

**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.

		<b>MARKS</b>
<b>Q.1</b>	(a) Define the term “Artificial Intelligence”. Explain how AI techniques improve real-world problem solving.	<b>03</b>
	(b) What is the significance of the “Turing Test” in AI? Explain how it is performed.	<b>04</b>
	(c) Enlist and discuss the major task domains of Artificial Intelligence.	<b>07</b>
<b>Q.2</b>	(a) What is meant by “control strategy”? State the requirements of a good control strategy.	<b>03</b>
	(b) Explain what is meant by “Production System” with respect to AI. Discuss the components of a Production System.	<b>04</b>
	(c) Explain how a problem can be analyzed based on its characteristics. Analyze the game of “8-Puzzle” based on these characteristics.	<b>07</b>
	<b>OR</b>	
	(c) Consider the Water Jug problem stated below: <b>Water Jug Problem:</b> “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.	<b>07</b>
<b>Q.3</b>	(a) Explain why it is necessary to choose appropriate ‘granularity’ for knowledge representation.	<b>03</b>
	(b) Differentiate between Breadth First Search and Best First Search.	<b>04</b>
	(c) Explain the MiniMax search procedure for Game Playing using suitable example. What is the significance of Alpha and Beta cut-offs?	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) What is “iterative deepening”? How is it useful in time constrained search?	<b>03</b>

	(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
<b>Q.4</b>	(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:	07
		<ul style="list-style-type: none"> <li>• Raghu likes all kinds of food.</li> <li>• Mangoes are fruit.</li> <li>• Cabbage is not fruit.</li> <li>• All fruits are food.</li> </ul>	
		Represent the above facts using Predicate Logic and use Resolution to prove that “Raghu likes Mangoes”	
		<b>OR</b>	
<b>Q.4</b>	(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
<b>Q.5</b>	(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:	07
		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])	
		<b>OR</b>	
<b>Q.5</b>	(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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