



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.TECH (EE-CI)/SEM-1/CIM-103(B)/2012-13  
2012**

**SOFT COMPUTING TECHNIQUES**

Time Allotted : 3 Hours

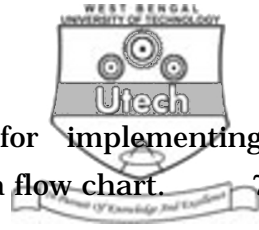
Full Marks : 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer Question No. **1** and any *four* from the rest.

1. a) Genetic algorithm is based on global stochastic search method. Justify. 2
- b) Genetic algorithm works with the coding of the parameter set. Justify. 2
- c) There is a fundamental difference between fuzzy relation and classical relation. Justify. 2
- d) What are the drawbacks of classical technique ? 2
- e) What are the drawbacks of expert system ? 2
- f) Define strong  $\alpha$  cut with reference to fuzzy set. 2
- g) What is feed forward neural network ? 2



2. a) Illustrate the programming steps for implementing simple binary genetic algorithm with a flow chart. 7
- b) Solve GA optimization for the function,  $y = x^2$ , over  $\{0, 1, 2, \dots, 30, 31\}$  subject to maximization problem. 7
3. a) Explain reinforcement learning with examples. 6
- b) Develop a perceptron for the AND function with bipolar inputs and targets. 8
4. a) What is meant by defuzzification ? Explain the different methods of defuzzification. 8
- b) What are the different fuzzy rule formats ? 6
5. a) Write down the training algorithm of Backpropagation network. 6
- b) Explain with suitable block diagram with operation of a fuzzy logic controller. 8
6. a) What do you understand by composition of two fuzzy sets ? 3
- b) Let set  $X$  and set  $Y$  be two fuzzy sets where
 
$$A = \frac{0.5}{x_1} + \frac{1}{x_2} + \frac{0.6}{x_3} \text{ and } B = \frac{0.5}{y_1} + \frac{0.3}{y_2}.$$

The preposition “if  $X$  is  $A$ , then  $Y$  is  $B$ ” is given. Now if “ $x$  is  $A'$ ” where

$A' = \frac{0.5}{x_1} + \frac{0.1}{x_2} + \frac{0.7}{x_3}$  derive a conclusion in the form “ $y$  is  $B'$ ”.

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7. Write short notes on any *two* of the following :  $2 \times 7$

- a) Kohonen Self Organizing Map
- b) Hopfield network
- c) Fuzzy expert system.

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