Seat No.: _____ Enrolment No._____

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-propogation 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? Explain various selection methods for reproduction in genetic algorithm.	**07**
		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**

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