2021
B.E. (Computer Science and Engineering)
Seventh Semester
Elective – III
CS-705B: Neural Networks

Time allowed: 3 Hours   Max. Marks: 50

NOTE: Attempt _five_ questions in all, including Question No. I (Section-A) which is compulsory and selecting two questions from each section B-C.

x-x-x

	Section-A	
Q1.	a) Differentiate between AI and neural network.	10
	b) Compare MLP and RBF.	
	c) How Hebbian learning is used in neural network?	
	d) Compare linear separability and non-separability in neural network.	
	e) List main features of Self Organizing Map that can help to analyze business data in a data warehouse?	
	Section-B	
Q2.	a) Compare following learning mechanism:	4
	i) Competitive ii) Boltzmann	
	b) Solve 3-input NAND gate and 3-input NOR gate realizations using McCulloch Pitts.	6
Q3.	a)What are the difficulties in applying gradient descent?	3
	b) List various heuristics for Back-Propagation algorithm.	3
	c)Write short note on Least Square Filters.	4
Q4.	a) One possible weight update equation for artificial neural network training is: $$\Delta w_{kl} = \eta \sum_{p}(targ_l - out_l).f'(\sum_{n} in_n w_{nl}).in_k$$ Describe in words what the various symbols, parameters and variables in it refer to, and how this equation might have been derived. Sufficient assumptions can be made.	6
	b) Write and explain initialization, activation, computation of actual response adaptation of weight vector and continuation operations of perceptron convergence theorem.	4
	Section-C	
Q5.	a) Construct an auto-associative network to store vector [1 1 -1 +1]. Use iterative auto-associative network to test the vector with three missing elements.	6
	b)Define competitive learning network. Explain various components of competitive learning network.	4
Q6.	a)Describe in detail how we can carry out dimensionality reduction using Principle Component Analysis.	5
	b)What is meant by the term Vector Quantization using Self Organizing Map?	5
Q7.	a)Define Radial basis function network. What is the main advantage of Radial Basis Function (RBF) network over a Multi-Layer Perceptron (MLP) network carrying out the same function?	5
	b) Construct a Max net with four neurons and inhibitory weights $E = 0.25$ when given the initial activations (input signals). The initial activations are $a_1(0) = 0.1$, $a_2(0) = 0.3$, $a_3(0) = 0.4$, $a_4(0) = 0.7$.	5

x-x-x