

2062

B.E. (Electronics and Communication Engineering)
Eighth Semester
Elective – II & III
EC-810: Neural Networks and Fuzzy Logic

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Part.

x-x-x

1. Answer in brief and to the point: 1x10
- a). Differentiate between biological and artificial neuron.
 - b). What is the purpose of training of neural network.
 - c). What is the physical significance of linear separability?
 - d). Discuss the role of hidden layers.
 - e). Can we use single layer network for function approximation? Discuss.
 - f). How ANN based memory is different from computer memory.
 - g). Discuss specific characteristics of ART network.
 - h). Explain the concept of competitive learning. *WTA*
 - i). Giving suitable example, describe membership function. *SCB*
 - j). What are basis for deciding number of fuzzy rules?

PART A

2. (a) Derive model of artificial neuron from biological neuron. 05
- (b) Is associative memory different from content addressable memory? Justify your answer. 05
3. (a) Discuss any two unsupervised learning rules for single layer neural network. 05
- (b) With the help of an appropriate numerical example, explain how the Hopfield network is designed and contents are retrieved. 05
4. (a) Give flow diagram of Back Propagation Algorithm for training of three layer ANN and explain each step. 05
- (b) Write short technical note on 'Classical AI and Neural Network'. 05

PART B

5. Consider two fuzzy sets A and B defined in the universe {1,2,3,4,5,6} are given by:
- $$A = \left\{ \frac{0.1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5} \right\} \text{ and } B = \left\{ \frac{0.5}{2} + \frac{0.7}{3} + \frac{0.8}{4} + \frac{0.4}{5} \right\}$$
- Find: i) $A \cup B$ ii) $A \cap B$ iii) $A \setminus B$ iv) $\overline{A \cup B}$ v) $\overline{B \cap A}$
- Discuss physical interpretation of each operation with the help of suitable examples. 10
6. (a) Give architecture of ART1 network and discuss under what conditions a new cluster is created. 05
- (b) Draw simplified architecture of Mexican Hat Network and explain its working. Here what does 'Mexican Hat' term signify? 05
7. Write technical notes on:
- (a) Defuzzification techniques *F-to-C* 05
- (b) SOFM algorithm. *K-SOFM* 05

x-x-x

