GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VIII.EXAMINATION – WINTER 2016

Subject Code: 180703   **Date: 22/10/2016**
Subject Name: Artificial Intelligence (Department Elective - II)
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.

Q.1 **(a)** Discuss following: **07**
       i.   Turing Test
       ii. State space of a problem
  (b) Analyze (a) 8-puzzle, (b) Chess and (c) Tower of Hanoi problems with respect   **07**
      to the following problem characteristics:
       i.   Is the problem decomposable?
       ii.   Can solution step be ignored?
       iii. Is the good solution absolute or relative?
       iv. Is the solution state or a path?
       v.   What is the role of knowledge?

Q.2 **(a)** Describe the components of a semantic net.   **07**
  (b) Consider the following sentences: **07**
      • Raj likes all kinds of food.
      • Apples are food.
      • Anything anyone eats and isn't killed by is food.
      • Sachin eats peanuts and is still alive.
      • Vinod eats everything Sachin eats.
    Now, attempt following:
      i. Translate these sentences into formulas in predicate logic.
      ii. Use resolution to answer the question, "What food does Vinod eat?"
<div align="center">OR</div>
  (b) What is wrong with the following arguments?   **07**
      • Men are widely distributed over the earth
      • Socrates is a man.
      • Therefore, Socrates is widely distributed over the earth.
    How should the facts represented by these sentences be represented in logic so
    that this problem does not arise?

Q.3 **(a)** Explain AO* algorithm with an example.   **07**
  (b) Enlist and Explain various phases involved in Natural Language Processing.   **07**
<div align="center">OR</div>
Q.3 **(a)** Explain non-monotonic reasoning in detail.   **07**

(b) Solve the Crypt – arithmetic problem with the following constraints. Give solution steps.   **07**

Constraints :- (i) Use decimal arithmetic
(ii) No two letters possess same digit.

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    C   R   O   S   S
+   R   O   A   D   S
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    D   A   N   G   E   R
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Q.4 (a) Explain how list is used in Prolog. Discuss how following list-functions can be implemented in Prolog: **07**
(a) Checking membership of an element in a given list, (b) concatenating two lists, and (c) deleting an element from a given list.
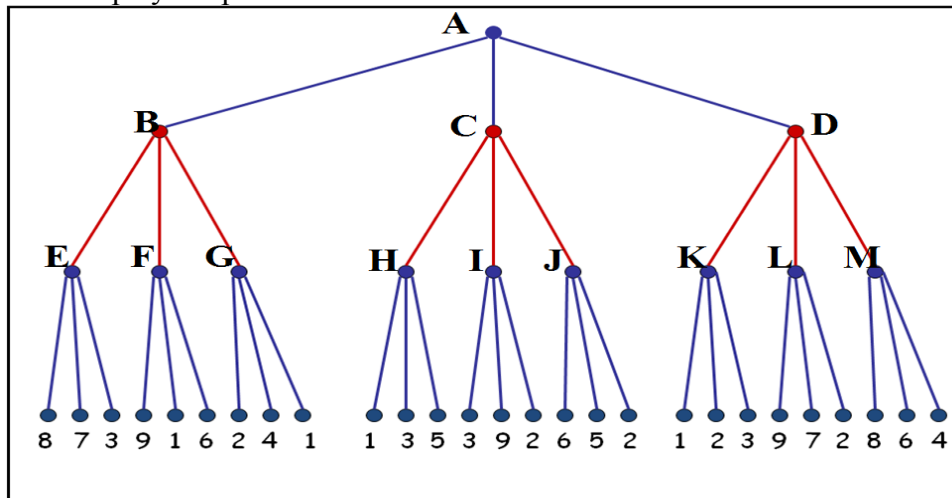
(b) Explain cut and fail predicate with example.   **07**

OR

Q.4 (a) Write a Prolog program to find factorial of a given number.   **07**

(b) Discuss Hill climbing and Simulated Annealing. State the differences between these two methods.   **07**

Q.5 (a) Consider the following 2 player game tree in which static scores are given from the first player's point of view: **07**

Suppose the first player is the maximizing player. What move should be chosen? Why? Use Mini-Max search to solve.
Also explain limitations of Mini-Max search. How to overcome them?

(b) Describe Expert System development procedure.   **07**

OR

Q.5 (a) Discuss perceptron learning algorithm for training a neural network. Also discuss different activation functions.   **07**

(b) Discuss following: **07**
    i.   Bayesian network
    ii. Fuzzy logic

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