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

July – Aug. 2024-25	
(B. Tech) Program: B.Tech. AI-DS Scheme IIB	
Supplementary Regular Examination: TY Semester: VI	
Course Code: AIC601 and Name: Artificial Neural Network	
Date of Exam: 29/07/2025 — Duration: 2.30 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)**			
a)	Why is learning important in ANN? Explain it with an example?	10	CO2	U
b)	State the testing algorithm for Perceptron Network.		CO3	U
c)	Explain different topologies used in Self Organizing Map.		CO4	U
Q 2	**Solve any two questions out of three: (05 marks each)**			
a)	Explain any five applications of Adaline networks in details	10	CO3	U
b)	Explain SOM learning algorithm with example.		CO4	U
c)	Explain how the expert system is used for low back pain diagnosis.		CO6	U
Q.3	**Solve any two questions out of three. (10 marks each).**			
a)	Design a Hebb net to implement logical OR function (use bipolar input and targets)	20	CO2	Ap
b)	Construct an autoassociative network to store the vectors x1=[1 1 1 1 1], x2=[1 -1 -1 1 -1], x3=[-1 1 -1 -1 -1]. Find weight matrix with no self-connection. Calculate the energy of the stored patterns. Using discrete Hopfield network test patterns if the test pattern are given as x1=[1 1 1 -1 1], x2=[1 -1 -1 -1 -1] and x3=[1 1 -1 -1 -1]. Compare the test patterns energy with the stored patterns energy.		CO5	Ap
c)	Explain following terminology related to neural network with example, 1.Weight 2. Bias 3. Threshold 4. Learning Rate 5. Momentum factor		CO1	U

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Q.4	Solve any two questions out of three. (10 marks each)			
a)	Train the hetroassociative memory network using outer product rule to store input row vector $s=(s_1, s_2, s_3, s_4)$ to the output row vector $t=(t_1,t_2)$, use vector pair as given in the following table,	20	CO5	Ap
b)	Implement ANDNOT function with bipolar inputs and targets using perceptron training algorithm. Learning rate is 1 and threshold is 0.		CO3	Ap
c)	Using the Hebb rule, find the weights required to perform the following classifications of the given input patterns "U" and "L". The pattern is shown as 3x3 matrix form in the squares. The "+" symbols represent the value "1" and the empty squares indicate "-1". Consider "U" belongs to the members of class (so has target value 1) and "L" does not belong to the members of class (so has target value -1).		CO2	Ap

The table in part a):

Input targets	s_1	s_2	s_3	s_4	t_1	t_2
1st	1	0	1	0	1	0
2nd	1	0	0	1	1	0
3rd	1	1	0	0	0	1
4th	0	0	1	1	0	1

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