Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII • EXAMINATION – SUMMER • 2015

Subject code: 180703 **Date: 05/05/2015**

Subject Name: Artificial Intelligence

Time: 10.30AM-01.00PM **Total Marks: 70**

Instructions:

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

Q.1 **(a)** How problem characteristics help in the selection of AI technique? Explain these characteristics with possible examples. **07**

(b) Explain the method of Hill climbing. Also explain the problems associated with hill climbing and possible solutions. **07**

Q.2 **(a)** Consider the following initial and goal configuration for 8-puzzle problem. Draw the search tree for initial three iterations of A* algorithm to reach from initial state to goal state. Assume suitable heuristic function for the same. **07**

Initial state

	1	2
3	4	5
6	7	8

Goal state

1	2	3
8		4
7	6	5

(b) Write a Prolog program for finding a set, which is result of the intersection of the two given sets. **07**

Hint: Goal: intersect([1, 2, 3], [2, 3, 4], A)
A = [2, 3]
Goal: intersect([d, f, g], [a, b, c], X)
X = []

OR

(b) Write a Prolog program to merge two sequentially ordered (ascending) lists into one ordered list. **07**

Hint: Goal: merge([1, 3, 5, 7], [0, 2, 4, 6], L)
L = [0, 1, 2, 3, 4, 5, 6, 7]
Goal: merge([a, c], [b, d], [a, b, c, d])
Yes

Q.3 **(a)** Explain different approaches of knowledge representation. **07**

(b) Consider the following axioms: **07**

1. Anyone whom Mary loves is a football star.
2. Any student who does not pass does not play.
3. John is a student.
4. Any student who does not study does not pass.
5. Anyone who does not play is not a football star.

Prove using resolution process that "If John does not study, then Mary does not love John".

OR

Q.3 **(a)** Explain the steps of unification in predicate logic. Also discuss the steps of converting predicate logic wffs to clause form. **07**

	(b)	Explain following terms with reference to Prolog programming language: Clauses, Predicates, Domains, Goal, Cut, Fail, Inference engine	**07**
Q.4	**(a)**	Explain forward and backward reasoning in detail with suitable examples of each.	**07**
	(b)	What is nonmonotonic reasoning? Explain different subtypes of nonmonotonic reasoning in brief.	**07**
		OR	
Q.4	**(a)**	Define 'certainty factor'. How does certainty factor help in dealing with uncertainty? Explain with reference to rule based system.	**07**
Q.4	**(b)**	Explain followings:	
		(i) Sementic net	**3.5**
		(ii) Frames	**3.5**
Q.5	**(a)**	Explain goal stack planning in detail.	**07**
	(b)	Enlist the phases of natural language understanding. Describe the role of each phase in brief.	**07**
		OR	
Q.5	**(a)**	Explain perceptron learning algorithm for training a neural network. What are the limitations of this algorithm?	**07**
	(b)	Explain followings with reference to expert system:	
		(i) Expert system shell	**3.5**
		(ii) Knowledge acquisition	**3.5**

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