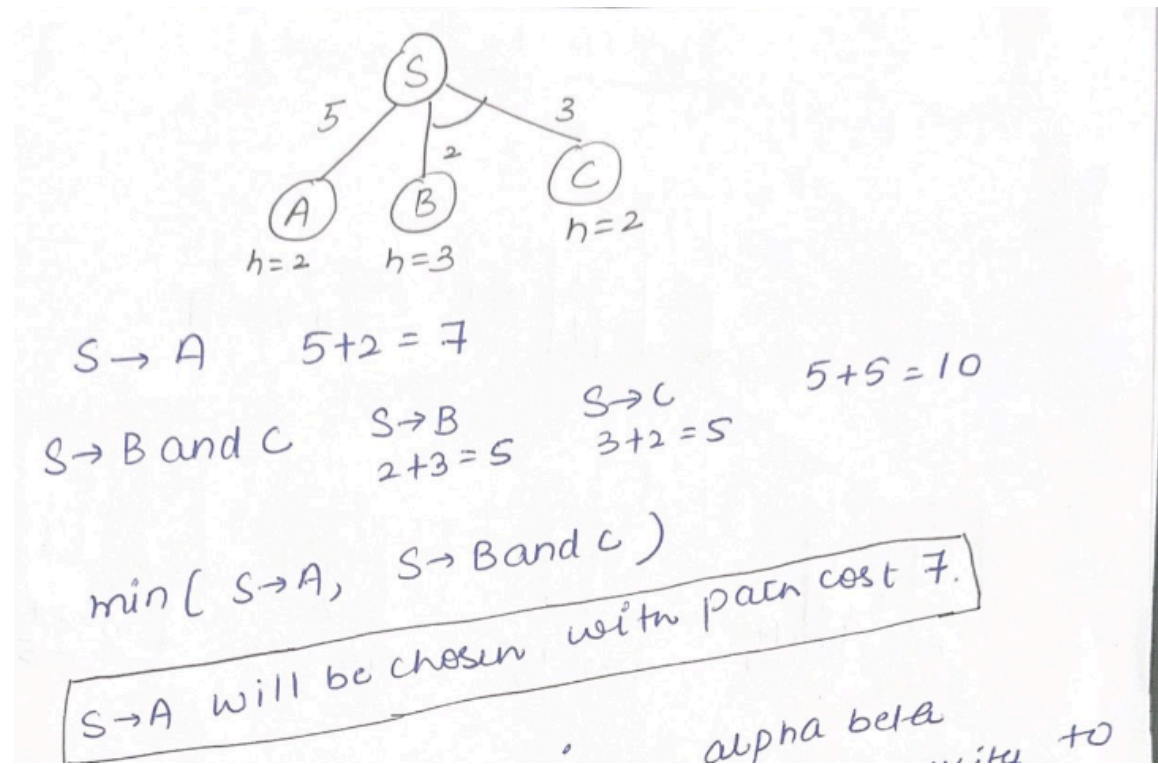| Q13. Which of the following algorithms have space complexity of O(bd), where b is branching factor and d is depth. I. DFS II. BFS III. DFS-ID IV. Depth Limited Search		
A.	Only I	B
B.	I, III, and IV	
C.	III & IV	
D.	II & IV	
Q14. Environment of Deep Blue (Chess) agent program is ------------------------------ _____		
A.	Stochastic	D
B.	Continuous	
C.	Partially Observable	
D.	Deterministic	
Q15. In the Monkey Banana Problem, if the monkey is at coordinates (3, 2) and the banana is at coordinates (7, 4), and the monkey can move only diagonally (up-left, up-right, down-left, down-right), how many steps will the monkey take to reach the banana if it moves optimally?		
A.	3	B
B.	4	
C.	5	
D.	6	

Ans 1: Provide near optimal solutions for NP complete problems based on probability or random numbers and can accept a bad move.
Ans 2: A* algorithm is complete and optimal for positive path costs and admissible heuristic functions.
Ans 3: Right choice is option D (In case of infinite search trees, a DFS algorithm is caught in blind alley).

Ans 4:

S → A   5+2 = 7

S → B and C   S → B   S → C   5+5 = 10
                   2+3 = 5   3+2 = 5

min (S→A,   S→ B and C)

S→A will be chosen with path cost 7.

,   alpha beta ....ith to

Ans 5: Mutation

Ans 6: The time complexity of Beam search algorithm is of the order
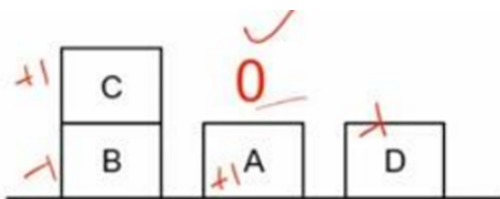 O (depth * beamwidth * branchingfactor)

Explanation: Because the beam search at each level at the maximum generate beta*branchingfactor nodes.

Ans 7: TWO , ONE

Ans 8: Stack/ DFS

Ans 9: Right Choice is option D.

Explanation:

Ans 10: A   B

0	3
3	0
3	3
5	1

Ans 11: Right Choice is A.

Explanation: On each day, a solution is a combination of 3 cabin crews assigned to 5 airplanes. Thus, a chromosome of 3 genes could be used in this algorithm with each gene representing a crew on a certain plain.

Ans 12: Right Choice is option C.

Explanation: A utility-based agent acts based not only on what the goal is, but the best way to reach that goal.

Ans 13: Right choice is option B (as space complexity of BFS is $O(b^{(d+1)})$).

Ans 14: Right choice is option D.

Explanation: Environment of Deep Blue (Chess) agent program is Deterministic. Because the next state of the environment is completely determined by the current state and action executed by the agent. In chess, the agents know the aftereffects of any action.

Ans 15:

91.

b.