Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019

Subject Code: 2180703 **Date: 27/11/2019**

Subject Name: Artificial Intelligence

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	Define the term "Artificial Intelligence". Explain how AI techniques improve real-world problem solving.	**03**
	(b)	What is the significance of the "Turing Test" in AI? Explain how it is performed.	**04**
	(c)	Enlist and discuss the major task domains of Artificial Intelligence.	**07**
Q.2	**(a)**	What is meant by "control strategy"? State the requirements of a good control strategy.	**03**
	(b)	Explain what is meant by "Production System" with respect to AI. Discuss the components of a Production System.	**04**
	(c)	Explain how a problem can be analyzed based on its characteristics. Analyze the game of "8-Puzzle" based on these characteristics.	**07**
		OR	
	(c)	Consider the Water Jug problem stated below: **Water Jug Problem:** "You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug? " Explain how this problem can be solved using State Space Search. Also, give the Production Rules to solve this problem and derive ONE feasible solution using the same.	**07**
Q.3	**(a)**	Explain why it is necessary to choose appropriate 'granularity' for knowledge representation.	**03**
	(b)	Differentiate between Breadth First Search and Best First Search.	**04**
	(c)	Explain the MiniMax search procedure for Game Playing using suitable example. What is the significance of Alpha and Beta cut-offs?	**07**
		OR	
Q.3	**(a)**	What is "iterative deepening"? How is it useful in time constrained search?	**03**

	(b)	Differentiate between Forward Reasoning and Backward Reasoning.	**04**
	(c)	Explain the algorithm for Steepest-Ascent Hill Climbing. Briefly describe the situations in which hill climbing may fail to find a solution.	**07**
Q.4	**(a)**	What is a heuristic? What care should you take while designing a heuristic function?	**03**
	(b)	Explain probabilistic inference in Bayesian Networks with the help of a suitable example.	**04**
	(c)	Consider the following facts: • Raghu likes all kinds of food. • Mangoes are fruit. • Cabbage is not fruit. • All fruits are food. Represent the above facts using Predicate Logic and use Resolution to prove that "Raghu likes Mangoes"	**07**

OR

Q.4	**(a)**	Explain the difference between Boolean and Fuzzy Set membership using a suitable example.	**03**
	(b)	Explain Problem Reduction using "AND-OR" graph.	**04**
	(c)	What is a "Semantic Net"? Illustrate 'property inheritance' in Semantic Network using "isa" and "instance" attributes.	**07**
Q.5	**(a)**	Enlist some applications of Neural Networks.	**03**
	(b)	Explain "Morphological Analysis" and "Syntax Analysis" in Natural Language Processing.	**04**
	(c)	Write Prolog programs to perform the following: i) Find the last element of a list ii) Merge two sorted integer lists L1 and L2 to generate a final sorted list L3. (For example, if L1= [1,3] and L2=[2,5,8], then L3=[1,2,3,5,8])	**07**

OR

Q.5	**(a)**	State the factors which may make understanding of natural language difficult for a computer.	**03**
	(b)	Write a note on non-monotonic reasoning.	**04**
	(c)	Demonstrate the use of 'cut' and 'fail' predicates in Prolog with the help of a suitable example.	**07**

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