ROLL NO. _____

Code: CT79 **Subject: SOFT COMPUTING**

ALCCS

Time: 3 Hours **JUNE 2015** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1 a. What is a perceptron? Explain major features of single layer perceptron.

b. Compare features of soft computing paradigm with hard computing paradigm.

c. Describe Genetic Programming (GP). What is the advantage of GP over Genetic Algorithms?

d. Briefly describe the Takagi-Sugeno's fuzzy rules with example.

e. What role membership function plays in fuzzy logic? Describe Trapezoidal membership function.

f. Describe applications of Genetic Algorithms.

g. What is the purpose of using momentum term in error back-propagation algorithm in neural networks? **(7×4)**

Q.2 a. What is the necessity of activation function in neural networks? What are various activations functions used in neural networks? Explain any two in detail. **(10)**

b. Two fuzzy sets are given as A={(x1,0.2), (x2,0.7), (x3,1), (x4,0)}, B={(x1,0.5), (x2,0.3), (x3,1), (x4,0.1)}.
Obtain the disjunctive sum of A and B defined as $A \oplus B = (A \cap \sim B) \cup (\sim A \cap B)$. **(8)**

Q.3 a. Explain the concept of binary Hopfield network. **(9)**

b. What do you mean by defuzzification? State and define commonly used techniques needed for defuzzification. **(9)**

Q.4 a. Describe Kohonen Self Organizing Feature Maps and write its algorithm. Also, mention some of the applications of this network. **(10)**

b. Define linguistic variable with the help of an example. What do you mean by fuzzy quantization? **(8)**

Q.5 a. Describe Particle Swarm Optimization technique comparing it with continuous GA. Also, write the advantages of PSO. **(9)**

b. How rough set theory is different from fuzzy set theory? Explain rough sets approximations. **(9)**

Q.6 a. What do you mean by crossover in GA encoding? Describe various crossover operators with example. How mutation differs from crossover? **(10)**

b. What is genetic algorithm? Write down the basic genetic algorithm. **(8)**

Q.7 a. Why there is a need for hybridization to build intelligent systems? What are the main characteristics of neuro-fuzzy systems? **(10)**

b. Write a note on decision table for rough set based data analysis. **(8)**