C9-R4: SOFT COMPUTING

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Differentiate between hard computing and soft computing.

b) What is Optimization? Explain ant colony optimization.

c) Explain the Genetic Algorithm cycle with example.

d) Explain fuzzy logic and fuzzy quantifiers with example.

e) Explain least square method for system identification.

f) Define Associative memory used in Neural network?

g) What is learning? Explain difference between learning and Training?

(7x4)

2.

a) How a fuzzy relation is converted into a crisp relation using lambda-cut process?

b) Determine the weights after one iteration for Hebbian learning of a single neuron network starting with initial weights w=[1,-1], inputs as X_1=[1,-2], X_2=[2,3], X_3=[1,-1] and C=1. Use bipolar activation function.

c) Train a perceptron network for learning a binary inputs and bipolar output OR gate function. Work out two complete iterations.

(6+9+3)

3.

a) Differentiate between Derivative Based Optimization and Derivative free Optimization. Give suitable example.

b) Explain hybrid learning algorithm with the help of suitable example.

(9+9)

4.

a) Differentiate between blind search and heuristic search.

b) How heuristics is included in hill climbing method. Explain three problems encountered in hill climbing.

c) Differentiate between Genetic Algorithm and traditional methods of problem solving.

(6+6+6)

5.

a) Whether a power set can be formed for a fuzzy set. Justify.

b) What are the various types of cross over and mutations technique?

c) State and explain hebb's learning rule for neural network.

(3+8+7)

6.

a) If the activation function of all hidden unit is linear, then show that MLP is equivalent to single layer perceptron.

b) Using Mc-Culloch Pitts neuron, implement a bipolar AND function. Assume initial weights to be [1, 1].

c) Write the characteristics and applications of Error Back propagation algorithms.

(7+7+4)

7.

a) Let the universe**,** X = {1,2,3,4} and 'small integers' be defined as, A={(1,1),(2,0.5),(3,0.4),(4,0.2)}. Let the fussy relation 'almost equal' is represented as, R:

	1	2	3	4
1	1	0.8	0	0
2	0.8	1	0.8	0
3	0	0.8	1	0.8
4	0	0	0.8	1

Find the membership function of the fuzzy set, B= 'rather small integers', if it is interpreted as the composition A o R.

b) Write short notes on following:

i) Neuro–Genetic System

ii) Fuzzy logic-controlled GA

c) Explain supervised and unsupervised learning with the help of example.

(9+5+4)