

**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 hetero and auto 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**

$$R = \begin{bmatrix} 0.9 & 0.2 & 0.4 \\ 0.1 & 1.0 & 0.7 \end{bmatrix} \quad S = \begin{bmatrix} 0.9 & 0.2 \\ 0.1 & 1.0 \\ 0.4 & 0.6 \end{bmatrix}$$

**(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**

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