CT2 Qp set4 - There are important questions in it

Artificial Intelligence (SRM Institute of Science and Technology)

AI CT-2 Question Pattern

Part-A (20x1 = 20 marks)

1. The 8-queen problem involves placing 8 queens on the 8X8 board such that no queen is attacked by the other in
   a. Horizontal, vertical
   b. Horizontal
   c. Vertical, diagonal
   d. **Horizontal, vertical and diagonal**

2. Rita decided to buy a new car. She is very concerned about the brand, qualities of the car such as engine type, horse power, gear system etc., and cost. She cannot go long distance to purchase a car. The constraints given
   a. Increases the number of goal states
   b. **Reduces the number of goal states**
   c. No changes in the goal states
   d. Depends on the problem statement

3. DFS and BFS falls under which category
   a. **Blind**
   b. **Systematic**
   c. **Uninformed**
   d. **Forward search**

4. Consider the given state space and select the best search method
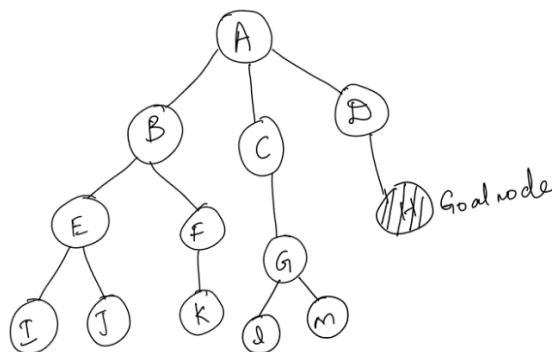
   a. DFS
   b. **BFS**
   c. **IDS**
   d. DLS

5. **Find the odd one out?**
   a. DFS: $T(n)=O(b^d)$ where d is depth
   b. BFS: $T(n)=O(b^d)$ where d is depth
   c. **DLS: $T(n)=O(b^d)$ where d is depth**
   d. Uniform cost search: $T(n)=O(b^d)$

6. A student visits an university for enquiring about the admissions. The University building is having 12 floors. The student has to search for admission office. What kind of searching technique can be used?
   a. DFS
   b. **BFS**

    c. DLS

    d. IDS

7. Random alteration of the values in genetic algorithm is done in
   a. Crossover
   b. Mutation
   c. Fitness function
   d. Population

8. Which is not an heuristic search?
   a. Best first
   b. A*
   c. Bi-directional search
   d. AO*

9. Pick the correct option for i, ii, iii, iv

i. Bi-directional	1. F(n)=h(n)
ii. Best first	2. Selection of multiple values
iii. AO*	3. And-Or graph
iv. Local beam	4. Forward and backward search

       a. 1, 2, 3, 4

       b. 2, 1, 3, 4

       c. 4, 1, 3, 2

       d. 4, 3, 2, 1

10. What are the problems of hill climbing algorithm?
    a. Local maximum
    b. Plateau
    c. Ridge
    d. Local minimum

11. Find out the missing steps in the process of genetic algorithms
    Population, _____, _____, crossover, _____, new population
    a. Fitness evaluation, mutation, selection of pairs
    b. Fitness evaluation, selection of pairs, mutation
    c. Mutation, fitness evaluation, selection of pairs
    d. Selection of pairs, fitness evaluation, mutation

12. Consider the parent1 chromosome is 1000|11011 and the parent2 chromosome is 1100| 110110 then the chromosome for the first child is 1000110110, for second child is 110011011. What will be the chromosome for the third child?
    a. Same as first child
    b. Same as second child
    c. Random Generation
    d. Solution not possible

13. Pick the wrong choice out from the given statements
    Variations of hill climbing search techniques are
    a. Choosing random successor among the neighbors
    b. Restart form the random state
    c. Generate random successors and update one is better if the number of neighbors is less

d. Random mutations

14. In alpha-beta pruning, the values of alpha and beta initially assigned with

a. alpha= beta+1

b. alpha= max, beta=min

c. alpha=min, beta=max

d. alpha=beta-1

15. Consider the given statements and choose the correct option

Statement 1: Ram's age is 16

Statement 2: All person above 18 is eligible to vote

Statement 3: Ram cannot vote

Statement 1 and statement 3 are given and deriving statement 2 is called

a. Induction

b. Abduction

c. Refutation

d. Deduction

16. Consider the given state of Wumpus world game and choose the next grid to move on

If the agent is in the room 2,2. The next possible step of the agent will be

a. 2, 3

b. 1, 2

c. 3, 2

d. 2, 1

17. Assume that the Knowledge Base contains the axiom

"All students who did hard work got passed"

Pick the correct First Order Logic for the given axiom

a. ∀x student(x) ⬚ hardwork(x) -> pass(x)

b. ∀x student(x) ⬚ hardwork(x) -> pass(x)

c. ∀x ⬚ student(x) ⬚ ⬚ hardwork(x) ⬚ pass(x)

d. ∀x ⬚ student(x) ⬚ ⬚ hardwork(x) ⬚ pass(x)

18. Alpha beta pruning search essentially performs

a. Reduction in the number of moves

b. Reduction in the MAX-MIN values for the nodes

c. Reduction in the gains for the opponent

d. Improving the gain for the opponent

19. Choose the correct propositional logic for the next move in the given diagram if the agent is in room $B_{[1,3]}$ where B represents Breeze, R represents Room and P represents Pit.
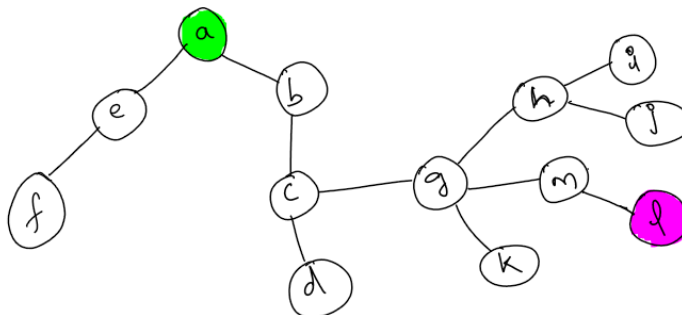
a. $B_{[1,3]} \leftrightarrow P_{[1,4]} \lor P_{[2,3]} \lor P_{[1,2]}$

b. $B_{[1,3]} \rightarrow P_{[1,4]} \lor P_{[2,3]} \lor P_{[1,2]}$

c. $B_{[1,3]} \rightarrow P_{[1,4]} \; ? \; P_{[2,3]} \; ? \; P_{[1,2]}$

d. $B_{[1,3]} \leftrightarrow P_{[1,4]} \; ? \; P_{[2,3]} \; ? \; P_{[1,2]}$

20. Match the terms with correct options

i.   Disjunction   1. $a \rightarrow b$
ii. Implication   2. $a \; ? \; b$
iii. Biconditional   3. $a \lor b$
iv. Conjunction   4. $a \rightarrow b \; ? \; b \rightarrow a$

a. 1, 2, 3, 4
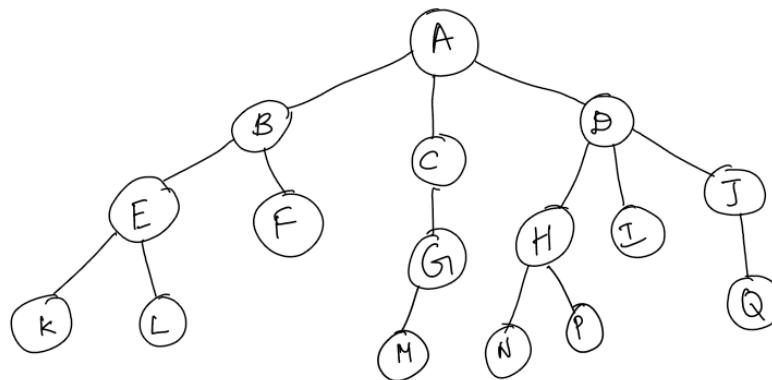**b. 3, 1, 2, 4**
c. 2, 1, 3, 4
d. 3, 4, 2, 1

Part- B (10X3=30 marks)

1. Give search path for the given graph using Bi-directional search. Justify its complexity.

'a' is the start node and 'l' is the goal node

2. Consider the given graph

'A' is the root node. 'F' is the goal node. Explain the searching process using IDS.

3. Explain about open list and close list with an example.
4. Riyaz wants to go to a restaurant which is near to his house. The graphical model of the routes that leads to restaurant and heuristic table are given below. Apply best first search and find the search path.
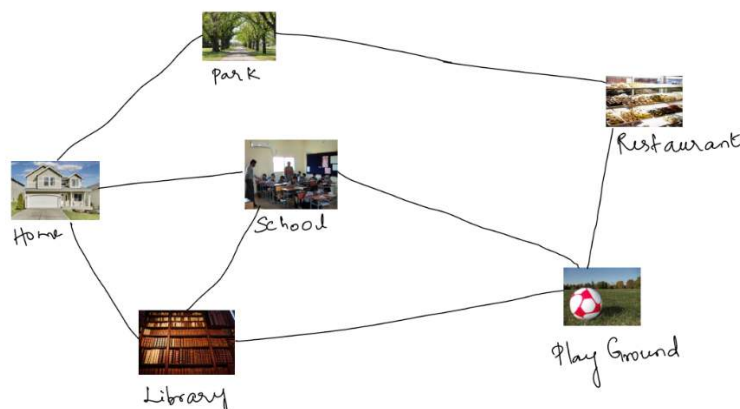
Home	85
Library	40
School	30
Park	35
Playground	45
Restaurant	0

5. Write a pseudocode for Hill Climbing search.
6. Consider 8 puzzle game where the initial state and goal state are given below. Find the energies of next states in simulated annealing.

Initial State: Goal State:

2	3	7
6	1	8
4	5	

1	2	3
4	5	6
7	8	

7. Explain in brief about the steps of Genetic algorithm.
8. What is Unification? Explain with an example.
9. List the steps of resolution. Assume that the Knowledge Base contains the following axioms/facts/conclusion.
   Knowledge Base:
   Facts/Axioms:
   1. All kids like ice cream.
   2. Ramu is a kid

Conclusion:

Ramu like ice cream

Prove the conclusion using resolution theorem.

10. Amit and Raghav are playing Tic-Tac-Toe game. The current instance is given below where X- Amit and O- Raghav. Give the heuristic function and conditions on heuristic value obtained from the heuristic function to decide the chances of winning the game by Amit and Raghav. The next turn to be played by Amit. Find the possible next states along with heuristic function for each state. Represent the current instance and next states using state space tree.

X	X	
O	O	
	O	X