

GUJARAT TECHNOLOGICAL UNIVERSITY**MCA - SEMESTER-VI • EXAMINATION – SUMMER 2013****Subject Code: 640009****Date: 31-05-2013****Subject Name: Soft Computing (SC)****Time: 10.30 am - 01.00 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) Give the comparative specifications of biological neuron and artificial neuron based on different criteria. Describe the M-P neuron characteristics and architecture. **07**
- (b) Explain the architectures of discrete BAM and Hopfield network. **07**
- Q.2** (a) Draw the architecture of Mexican hat and state its activation function with flowchart and training algorithm specification. **07**
- (b) What is fuzzy logic? Explain basic fuzzy set operations with example. **07**
- OR**
- (b) Define Artificial Neural Network with its characteristics and advantages. Describe any five applications of using the artificial neural networks. **07**
- Q.3** (a) Describe the Hebb neural network system with clear algorithmic explanation. Implement NOR function using Hebb net with (i) bipolar inputs and targets (ii) bipolar inputs and binary targets. **07**
- (b) Draw the architecture of back-propagation algorithm. Explain TDNN. **07**
- OR**
- Q.3** (a) Explain different training algorithms for pattern association nets. **07**
- (b) What is fuzzy rule based system? State various applications of fuzzy systems. Explain any one in detail. **07**
- Q.4** (a) What is the basic concept behind genetic algorithm? What is the need for encoding in genetic algorithm? Explain various encoding methods. **07**
- (b) Explain reproduction in genetic algorithm? **07**
- Explain various selection methods for reproduction in genetic algorithm.
- OR**
- Q.4** (a) What is genetic modeling? Explain mutation in genetic modeling. What is the need for mutation operator in genetic algorithm? **07**
- Q.4** (b) Explain perceptron networks. Describe the perceptron training algorithm with flowchart for single output class. How the network performance is tested? **07**
- Q.5** (a) Explain the basic components of soft computing. **07**
- (b) How Boltzmann machine used in constrained optimization problems? With a neat architectural diagram explain the application procedure used in Boltzmann machine. **07**
- OR**
- Q.5** (a) State the merits and demerits of Kohonen self-organizing feature maps. Construct a Kohonen self-organizing feature map to cluster four vectors [0 0 1 1], [1 0 0 1], [0 1 0 1], [1 1 1 1]. The maximum number of clusters to be formed is 2 and assume learning rate as 0.5. Assume random initial weights. **07**
- (b) Explain the basic architecture and operation of FLC with all steps. List out various applications of FLC system and explain any one of them. **07**
