Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1720203 **Date: 10/07/2012**

Subject Name: Artificial Intelligence

Time: 10:30 am – 13:00 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)** Define the importance of state space representation. Give the state space representation for the following problems. **07**

i. 8 puzzle ii. Tower of Hanoi

(b) Describe main features of genetic algorithm. State various applications which can be efficiently solved by genetic algorithm. **07**

Q.2 **(a)** Describe A* algorithm. Explain iterative deepening search and IDA* algorithm. **07**

(b) Define a good heuristic function and solve block world problem using Hill Climbing algorithm. **07**

OR

(b) Define a good heuristic function and solve 8 puzzle problem using Hill Climbing algorithm. **07**

Q.3 **(a)** Solve Tic-Tac-Toe using Minimax Search strategy. **07**

(b) Give the architecture of expert system and explain in detail the building blocks of expert system. **07**

OR

Q.3 **(a)** Explain Minimax Search algorithm; also describe how alpha beta cut off can improve search efficiency. **07**

(b) What is learning? Explain various learning techniques. **07**

Q.4 **(a)** Consider the following facts: **07**

i. The members of the Elm St. Bridge Club are Joe, Bill, and Ellen.
ii. Joe is married to Sally.
iii. Bill is Ellen's brother.
iv. The spouse of every married person in the club is also in the club.
v. The last meeting of the club was at Joe's house.

I. Represent these facts in predicate logic.
II. From the facts given above, would be able to decide on the truth of the following additional statements:
   1. The last meeting of the club was at Sally' house.
   2. Ellen is not married.

Can you construct resolution proofs to demonstrate the truth of each of these statements given the five facts listed above? Do so if possible. Otherwise, add the facts you need and then construct the proofs.

(b) Define reasoning process. Explain in detail symbolic and statistical reasoning. **07**

OR

Q.4 **(a)** What is resolution? Explain unification algorithm. Mention one example indicating how unification works. **07**

Q.4 **(b)** Explain the architecture of neural network. Give various application domains where neural networks have been successfully applied. **07**

Q.5 **(a)** Define the fuzzy set theory. How fuzzy sets are different from crisp sets? Give two examples. **07**

(b) Describe the learning process in neural network. **07**

OR

Q.5 **(a)** Explain Back Propagation algorithm in neural network. **07**

(b) What is defuzzification? Explain the methods defuzzification. **07**

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