

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: **07**
- 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”
- 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: **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])
- 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**
