

2056
B.E. (Electronics and Communication Engineering)
Eighth Semester
EC-810: Neural Networks and Fuzzy Logic

Time allowed: 3 Hours

Max. Marks: 50

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

x-x-x

- Q.1a) Define activation function. Why is it important? (2×5)
- b) What is overfitting and underfitting?
 - c) What is meant by stability in a Hopfield network?
 - d) What is the principle of VQ?
 - e) What is winner-takes-all strategy?

Section - A

- Q.2a) What is a Perceptron? State its limitations. (4)
- b) What is BAM in neural networks? Differentiate between BAM and Hopfield network. (6)
- Q.3a) Compare threshold function and sigmoid function. (5)
- b) What is the connection between RBFN and interpolation theory? (5)
- Q.4a) Differentiate between auto-associative and hetero-associative memory. (5)
- b) What is linear separability? Give examples of linearly separable and non-separable problems. (5)

Section - B

- Q.5a) ART1 algorithm is used to cluster four vectors with 4 components ($n=4$) in each. If maximum number of clusters is 3, find bottom – up and top- down matrices corresponding to input vector (1,1,0,0). Select vigilance parameter as 0.4 and up-date parameter as 2 in update of bottom –up weights. Given initial top-down weight is 1 and initial bottom –up weights as $1/(1+n)$ (one half the maximum value allowed). (5)
- b) Explain how ART solves the stability-plasticity dilemma. (5)
- Q.6a) Explain stability and ordering phases in SOFM training. (5)
- b) What is a Mexican Hat function? How does it influence feature map formation? (5)
- Q.7a) $A = \{(x_1, 0.3), (x_2, 0.8)\}$, (5)
 $B = \{(y_1, 0.6), (y_2, 0.4)\}$
- Find the relation R ($A \times B$).
- b) Explain tolerance and compatibility relations. (5)

x-x-x