

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2024****Subject Code:3170716****Date:28-05-2024****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.
4. Simple and non-programmable scientific calculators are allowed.

			MARKS
Q.1	(a)	Define the term: Artificial Intelligence. State various applications of Artificial Intelligence.	03
	(b)	Enlist and briefly discuss the major task domains of Artificial Intelligence.	04
	(c)	Explain AI problem characteristics in detail.	07
Q.2	(a)	What is meant by control strategy? State the requirements of a good control strategy.	03
	(b)	Explain the nonmonotonic reasoning.	04
	(c)	Consider the water jug problem stated below: You are given two jugs, a 5-litre one and a 4-litre one. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2-litre of water into the 4-litre jug? Explain how this problem can be solved using State Space Search. Also, give the production rules to solve this problem and derive a feasible solution using the same.	07
OR			
	(c)	In the missionaries and cannibals problem, three missionaries and three cannibals must cross a river using a boat which can carry at most two people, under the constraint that, number of cannibals should be lesser than or equal to the missionaries on either side. The boat cannot cross the river by itself with no people on board. For the above mentioned problem, describe state space representation, actions, start and end state.	07
Q.3	(a)	Translate these sentences into formulas in predicate logic. 1. John likes all kinds of food. 2. Apples are food. 3. Chicken is food. 4. Anything anyone eats and isn't killed-by is food. 5. Bill eats peanuts and is still alive. 6. Sue eats everything Bill eats.	03
	(b)	Discuss the following terms with respect to fuzzy logic theory: - Membership function - Linguistic variable	04
	(c)	Write an objective of hill climbing method. Discuss any one type of hill climbing in detail with its algorithm.	07

OR

- Q.3** (a) Write the proposed solution(s) for the problems occurred in hill climbing. **03**
 (b) Explain the natural language processing steps in brief. **04**
 (c) Explain forward and backward reasoning with suitable example(s). **07**

- Q.4** (a) Explain problem reduction using “AND-OR” graph. **03**
 (b) Discuss goal stack planning in brief. **04**
 (c) Consider the following facts: **07**
 (1) Steve only likes easy courses.
 (2) Science courses are hard.
 (3) All the courses in the HaveFun department are easy.
 (4) BK301 is a HaveFun department course.
 Use resolution to answer the question “What course would Steve like?”

OR

- Q.4** (a) Write the basic differences between declarative and procedural knowledge. **03**
 (b) Solve the following cryptarithmic problem using constraint satisfaction. **04**
 L E O + L E E = A L L
 (c) Explain the minimax search procedure for game playing using suitable example. What is the significance of alpha-beta cut-offs? **07**

- Q.5** (a) Write a brief note on best-first Search. **03**
 (b) Write a prolog program to count the number of elements present in the given list. **04**
 (c) Discuss different types of learning in artificial neural networks. Also write the differences between/among them. **07**

OR

- Q.5** (a) State the factors which may make understanding of natural language difficult for a computer. **03**
 (b) Write a prolog program to demonstrate the use of cut and fail predicates. **04**
 (c) Explain Hopfield networks. **07**
