

**B.TECH.****THEORY EXAMINATION (SEM-IV) 2016-17****INTRODUCTION TO SOFT COMPUTING (NEURAL NETWORK, FUZZY LOGIC & GENETIC ALGORITHM)***Time : 3 Hours**Max. Marks : 100**Note : Be precise in your answer.***SECTION – A****1. Attempt the following:****(10x2=20)**

- a) Artificial Intelligence can be used in Neural Network or not. Justify your answer.
- b) Write different applications of neural networks.
- c) What is Reinforcement Learning?
- d) What do you mean by convergence of GA?
- e) What is the significance of fuzzy Quantifier?
- f) Define the fuzzy inference.
- g) What is the Mutation?
- h) Use the Hebb rule to store the vector [1 1 1 -1] in an auto-associative neural network
- i) What is FLC?
- j) Write the benefit of GA.

**SECTION – B****2. Attempt any 5 parts from the following 8 parts:****(5x10=50)**

- a) Define an artificial neural network. State the characteristics of an artificial neural network.
- b) Discuss the factors affecting the training of back propagation neural network.
- c) Explain the different types of Operation used in Fuzzy Set with suitable examples
- d) Discuss the selection of Various parameter in BPN.
- e) What is Genetic Algorithm? Draw the general flow diagram of genetic algorithm.
- f) Differentiate between Roulette-wheel based on fitness and Roulette wheel based on ran with suitable example
- g) Find the weights required to perform the following classification using perceptron network. The vectors (1,1,1,1) and (-1,1,-1,-1) are belonging to the class (so have target 1), vectors (1,1,1,-1) and (1,-1,-1,1) are not belonging to the class (so have target value -1). Assume learning rate is 1 and weights is 0.
- h) What are different attributes of predicate logic? Using inference in predicate logic prove following statement
  - (i) All men are mortal
  - (ii) Socrates is a man
 Prove: Socrates is mortal

**SECTION – C****Attempt any 2 parts from the following:****(2x15=30)**

3. Explain the following Neural Network Architecture in Details:
  - (i) Rosenblatt's Perceptron Model
  - (ii) McCulloch- Pitts Model
4. Explain the Greg Voit's Fuzzy Cruise Controller
5. Use GA to solve the following non-linear programming problem:  
Minimize  $(x - 2.5)^2 + (y - 5)^2$  subject to  $5.5x + 2y^2 - 18 \leq 0, 0 \leq x, y \leq 5$ .