Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VIII • EXAMINATION – SUMMER 2014

Subject Code: 180703 **Date: 27-05-2014**

Subject Name: Artificial Intelligence

Time: 10:30 am TO 01:00 pm **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)** Explain depth first search (DFS) and breadth first search (BFS) with suitable examples. **07**
Why is 'depth limited search' necessary in DFS?

(b) What do you mean by state space representation of a problem? Illustrate how you can **07**
represent following water jug problem as a state space search: There are two jugs
(without any measuring marks on them) of 4 and 3 liters capacity, respectively. There
is a tap of water to fill the jugs. The objective is to fill the 4-liter jug with exactly 2 liter
of water.

Q.2 **(a)** Translate these sentences into formulas in predicate logic. **07**
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.

(b) Convert the formulas derived in Q2(a) into clauses. Prove that John likes peanuts using **07**
resolution.

OR

(b) Using the formulas derived in Q2(a) prove John likes peanuts using forward chaining as **07**
well as backward chaining.

Q.3 **(a)** Answer following questions:
1. What do you mean by the problem of plateau occurring in hill climbing? How **02**
can it be solved?
2. Differentiate between declarative and procedural representation of knowledge. **02**
3. What do you mean by admissibility of an algorithm? Is A* algorithm an
admissible one? When?

03

(b) Consider the game tree of Fig. 1 in which the static scores are from first player's point **07**
of view. Suppose the first player is maximizing player. Applying mini-max search, show
the backed-up values in the tree. What move will the MAX choose? If the nodes are
expanded from left to right, what nodes would not be visited using alpha-beta pruning.

OR

Q.3 **(a)** Answer the following questions:
   1. 'Minimax is not good for game playing when the opponent is not playing **02** optimally.' Justify using suitable example.
   2. Explain AND-OR graphs.
   3. Represent following sentence using semantic net: `Sita gave the pearl garland to **02** Hanuman.'

   03
   (b) Explain Goal Stack planning using suitable example. **07**

Q.4 **(a)** Answer following questions:
   1. Explain abductive reasoning using example. **02**
   2. Justify using an example that Prolog uses Backward chaining to prove or **02** answer any given goal.
   3. Describe any one conflict resolution approach used in rule based systems. **03**
   (b) Explain simulated annealing algorithm. **07**

OR

Q.4 **(a)** Explain how list is used in Prolog. Discuss how following list-functions can be **07** implemented in Prolog:
   Checking membership of an item in a given list, concatenating two lists, and deleting an item in a given list.

Q.4 **(b)** What do you mean by constraint satisfaction problems? Explain constraint propagation **07** algorithm using suitable example.

Q.5 **(a)** Explain Hopfield networks. **07**
   (b) Explain Bayesian networks with example. **07**

OR

Q.5 **(a)** List various components of natural language understanding process. Describe syntactic **07** analysis and semantic analysis in brief.
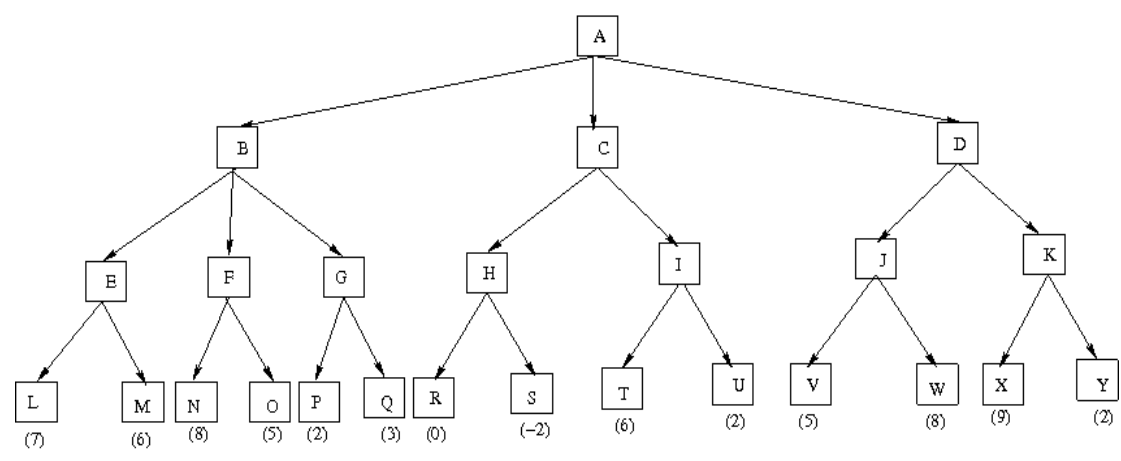   **(b)** Describe the expert system development procedure. **07**

Fig. 1 (Game tree for Question 3(b))

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