**SOFT COMPUTING**

**MODULE 1**

Q1) Define soft computing? Distinguish between soft computing and hard computing.

Q2) Distinguish between Supervised and Un-supervised learning

Q3) what is learning in neural networks? Differentiate between supervised and unsupervised learning.

**MODULE 2**

Q1) Explain Mc Culloch Pitts neuron model with the help of an example.

Q2) Explain linear separable and non-linearly separable pattern with example.

Q3) Explain error back propagation training algorithm with the help of a flowchart.

Q4) Explain hard limit and soft limit activation function

Q5) Prove the following:

(A) For unipolar continuous activation f ‘(net) = 0(1 –0).

(B) For bipolar continuous activation function f ‘(net) = 0(1 –02)/2

Q6) Explain learning vector quantization Algorithm.

Q7) how is LVQ working as a classifier? With a neat flow explain the working of LVQ?

Q8) what is self-organizing map? Draw and explain architecture of Kohonen Self organization Feature Map KSOFM.

Q9) Winner take all learning rule

Q10) Character recognition using neural network.

Q11) Flowchart of Single Discrete Perceptron Algorithm (SDPTA)

Q12) Four steps of Hebbian learning of a single neuron network is implemented starting with w1 = [1 –1] at the rate = 1, using the inputs given below: X1 = [1,–2] X2 = [0, 1] X1 = [2, 3] X1 = [1, – 1]

Find final weights for binary continuous activation function,

Q13) what are the types of neural processing?

Q14) Explain perceptron learning with the help of an example

Q15) Back Propagation Numerical (Dec-15)

**MODULE 3**

Q1) Design a fuzzy controller to determine the wash time of domestic washing machine. Assume that input is dirt and grease on clothes. Use three descriptors for input variables and five descriptors for out variables. Derive set of rules for control the action and defuzzification. The design should be supported by figures. Show if the clothes are soiled to larger degree the wash time will be more and vice versa.

Q2) Design a fuzzy controller for a train approaching or leaving a station. The inputs are the distance from the station and speed of the train. The output is the amount of brake power used. Use four descriptors each for inputs and output and design using mamdani fuzzy model. Derive set of rules for control action and defuzzification. The design should be supported by figures. Prove that if the train is at a short distance with great speed the brake power required would be very high and vice versa.

Q3) Explain any four defuzzification methods with suitable example.

Q4) Explain fuzzy extension principle with the help of an example.

Q5) what are the types of Fuzzy Inference Systems? Explain each with appropriate diagrams,

Q6) Define Support, Core, Crossover points, Normality and Convex Fuzzy sets.

Q7) Explain Mamdani type of fuzzy inference systems in detail.

Q8) Determine (Alfa) **α** -level sets and strong **α** -level sets for the following fuzzy set.

A= {(1, 0.2), (2, 0.5), (3, 0.8), (4, 1), (5, 0.7), (6, 0.3)}

Q9) the formation of algal solutions in surface water is strongly dependent on pH of water, temperature and 10 oxygen content. T is a set of water temperatures from a lake given by

T= (50, 55, 60) and 0 is oxygen content values in water given by 0 = (1, 2, 6) the fuzzy set of T is given by {0.7/50+0.8/55+0.9/60} and fuzzy set of 0 is given by {0.1/1+0.6/2+0.8/6)

(1) Find R = T × O for Given I = {0.5/50 + 1/55+ 0.7/60}

(2) Find S = 10 R using max-product composition

(3) Find S = I o R using max-min composition

**MODULE 4**

Q1) what are the features of hybrid system? Why is it required?

Q2) ANFIS

Q3) CANFIS

**MODULE 5**

Q1) Newton's Method in derivative based optimization

Q2) State differences between derivative based and derivative free optimization techniques?

Q3) Steepest Descent algorithm

**MODULE 6**

Q1) what are the different types of encoding, selection, crossover, mutations of GA. explain each type with suitable examples.

Q2) what are the steps in Genetic Algorithm? Explain examples the uniform crossover, tournament selection and mutation.