2055

B.E. (Electronics and Communication Engineering)

Eighth Semester

EC-810: Neural Networks and Fuzzy Logic

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt* <u>*five*</u> *questions in all, including Question No. which is compulsory and selecting two questions from each Section.*

x-x-x

Q 1(a)	Can we approximate any function using ANN? Comment on it.	(2)
(b)	What do you mean by Generalization?	(2)
(c)	What is bidirectional associative memory?	(2)
(d)	What is the use of linguistic hedges?	(2)
(e)	In which conditions, ReLU is preferred over Sigmoid activation function?	(2)

Section - A

Q2 (a) What is meant by activation function in an artificial neuron model? Describe the various activation functions that are employed and compare their merits and demerits? (5)

(b) Discuss the operation of single neuron system. A neuron j receives inputs from four other neurons whose activity levels are 10, -20, 4 and -2. The respective synaptic weights of the neuron j are 0.8, 0.2, -1.0, and -0.9. Calculate the output of neuron when neuron is linear. Assume that the bias applied to the neuron is zero. (5)

Q3 (a) Describe the different learning strategies used in RBF network. (5)

(b) What are feed forward networks? Explain by taking a simple example. (5)

Q 4 (a) Design a neural network to divide the product of a departmental store into two categories based on their Quality (High, Medium, Low) and Price ((High, Medium, Low). First categories contain product that are good purchase and second category contains product that are bad purchase. Explain the back propagation algorithm to determine weights in this case. (5)

(b) What is hyper parameter tuning? Explain the different hyper parameters that are tuned? (5)

Section -B

Q5 (a) What are self-organizing networks? Explain how weights are initialized and learned in these by using an example. (5)

(b) What are the assumptions to be made in a fuzzy control system design? Explain the steps in designing a fuzzy control system. (5)

Q6 (a) What is the role of membership function in fuzzy logic? Explain the de-fuzzification method of center of sums (5)

(b) What are bidirectional associative memory? How these can be used for pattern sequence encoding? (5)

Q7 (a) Construct a Hopfield network to associate 3x3 input images with dots and dashes. How many patterns other than dots and dashes are stable attractors? How much can the image of a dot (or dash) be corrupted while still allowing the network to retrieve a dot (or dash)? (6)

(b) Explain the associative memory model used for learning in detail. (4)

x-x-x