

**NEURAL NETWORKS AND FUZZY LOGIC**

Paper-ECO-14A

Time Allowed : 3 Hours]

[Maximum Marks : 75

**Note** : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

**UNIT-I**

1. (a) State and explain properties of fuzzy sets with example. 8
- (b) Write short notes on fuzzy propositions. 7
2. (a) With an example for each bring out the significance of the following as referred to Genetic Algorithm :  
(i) Fitness function, (ii) Reproduction, (iii) Roulette wheel selection, (iv) Cross Over, (v) Mutation Operator and (vi) Bitwise operators. 8
- (b) Mention the role of fitness function in Genetic Algorithm. 7

**UNIT-II**

3. (a) Explain characteristic features, limitations and applications of associative memory. 8



- (b) Explain basic architecture, working and analysis of adaptive resonance theory. 7
4. (a) Describe the basic steps of Genetic Algorithm used for solving optimization techniques. 7
- (b) With neat architecture, explain the training algorithm of Kohonen selforganizing feature maps. 8

### UNIT-III

5. (a) The discretized membership functions for a transistor and a resistor are given below : 8

$$\mu_T = \{0/0 + 0.2/1 + 0.7/2 + 0.8/3 + 0.9/4 + 1/5\}$$

$$\mu_R = \{0/0 + 0.1/1 + 0.3/2 + 0.2/3 + 0.4/4 + 0.5/5\}$$

Find the following :

- (i) Algebraic sum (ii) Algebraic product (iii) Bounded sum (iv) Bounded difference.
- (b) Discuss about the four modes of fuzzy reasoning. 7
6. (a) With suitable block diagram, explain the working principle of fuzzy inference system. 8
- (b) Discuss the design of FLC of a typical non-linear systems. 7

### UNIT-IV

7. (a) Design a fuzzy logic controller to simulate a temperature control system for a room. 8

- (b) Describe the basic steps of Genetic Algorithm used for solving optimization techniques. 7
8. (a) With suitable block diagram, explain the principle involved in a liquid level controller using neurofuzzy technique. 8
- (b) Explain in detail the concept of fuzzy genetic hybrid systems. 7

