

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2026

B. Tech Program: B.Tech AIDS Scheme :III

Regular Examination:TY Semester:VI

Course Code: AIC601 and Course Name: Artificial Neural Network

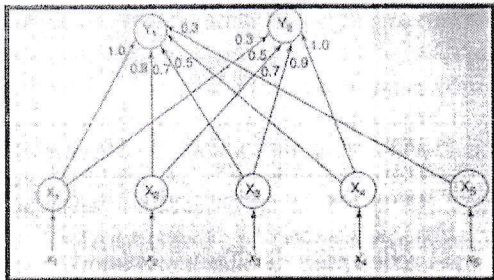
Date of Exam: **18/5/26**

Duration: 02.5 Hours

Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Differentiate Biological neuron and Artificial Neuron Network		CO1	U
b)	Give advantages and disadvantages of Associative memory network		CO5	U
c)	Explain step by step Handwritten Digit recognition in details		CO6	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Explain the stages of the Self-Organizing Map learning algorithm?		CO2	U
b)	write note on Widrow Hoff Rule		CO3	U
c)	Write training algorithm for Hebbian learning rule		CO4	U
Q.3	Solve any two questions out of three. (10 marks each).	20		
a)	Consider KSO net with two clusters and five input units. The weight vector for the cluster units are given by $w_1 = [1.0 \ 0.9 \ 0.7 \ 0.5 \ 0.3]$, $w_2 = [0.3 \ 0.5 \ 0.7 \ 0.9 \ 1.0]$. Use the square of the Euclidean distance to find the winning cluster unit for the input pattern $x = [0.0 \ 0.5 \ 1.0 \ 0.5 \ 0.0]$. Using a learning rate of 0.25, find the new weights for the winning unit. 		CO4	Ap
b)	a) Explain ELU activation function and limitation of ELU function. b) Calculate the output of neuron Y for the net shown below using binary and bipolar sigmoidal activation.		CO1	AP

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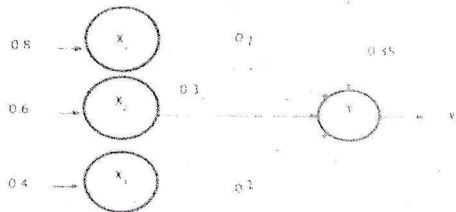
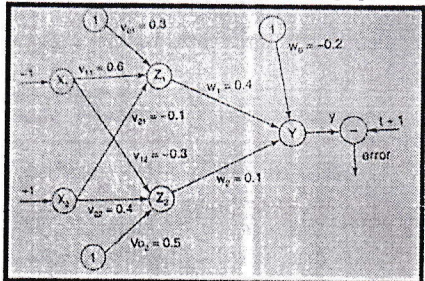
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c)	Train the Hetro-associative memory network using outer product rule to store input row vectors-(s1, s2, s3, s4) to the output row vector t-(t1, t2). The bipolar vector pairs are as given in the table and then test the performance of the network with missing and mistaken data in the test vector. <table border="1" data-bbox="347 821 927 1012"><thead><tr><th></th><th>s1</th><th>s2</th><th>s3</th><th>s4</th><th>t1</th><th>t2</th></tr></thead><tbody><tr><td>1st</td><td>1</td><td>-1</td><td>-1</td><td>-1</td><td>-1</td><td>1</td></tr><tr><td>2nd</td><td>1</td><td>1</td><td>-1</td><td>-1</td><td>-1</td><td>1</td></tr><tr><td>3rd</td><td>-1</td><td>-1</td><td>-1</td><td>1</td><td>1</td><td>-1</td></tr><tr><td>4th</td><td>-1</td><td>-1</td><td>1</td><td>1</td><td>1</td><td>-1</td></tr></tbody></table>		s1	s2	s3	s4	t1	t2	1 st	1	-1	-1	-1	-1	1	2 nd	1	1	-1	-1	-1	1	3 rd	-1	-1	-1	1	1	-1	4 th	-1	-1	1	1	1	-1	CO5	AP
	s1	s2	s3	s4	t1	t2																																
1 st	1	-1	-1	-1	-1	1																																
2 nd	1	1	-1	-1	-1	1																																
3 rd	-1	-1	-1	1	1	-1																																
4 th	-1	-1	1	1	1	-1																																
Q.4	Solve any two questions out of three. (10 marks each)																																					
a)	Explain step by step Diabetes prediction process using ANN.	CO6	U																																			
b)	Using BPN, find the new weights for the net shown. It is presented with the input pattern [-1,1] and the target output is +1. Use a learning rate $a=0.25$ and bipolar sigmoidal activation function. The initial weights are $[v_{11} \ v_{21} \ v_{01}]=[0.6-0.1 \ 0.3]$. $[V_{12} \ V_{22} \ V_{02}]=[-0.3 \ 0.4 \ 0.5]$ and $[w_1 \ w_2 \ w_0]=[0.4 \ 0.1-0.2]$ 	CO3	AP																																			
c)	Using the Hebb rule, find the weights required to perform the following classifications of the given input patterns "L" and "U". The pattern is shown as 3x3 matrix form in the squares. The "+" symbols represent the value "1" and the empty squares indicate "-1". Consider "L" belongs to the members of class (so has target value 1) and "U" does not belong to the members of class (so has target value -1).	CO2	AP																																			