Roll No. ..... Total Pages : 3

BT-8/D-23 48316

SOFT COMPUTING

Paper : ECO-13A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each section.

SECTION–I

1. (a) Compare soft computing *vs.* hard computing. (5)
   (b) Why is the McCulloch Pitts neuron widely used in logic functions? (5)
   (c) Define net architecture and give its classification. (5)

2. (a) Discuss in detail the various types of activation function used in neural network with aid of graphical as well as mathematical representation and its output. (7)
   (b) Explain the single perceptron with its learning algorithm and its seperability and convergence property. (8)

SECTION–II

3. (a) Determine the weights of a single layer perceptron for implementing the AND function. Consider the inputs and targets to be bipolar and $\alpha = 1$. (7)

(b) Find the weights requires to perform the following classification using perceptron network. The vectors (1, 1, 1, 1) and (–1, 1, –1, –1) are belong to the class (so have target value 1) and vectors (1, 1, 1, –1) and (1, –1, –1, 1) are not belonging to class (so have target value –1). Assume learning rate as '1' & initial weight as '0'. (8)

4. (a) Draw the architecture of back propagation algorithm. What is a back propagation NN? What are the factors affecting back propagation training? (7)

(b) Explain with a neat diagram the neural network architecture of multilayer feed forward network. (8)

SECTION–III

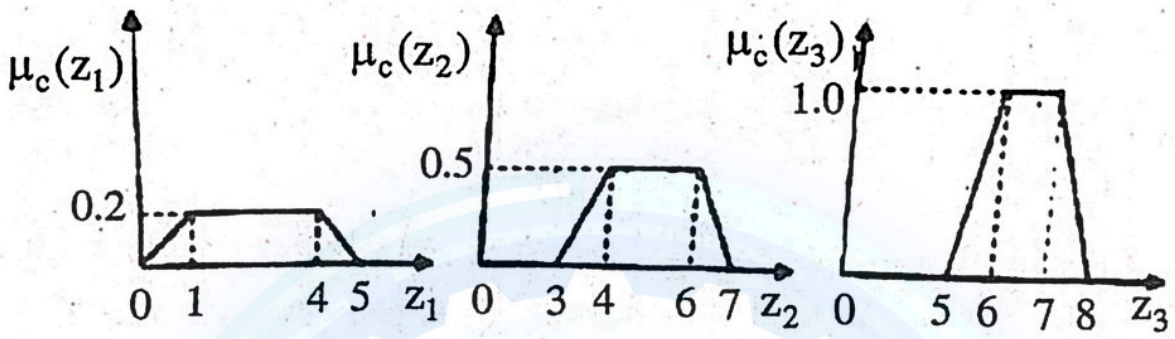
5. (a) Calculate (i) Complement (ii) Union (iii) Intersection (iv) Difference (v) De Morgan's Principles for the two given fuzzy sets

$$\underline{A} = \left\{\frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8}\right\}$$

$$\underline{B} = \left\{\frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8}\right\} \quad (8)$$

(b) Discuss about the four modes of fuzzy reasoning. With suitable block diagram, explain the working principle of fuzzy inference system. (7)

6. (a) The results of three implication processes are as shown in fig. Find the aggregated output and the defuzzified output using the (i) Center of gravity (ii) Center of sums and (iii) Weighted average methods (8)



(b) Differentiate between Mamdani FIS and Sugeno FIS. (7)

SECTION–IV

7. (a) How to implement particle swarm optimization for travelling salesman problem? (7)

(b) How are genetic algorithm utilized for optimizing the weights in neural network architecture? (8)

8. (a) What are the classifications of neuro-fuzzy hybrid systems? Explain in detail any one of the neuro-fuzzy hybrid systems. (8)

(b) Describe the architecture and algorithm of Support Vector machines. (7)