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 α 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 $\{ 0, 1, 2, \ldots , 30, 31 \}$ 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

   $A = \frac{0{\cdot}5}{x_1} + \frac{1}{x_2} + \frac{0{\cdot}6}{x_3}$ and $B = \frac{0{\cdot}5}{y_1} + \frac{0{\cdot}3}{y_2}$.

   The preposition "if X is A, then Y is B" is given. Now if "x is $A^{\prime}$" where

   $A^{\prime} = \frac{0{\cdot}5}{x_1} + \frac{0{\cdot}1}{x_2} + \frac{0{\cdot}7}{x_3}$ derive a conclusion in the form "y is $B^{\prime}$". 11

7. Write short notes on any *two* of the following : 2 × 7

   a) Kohonen Self Organizing Map

   b) Hopfield network

   c) Fuzzy expert system.