

1079
B. Engg. (Computer Science and Engineering)
7th Semester
CS-705B (Elective-III): Neural Networks

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Q. No. 1 (Section-A) which is compulsory and selecting atleast two questions each from Section-B & C.

**_*_

Section-A		
Q1.	a) Define artificial neuron. List some applications of Artificial neural network. b) What are activation functions? Give two examples with graphical representation. c) Compare and contrast Hebbian and competitive learning mechanism. d) Why is gradient descent method adopted to minimize error? e) What are the various ways to realize competition in neural networks?	10
Section-B		
Q2.	a) Design neural networks that implements these logic operations: (i) NOT (x1); (ii) OR (x1, x2) where x1 and x2 belongs to {0, 1}.	5
	b) What is the appropriate choice for the learning rate in perceptron learning algorithm? Explain some general rules? Justify the cases of too high and too small learning rates.	5
Q3.	a) What is meant by linear separability? Explain a problem which is not linear separable and suggest a method to solve it.	5
	b) Discuss Multi-class classification using multi-layered perceptron with help of suitable example.	5
Q4.	a) Name three different types of loss functions? Discuss Least Mean Squares algorithm.	5
	b) Write a short note on Unconstrained optimization.	5
Section-C		
Q5.	a) Construct a Kohonen self-organizing feature map to cluster four vectors [0 0 1 1], [1 0 0 1], [1 0 1 1], [1 1 1 1]. The maximum number of clusters to be formed is 2 and assume learning rate as 0.5. Assume random initial weights.	6
	b) Explain the Hebb rule training algorithm used in pattern association.	4
Q6.	a) Draw the architecture of Mexican hat and state its activation function.	5
	b) Explain how the weights are determined in Radial Basis Functions Network?	5
Q7.	a) A hetero associative network is given. Find the weight matrix and test the network with training input vectors. s1 = (1, 1, 0, 0) t1 = (1, 0) s2 = (0, 1, 0, 0) t2 = (1, 0) s3 = (0, 0, 1, 1) t3 (0, 1) s4 = (0, 0, 1, 0) t4 (0, 1)	6
	b) Write a short note on Hebbian-based Principle component analysis.	4