Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–II EXAMINATION – SUMMER 2015

Subject Code: 2722314 **Date: 30/05/2015**

Subject Name: Artificial intelligence for Information Technology

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) **07**

1. Write the state space for maze. Maze is an area where it is difficult to find a way to come out once you have entered. **03**
2. For 8 puzzle problem, write all possible heuristics. Which of them are admissible heuristics if A* algorithm is applied? **04**

(b) For fuzzy room cooler, two parameters temperature and pressure decide the water flow rate. Fuzzy terms for temperature are ï cold, cool, moderate, warm, hot. Fan speed as ï Slack,Low,Medium,Brisk,Fast. The output of the system, which is the flow rate of the water controlled by the motorized pump, could be defined accordingly by another set of fuzzy terms ï Negative, Medium, Low-positive, Positive, High Positive. **07**

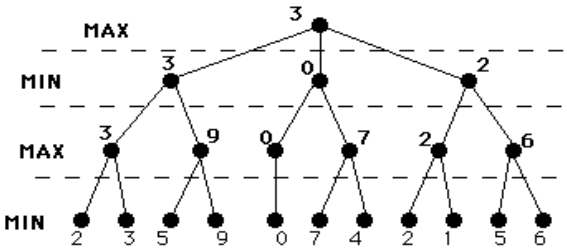
(i) Define the regions for both the input parameters, temperature and fan motor speed and output flow rate.

(ii) How degree of membership will be defined?

(iii) Write the fuzzy rules that takes input and determines output for above case.

(iv) Perform defuzzification if temperature is 42 degrees and fan speed is 31 rpm.

Q.2 (a) For what purpose alpha beta pruning is used? Explain alpha pruning and beta pruning. Explain alpha-beta prune of the hypothetical minimax search space shown below. **07**



(b) Which four properties should be possessed by a good system for the representation of knowledge in a particular domain? **07**

OR

(b) A problem solving search can proceed either forward or backward. What factors determine the choice of direction for a particular problem? If a problem solving search program were to be written to solve ñnatural language understandingò problem, determine whether the search should proceed forward or backward. **07**

Q.3 (a) Use the constraint satisfaction procedure to solve the cryptarithmetic problem: **07**

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  FOUR
+ FOUR
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 EIGHT
```

(b) **07**

(i) What can be done to improve the effectiveness of a search based problem solving program?

(ii) How the rule ñBirds typically flyò would be represented in symbolic reasoning?

OR

Q.3 **(a)** Consider the following set of propositions: **07**

Patient has spots
Patient has measles
Patient has high fever
Patient has Rocky Mountain Spotted Fever
Patient has an allergy

1. Create semantic net structure.
2. How can they be represented as frames?

(b) **07**

(i) Rolling two dice can generate which sums? How and which statistical reasoning terms can be applied to this exercise?

(ii) How to deal with uncertainty in rule based system?

Q.4 **(a)** Apply Bayesô theorem to the problem: Manaôs marriage is tomorrow. **07**

(i) In recent years, each year it has rained only for 10 days.

(ii) The weatherman has predicted rain for tomorrow.

(iii) When it actually rains, the weatherman correctly forecasts rains 90% of time.

(iv) When it doesnôt rain, the weatherman incorrectly forecasts rain 10% of the time.

Question : What is the probability that it will rain on the day of Manaôs wedding?

(b) Explain trend analysis and cyclical fluctuations with example. **07**

OR

Q.4 **(a)** Explain correlation and regression with example. **07**

(b) **07**

Mass	Length	class
10.0	6	Lorry
20.0	5	Lorry
5.0	4	Van
2.0	5	Van
2.0	5	Van
3.0	6	Lorry
10.0	7	Lorry
15.0	8	Lorry
5.00	9	Lorry

How do we construct a neural network that can classify any Lorry and Van? Write the perceptron learning rule.

Q.5 **(a)** Explain the concept of learning from examples. **07**

(b) Write the steps involved in developing an expert system and write the characteristics of Mycin. **07**

OR

Q.5 **(a)** Explain the concept of version spaces. **07**

(b) Explain supervised and unsupervised learning. **07**

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