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B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth Semester

18AIO351T - INTRODUCTION TO ARTIFICIAL INTELLIGENCE

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks) — Answer **all** Questions

		Marks	BL	CO
1.	Among the given options, which search algorithm requires less memory? (A) Optimal Search (B) Depth First Search (C) Breadth-First Search (D) Linear Search	1	2	1
2.	If a robot is able to change its own trajectory as per the external conditions, then the robot is considered as the_____ (A) Mobile (B) Non-Servo (C) Open Loop (D) Intelligent	1	2	1
3.	A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the_____ (A) Turing Test (B) Boolean Algebra (C) Logarithm (D) Algorithm	1	1	1
4.	Which agent deals with the happy and unhappy state? (A) Utility-based agent (B) Model-based agent (C) Goal-based Agent (D) Learning Agent	1	1	1
5.	Which algorithm is used in the Game tree to make decisions of Win/Lose? (A) Greedy Search Algorithm (B) DFS/BFS algorithm (C) Heuristic Search Algorithm (D) Min/Max algorithm	1	2	2
6.	In state-space, the set of actions for a given problem is expressed by the_____. (A) Intermediate States (B) Successor function that takes current action and returns next state (C) Initial States (D) Final state	1	1	2
7.	In artificial Intelligence, knowledge can be represented as_____. i. Predicate Logic ii. Propositional Logic iii. Compound Logic iv. Machine Logic (A) Both I and II (B) Only II (C) Both II and III (D) Only IV	1	2	2
8.	Which algorithm takes two sentences as input and returns a unifier? (A) Inference (B) Hill-climbing search (C) Unify algorithm (D) Depth-first search	1	1	2
9.	First order logic Statements contains_____. (A) Predicate and Preposition (B) Subject and an Object (C) Predicate and Subject (D) Perceive and Act	1	1	3

10.	Which of the given statement is true for Conditional Probability? (A) Conditional Probability gives 100% accurate results (B) Conditional Probability can be applied to a single event. (C) Conditional Probability has effect or relevance on independent events. (D) Conditional Probability has no effect or relevance on independent events.	1	2	3
11.	The devices that convert electrical energy into mechanical energy and are required for the rotational motion of the machines. (A) Electric Motors (B) Sensor (C) Muscles wire (D) Actuators	1	1	3
12.	What is the process of capturing the inference process as a single inference rule? (A) Ponens (B) Generalized Modus Ponens (C) Variables (D) Clauses	1	1	3
13.	Which of the following, is a component of an expert system? (A) a classifier (B) a regressor (C) a deep learning model (D) a knowledge base	1	1	4
14.	A graph that is used to represent for logic based on the semantic networks of artificial intelligence. (A) Knowledge Graph (B) Conceptual Graph (C) Weighted Graph (D) Reasoning Graph	1	1	4
15.	Which one is not an inference rule of propositional Logic. (A) Modus Tolens (B) Modus ponens (C) Universal Instantiation (D) Both A and B	1	1	4
16.	Which data Structure is used in the breadth first search of a graph to store nodes? (A) Stack (B) Tree (C) Queue (D) Array	1	2	4
17.	Which of the following is not an application of Breadth First Search? (A) Finding shortest path between two nodes (B) Finding bipartiteness of a graph (C) GPS navigation system (D) Path Finding	1	2	5
18.	_____ Is an algorithm, a loop that continually moves in the direction of increasing value – that is uphill. (A) up-hill search (B) hill-climbing (C) hill algorithm (D) reverse-down-hill search	1	1	5
19.	What is an auto-associative network? (A) a single layer feed-forward neural network with pre-processing (B) a neural network that has only one loop (C) a neural network that contains feedback (D) a neural network that contains no loops	1	1	5
20.	The rule state that if P→R is true whenever P→Q is true, and Q→R is true. (A) Modus Ponens (B) Modus Tollens (C) Hypothetical Syllogism (D) Disjunctive Syllogism	1	2	5

PART - B (5 × 4 = 20 Marks)

Answer **any 5** Questions

		Marks	BL	CO
21.	Explain Backtracking with any one suitable example.	4	2	1
22.	Explain the difference between Depth-first search and Depth-Limited first Search.	4	2	1
23.	Explain and draw stepwise Pseudocode of Unification with proper example.	4	2	2

		Marks	BL	CO
24.	Summarize the concept of FORWARD CHAINING and BACKWARD CHAINING with simple example.	4	2	2
25.	What is ROBOT? Explain their components in detail.	4	1	3
26.	Discuss briefly about Propositional logic with example.	4	2	4
27.	What is neural network? Discuss the steps involve in Neural networks.	4	1	5

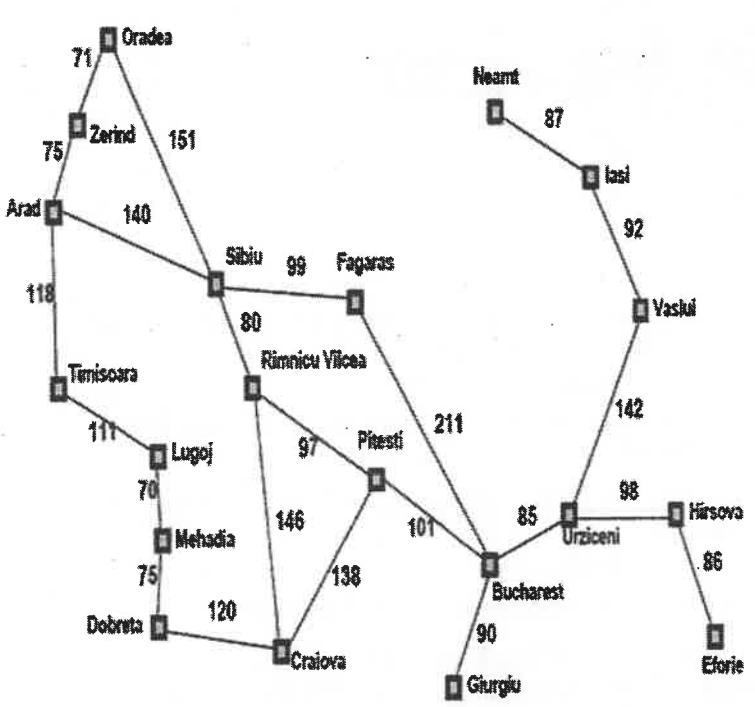
PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) Define Constraint Satisfaction Problems and solve the following problem using Crypt-Arithmetic Algorithm: BASE + BALL = GAMES.	12	3	1

(OR)

(b) Apply A* search to find the best path for the given Route map:

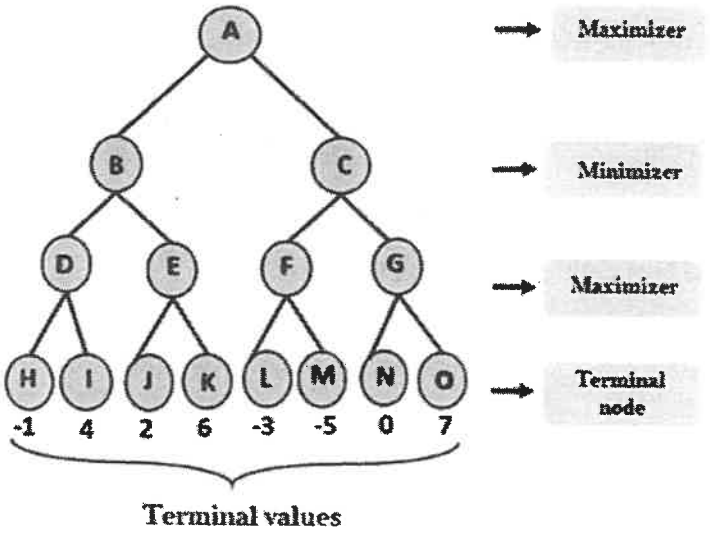


Straight-line distance to Bucharest	
Arad	366
Bucharest	0
Craiova	160
Dobreta	242
Eforie	161
Fagaras	178
Giurgiu	77
Hirsova	151
Iasi	226
Lugoj	244
Mehadia	241
Neamt	234
Oradea	380
Pitesti	98
Rimnicu Vilcea	193
Sibiu	253
Timisoara	329
Urziceni	80
Vaslui	199
Zerind	374

29. (a) Apply Unifier Algorithm to 12 3 2
i) Find the MGU of Q (a, g (x, a), f (y)), and Q (a, g (f (b), a), x)} (6 marks)
ii) Find the MGU OF {P(b, X, f (g(Z))) and P (Z, f (Y), f (Y))} (6 marks)

(OR)

(b) Calculate MAX MIN Algorithm Using Aplha and Beta Pruning



30. (a) Explain Architecture for intelligent agents and summarize Agent communication using PEAS with simple example. 12 2 3

(OR)

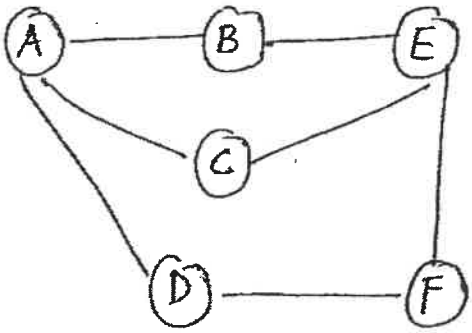
(b) What is Knowledge representation in AI? Discuss types of Knowledge representation in AI with example.

31. (a) Illustrate the Environment that describes Planning, Moving, Frames and Scripts in Artificial Intelligence. 12 2 4

(OR)

(b) Discuss about Knowledge based reasoning with suitable example.

32. (a) Explain Depth first search and Breadth First Search. (6 + 6) Marks 12 3 5
Solve the give problem using Depth first search – Breadth First Search.



(OR)

(b) Explain about Ant Colony Optimization and develop a pseudocode for Ant Colony Optimization with your own example.

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