

Tribhuvan University
Institute of Science and Technology

2081



Master Level / 1 Year/ 1st Semester/ Science
Computer Science and Information Technology (C.Sc. 543)
(Neural Networks)

Full Marks: 45
Pass Marks: 22.5
Time: 2 hours.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

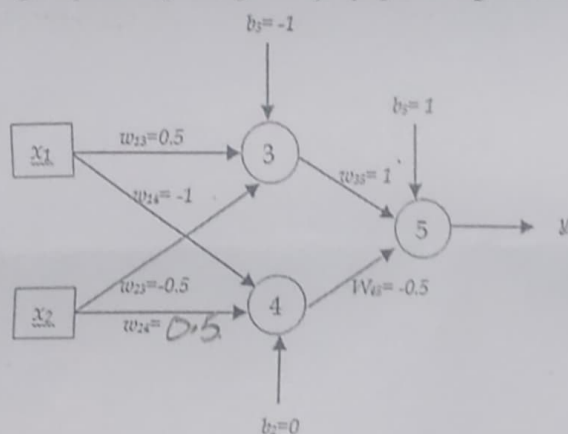
Section A

Long answer questions:

Attempt any two questions.

(2×10=20)

1. Consider a MLP given below. Let the learning rate be 0.5. The initial weights of the network are given in the figure. Assume that first training tuple is (0.4, 0.6) and its target output is 0. Calculate weight updates by using back-propagation algorithm. Assume tanh activation function. (10)



2. Derive weight update rule of BPTT and write down its algorithm. (7+3)
3. Devise a RBF neural network for XOR function using (0,0) and (1,1) as cluster centers. (10)

Section B

Short answer questions:

Attempt all questions.

(5×5=25)

4. Discuss about ReLU, Leaky ReLU and Softmax activation functions used in neural networks. (5)
5. Fit a cubic curve through the following data using gradient descent. Show one epoch of computation. (5)

x	1	3	4	6
$y=f(x)$	2	32	71	227

6. Discuss the concept of batch perceptron algorithm and derive weight update rule for the algorithm. (1+4)
7. Why kernel methods are important in SVM? Discuss various types of kernels briefly. (1+4)

C.Sc 543-2081 ☆

8. Construct an LVQ net with five vectors assigned to two classes. Given vectors along with classes is shown below. (5)

Vector	[0,0,0]	[1,0,1]	[0,0,1]	[1,1,0]	[1,0,1]
Class	1	2	1	2	2

W

$$w_{ij} + \alpha (no - w_{ij})$$