P P SAVANI UNIVERSITY

Seventh Semester of B. Tech. Examination

December 2022

SECE4042 Artificial Intelligence

28.11.2022, Monday **Time: 10:00 a.m. To 12:30 p.m.** **Maximum Marks: 60**

Instructions:

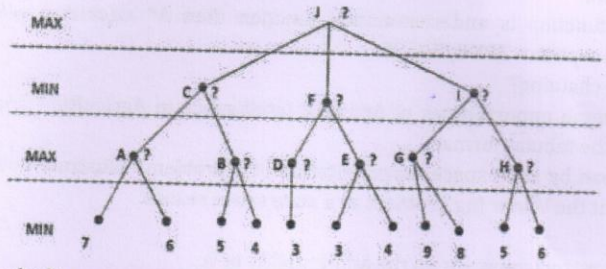
1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

			CO	BTL
Q - 1	Short Question/Fill in the Blanks (Any Five)	**[05]**		
(i)	State ONE merit of BFS as compared to DFS.		**2**	**2**
(ii)	A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the _____.		**1**	**1**
(iii)	When is A* an admissible algorithm?		**2**	**2**
(iv)	What is State space?		**2**	**1**
(v)	Give an example wherein Depth First Search is better than Iterative Deepening Depth First Search.		**2**	**4**
(vi)	If the heuristic function is underestimating function then A* algorithm will surely give optimal path. TRUE/FALSE		**1**	**1**
(vii)	What is Forward chaining?		**2**	**2**
Q - 2 (a)	Analyze the research opportunities of Artificial Intelligence in Agriculture and summarize it in the tabular format.	**[05]**	**3**	**4**
Q - 2 (b)	What do you mean by state space representation of a problem? Illustrate how you can represent the Water Jug problem as a state space search.	**[05]**	**2**	**3**
	OR			
Q - 2 (a)	Write A* algorithm and comment on the admissibility of it.	**[05]**	**2**	**2**
Q - 2 (b)	Analyze various heuristic functions for 8-puzzle problem. What is a dominant admissible heuristic for the 8 puzzle problem?	**[05]**	**3**	**4**
Q - 3 (a)	Explain Frame based knowledge representation technique with small example.	**[05]**	**3**	**3**
Q - 3 (b)	Consider the following facts. 1. Ravi likes all kinds of food. 2. Apples and chicken are food. 3. Anything anyone eats and is not killed is food. 4. Ajay eats peanuts and is still alive 5. Rita eats everything that Ajay eats. Prove by resolution that- "Ravi likes peanuts."	**[05]**	**3**	**5**
	OR			
Q - 3 (a)	Why we need heuristics? Justify your answer with suitable example.	**[05]**	**2**	**6**
Q - 3 (b)	Enlist different types of inference rules used in propositional logic. Explain any three rules in detail with example.	**[05]**	**2**	**2**
Q - 4	Attempt any one.	**[05]**		
(i)	Differentiate between forward reasoning and backward reasoning technique.		**2**	**4**
(ii)	Explain Bidirectional search technique with suitable example.		**2**	**2**

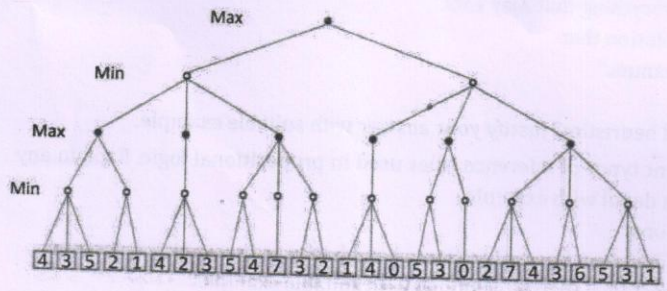
SECTION – II

Q - 1	MCQ/Short Question/Fill in the Blanks (Any Five)	**[05]**		
(i)	A bag 'A' contains 2 white and 3 red balls and a bag 'B' contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and is found to be red. The probability that it was drawn from bag 'B' is: (Assume that selection of bag is equally likely) a) 27/52 b) 3/5 c) 5/9 d) 25/52		**3**	**3**
(ii)	Enlist any two applications of neural network.		**1**	**3**
(iii)	Define fuzzy logic.		**1**	**1**
(iv)	How is dendrites from biological neurons relate with Artificial Neural Network?		**1**	**1**
(v)	Define Joint probability.		**2**	**1**
(vi)	Define Pragmatic analysis step in Natural Language processing.		**2**	**2**
(vii)	What is plausibility in Dempster Shafer theory?		**2**	**1**
Q - 2 (a)	Explain various phases of natural language processing in brief.	**[05]**	**2**	**2**
Q - 2 (b)	Explain Iterative deepening Depth first search with example.	**[05]**	**2**	**2**
	OR			
Q - 2 (a)	Describe any one application of Natural Language Processing in detail.	**[05]**	**3**	**3**
Q - 2 (b)	What do you mean by Fuzzy logic? Explain with example.	**[05]**	**3**	**5**
Q - 3 (a)	Consider the game tree below in which the first player is trying to maximize his score and the number at the leaves are the values returned by a static evaluator for the board positions reached.	**[05]**	**2**	**3**



You are asked to propagate numeric values up the parent at various levels using the minimax strategy. Show the numeric value for nodes A through J.

Q - 3 (b)	Explain neural network applications and recent developments.	**[05]**	**3**	**6**
	OR			
Q - 3 (a)	Consider the game tree of below figure, in which the static scores are from first player's point of view. Suppose the first player is maximizing player. Applying mini-max search, show the backed-up values in the tree. What move will the MAX choose? If the nodes are expanded from left to right, what nodes would not be visited using alpha-beta pruning?	**[05]**	**2**	**3**



Q - 3 (b)	Which types of problems can be solved using Bayesian network? Explain	**[05]**	**3**	**5**

usefulness of Bayesian network with proper example.

Q - 4	Attempt any one. **[05]**		
(i)	Write short note on single layer perceptron.	**2**	**2**
(ii)	Differentiate supervised learning, unsupervised learning and reinforcement learning with suitable example.	**2**	**4**

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CO : Course Outcome Number BTL : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create