

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			Goal state		
	1	2	1	2	3
3	4	5	8		4
6	7	8	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: **07**
 Clauses, Predicates, Domains, Goal, Cut, Fail, Inference engine
- Q.4** (a) Explain forward and backward reasoning in detail with suitable examples of **07**
 each.
- (b) What is nonmonotonic reasoning? Explain different subtypes of **07**
 nonmonotonic reasoning in brief.
- OR**
- Q.4** (a) Define 'certainty factor'. How does certainty factor help in dealing with **07**
 uncertainty? Explain with reference to rule based system.
- 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 **07**
 each phase in brief.
- OR**
- Q.5** (a) Explain perceptron learning algorithm for training a neural network. What **07**
 are the limitations of this algorithm?
- (b) Explain followings with reference to expert system:
- (i) Expert system shell **3.5**
- (ii) Knowledge acquisition **3.5**
