



PRESIDENCY UNIVERSITY

BENGALURU

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Mid - Term Examinations – October 2025

Date: 07-10-2025

Time: 02.00pm to 03.30pm

School: SOCSE	Program: B.Tech	
Course Code : CAI2512	Course Name: Neural Networks and Fuzzy Logic	
Semester: V	Max Marks: 50	Weightage: 25%

CO - Levels	C01	C02	C03	C04	C05
Marks	26	24			

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	Outline the design of neural network with 6 input nodes, 1 hidden layer and 3 output nodes.	2 Marks	L1	C01
2	List out the differences between hard computing and soft computing.	2 Marks	L1	C01
3	Outline the analogy of human neuron and artificial neuron.	2 Marks	L1	C01
4	Recite the limitations of rosenblatt's perceptron.	2 Marks	L1	C02
5	List down few applications of RBF networks.	2 Marks	L1	C02

Part B

Answer the Questions.

Total Marks 40M

6.	a.	An activation function is used to decide whether a neuron can be activated or not. Illustrate different activation functions used in neural networks comparing them with graphs, equations, their respective derivatives, features etc etc.	10 Marks	L2	CO 1
	b.	Explain the algorithmic steps of hebb's rule. Also, apply the same to realize the OR gate for bipolar inputs and targets.	10 Marks	L3	CO 1
Or					
7.	a.	Neural network learns from its environment and improves its performance. List any 4 types of learning and briefly explain them.	10 Marks	L2	CO 1
	b.	Illustrate the algorithmic steps of single layer perceptron rule. and apply the same rule to realize the AND gate for bipolar inputs and targets. Assume learning rate to be 1.	10 Marks	L3	CO 1

8.	a.	Explain the following with respect to Multi-Layer Perceptron: i) Architecture (ii) Signals (iii) Computations	10 Marks	L2	CO 2
	b.	Show that $\Delta W_{ji} = \eta \delta_j X_i$ using backpropagation algorithm.	10 Marks	L3	CO 2
Or					
9.	a.	Consider the following neural network architecture, using Kohonen's Self Organising map algorithm, cluster the first training sample to one of the output units. Assume learning rate = 0.5. Following training data and weight matrix is given to you: Which has two layers namely input and output. The input layer contains four nodes namely X_1, X_2, X_3, X_4 . The output layer contains two nodes namely Y_1 and Y_2 . The weights between input to output layers are $W_{11}, W_{21}, W_{31}, W_{41}, W_{12}, W_{22}, W_{32},$ and W_{42} . The initial weights are 0.2, 0.4, 0.6, 0.8, 0.9, 0.7, 0.5 and 0.3 respectively. The model is trained through four inputs [0 0 1 1], [1 0 0 0], [0 1 1 0] and [0 0 0 1]. Apply kohonen self organization model using above scenario.	10 Marks	L3	CO 2
	b.	With the help of equation and graph, describe the design and development of Radial Basis Function neural networks.	10 Marks	L2	CO 2