

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014****Subject code: 1722308****Date: 23-06-2014****Subject Name: Soft Computing****Time: 02:30 pm - 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) What do you mean by soft computing? Describe the various applications of soft computing. **07**

(b) Give the difference(s) between fuzzy set and crisp set. Discuss various fuzzy set operations with examples. **07**

Q.2 (a) Discuss backpropagation networks in detail with algorithm and derive the necessary formulae. **07**

(b) What is the need of defuzzification? Describe any two defuzzification methods in detail with proper illustration(s). **07**

OR

(b) Discuss the various methods of selecting chromosomes for parents to cross-over in genetic algorithm. **07**

Q.3 (a) What is meant by hybrid system? Enlist and explain different types of hybrid system with neat sketches. **07**

(b) Is it mandatory to apply mutation operation after cross-over operation to solve a problem using genetic algorithm? Give proper justification. Also explain fitness function and working principle of genetic algorithm. **07**

OR

Q.3 (a) Solve travelling salesperson problem using genetic algorithm. **07**

(b) Write a detailed note on GA based weight determination. **07**

Q.4 (a) Explain the working of associative memory along-with μ -hetero ϕ and μ -auto ϕ correlators. **07**

(b) (1) Discuss fuzzy logic controller in brief with neat sketches. **04**

(2) Briefly explain neural network based fuzzy logic inference. **03**

OR

Q.4 (a) Write short note on : **07**

- Neuro-fuzzy hybrid system

- Neuro-genetic hybrid system

(b) Describe decomposition rules in FAM. **07**

Q.5 (a) (1) Find out max-min composition for the following two fuzzy relations R and S. **04**

$$R = \begin{bmatrix} 0.9 & 0.2 & 0.4 \\ 0.1 & 1.0 & 0.7 \end{bmatrix}$$

$$S = \begin{bmatrix} 0.9 & 0.2 \\ 0.1 & 1.0 \\ 0.4 & 0.6 \end{bmatrix}$$

(2) Enlist and explain various learning methods in artificial neural networks. **03**

(b) Discuss hand-written character recognition as an application using both neural network and fuzzy logic. Support your answer with neat sketches. **07**

OR

- Q.5** (a) Discuss fuzzy quantifiers and fuzzy inference in brief. Enlist the methods of fuzzy inference systems and describe any one method in brief. **07**
- (b) (1) What do you mean by linearly separable problem? Support your answer with proper illustration. **03**
- (2) Enlist and briefly explain various encoding methods in genetic algorithm. **04**
