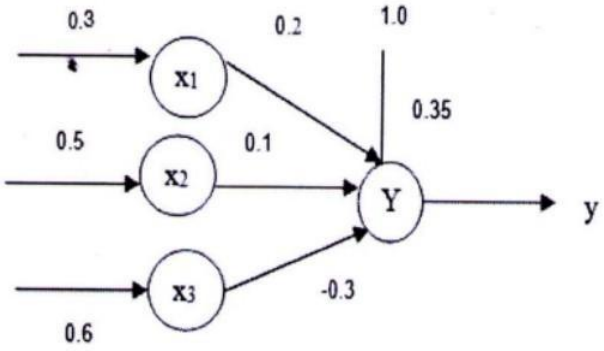
Name	
PRN No.	
Signature	

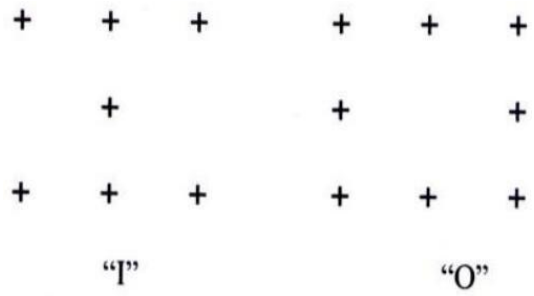
Series Test	1	Year/Semester	4th Year-Semester 8
Subject	CST444-SOFT COMPUTING	Branch	CS
Date of Exam	14 Jan 2026	Duration	
Starting Time		Max. Marks	15
Instructions to Students :			

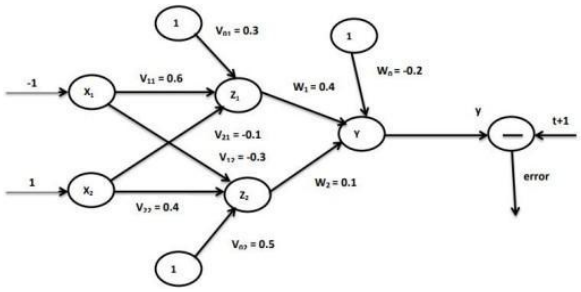
The roll numbers mentioned below are required to answer the corresponding questions.

Roll No.	Question No.
1-5	1
6-10	2
11-15	3
16-20	4
21-25	5
26-30	6
31-35	7
36-40	8
41-45	9
46-50	10
51-55	11
56-60	12

Answer 1 out of 12 question(s)					
Q.No			Marks	CO	Level
1	a	Using the Hebb rule, find the weights required to perform the following classifications: Given that the vectors (1, 1, 1, 1) and (-1, 1, -1, -1) are the members of the same class (target 1), and the vectors (1, 1, 1, -1) and (1, -1, -1, 1) are the members of another class (target -1).	8	CO2	L3
	b	Calculate the output of the neuron for the following network using 1. Binary sigmoidal activation function 2. Bipolar sigmoidal activation function. 	7	CO1	L3
2	a	Using the Hebb rule, find the weights required to perform the following classifications: Given that the vectors (1, 1, 1, 1) and (-1, 1, -1, -1) are members of the same class (target 1), and vectors (1, 1, 1, -1) and (1, -1, -1, 1) are not members of the class (target -1).	8	CO2	L3
	b	Implement the following logical function using the M-P neuron. Use binary data representation. 1. AND 2. OR 3. XOR	7	CO1	L3

3		Using the Hebb rule, find the weights	15	CO2	L3

		required to perform the following classifications of the given input patterns shown in the figure. The “+”' symbols represent the value "1" and space indicates "-1". Consider “1” belongs to the members of the class (so has target value 1) and "0" does not belong to the members of the class (so has target value -1).  			
4	a	Given two classes, A and B, with input vectors: A1 = (1, −1, 1, −1), A2 = (−1, −1, −1, −1), B1 = (1, 1, 1, 1), B2 = (−1, 1, −1, 1). Apply the Hebbian learning rule to find the weights that classify A vectors as target 1 and B vectors as target -1.	8	CO2	L3
	b	Design a Hebb net to implement the following logical function: Use bipolar inputs and targets. 1. AND 2. OR 3. XOR	7	CO1	L3
5		Find the weights required to perform the following classifications of given input patterns using the Hebb rule. The inputs are "1" where "+" symbol is present and " -1 " where "." is present. The "L" pattern belongs to the class (target value +1) and the "U" pattern does not belong to the class (target value -1).	15	CO2	L3

		+ . . + . + + . . + . + + + + + + + "L" "U"			
6		Classify the input patterns shown in the figure using the Hebb training algorithm. The inputs are "1" where "+" symbol is present and " -1 " where "." is present. The "L" pattern belongs to the class (target value +1) and the "U" pattern does not belong to the class (target value -1). + + + + + + + . + + . . + + + + + + + . + + . . + . + + + + "L" "U"	15	CO2	L3
7		Using the back-propagaon network, find the new weights for the network shown in the figure. It is presented with the input pattern [-1, 1], and the target output is 1. Use a learning rate α = 0.25 and binary sigmoidal activation function. 	15	CO2	L3

8	a	Find the weights using the perceptron network for ANDNOT function when all the inputs are presented only once. Use bipolar inputs and targets.	10	CO2	L3
	b	How is the training algorithm performed in back-propagation neural networks?	5	CO1	L2
9	a	Implement the AND logic function using the perceptron network algorithm for bipolar inputs and targets.	10	CO1	L3
	b	Define perceptron learning rule.	5	CO1	L1
10	a	Implement OR function using the perceptron training algorithm with binary inputs and bipolar targets.	10	CO2	L3
	b	Explain the training algorithm used for a perceptron network with single output classes.	5	CO1	L2
11	a	Use Adaline network to train OR function with bipolar inputs and targets. Perform two epochs of training.	10	CO2	L3
	b	Explain the training algorithm used in adaptive linear neurons.	5	CO1	L2
12	a	Use an Adaline network to train AND NOT function with bipolar inputs and targets. Perform two epochs of training.	10	CO2	L3
	b	State the concepts of the delta rule used in adaptive linear neurons.	5	CO1	L2

CO1 : Describe so computing techniques and the basic models of Artificial Neural Network

CO2 : Solve practical problems using neural networks

***Level**: Knowledge level based on Bloom's Taxonomy

[L1. Remembering, L2. Understanding, L3. Applying]