# GUJARAT TECHNOLOGICAL UNIVERSITY
## MCA Sem-VI Examination May 2011
### Subject code: 640009
### Subject Name: Soft Computing (SC)

Date:26/05/2011                                    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 are neurons? Give the difference between supervised and unsupervised learning in artificial neural network? **07**

**(b)** Explain defuzzification methods. **07**

**Q.2** **(a)** (i) Why mutation is done in genetic algorithm? Explain types of mutation. **04**
(ii) Explain two point crossover and uniform crossover in genetic algorithm. **03**

**(b)** Explain McCulloch-Pitts Neuron model and write disadvantage of it. **07**

**OR**

**(b)** Explain the structure of Boltzmann Machine. Why is it not proven useful for practical problems in machine learning or inference? **07**

**Q.3** **(a)** (i) What is the difference between autoassociative memory and Heteroassociative Memory? **04**
(ii) Explain the topology and learning in Bidirectional Associative Memory. **03**

**(b)** (i) Explain the genetic algorithm cycle of reproduction. **04**
(ii) Write benefits of genetic algorithm. **03**

**OR**

**Q.3** **(a)** (i) Explain Hebbian learning. **04**
(ii) Let $R$ be a *crisp relation* among the two sets $X$={dollar, pound, franc, mark} and $Y$={United States, France, Canada, Britain, Germany}, which associates a country with a currency. Represent it as a fuzzy relation using 2-dimensional membership array. **03**

**(b)** (i) Explain delta rule for pattern association. **04**
(ii) What is inheritance in genetic algorithm? **03**

**Q.4** **(a)** According to which rule each neuron updates its state in Hopfield network? What is the dynamic behavior of Hopfield network? **07**

**(b)** What is Simulated Annealing Used for? What is the structure of a Simulated Annealing Algorithm ? **07**

**OR**

**Q.4** **(a)** How fuzzy logic differs from crisp logic? How rules are defined in fuzzy rule base system. **07**

**(b)** How self organizing map is formed in unsupervised learning network? What is the advantage of Kohonen Self-Organizing Motor Maps? **07**

**Q.5** **(a)** Explain the back-propagation algorithm. **07**

**(b)** (i) Which neural network architecture is used for on line spell checking? **04**
Explain the architecture.
(ii) Which is the most common radial basis function? Explain that **03**
function.

**OR**

**Q.5** **(a)** Write fuzzy logic control system models. **07**
**(b)** (i) What is the role of fitness function in genetic algorithm? **04**
(ii) Explain binary encoding in genetic algorithm. **03**

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