



PRESIDENCY UNIVERSITY

BENGALURU

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End - Term Examinations – May / June 2026

Date: 27-05-2026

Time: 01:00pm – 04:00pm

School: : SOCSE	Program: CSE(AI&ML), IST, IST(AI&DS)	
Course Code: CAI2512	Course Name: Neural Networks and Fuzzy Logic	
Semester: VI	Max Marks: 100	Weightage: 50%

CO - Levels	C01	C02	C03	C04	C05
Marks	26	24	14	12	24

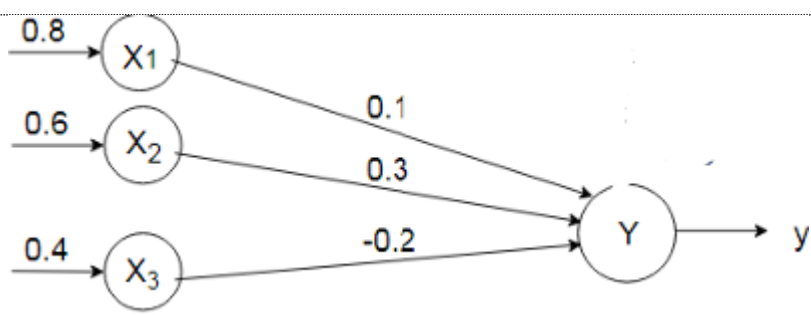
Instructions:

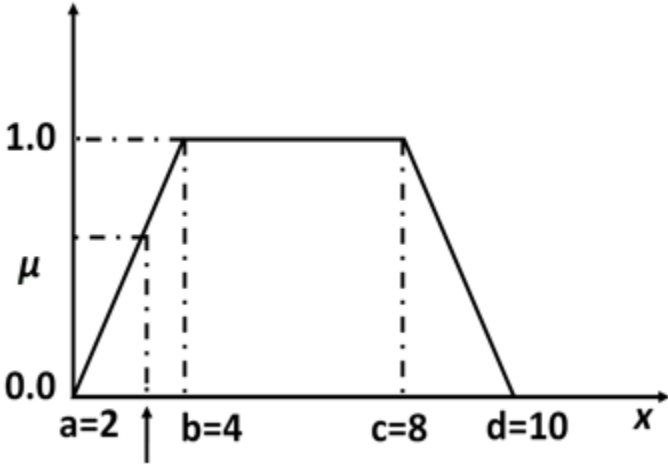
- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	What is a biological neuron? Mention any two parts.	2 Marks	L1	C01
2.	Define fault tolerance in ANN.	2 Marks	L1	C01
3.	State any two similarities between the human brain and ANN.	2 Marks	L1	C01
4.	 Calculate the net output of the given neural network.	2 Marks	L2	C02
5.	List the two passes in back propagation network.	2 Marks	L1	C02

6.	 Determine μ corresponding to $x=3.5$	2 Marks	L2	C03
7.	Let $A = \{(1,0.2), (2,0.7), (3,1.0)\}$ and $B = \{(1,0.5), (2,0.6), (3,0.8)\}$. Calculate algebraic product of fuzzy set.	2 Marks	L2	C04
8.	List the types of fuzzy sets.	2 Marks	L1	C03
9.	State the canonical form of conditional and unqualified proposition.	2 Marks	L1	C05
10.	What is fuzzy quantifier?	2 Marks	L1	C05

Part B

Answer the Questions.

Total Marks 80M

11.	a.	Explain the Linear Activation Function and its disadvantages in neural networks.	10 Marks	L2	C01
	b.	Describe single-layer and multi-layer feed-forward networks.	10 Marks	L2	C01
Or					
12.	a.	Explain Perceptron learning rule in detail.	10 Marks	L2	C01
	b.	Discuss supervised learning and unsupervised learning.	10 Marks	L2	C01
13.	a.	Describe the limitations of single-layer perceptron and explain how Multilayer Perceptron overcome these limitations.	10 Marks	L2	C02
	b.	Solve XNOR problem using Radial basis function by considering two inputs X_1 and X_2 and four cluster C_1, C_2, C_3 and C_4	10 Marks	L3	C02
Or					
14.	a.	Explain the working principle of the Backpropagation learning algorithm with necessary steps and equations.	10 Marks	L2	C02
	b.	Sketch the network by consider four inputs $X_1=[1,0,0,1]$, $X_2=[0,0,1,1]$, $X_3=[1,0,0,1]$ and $X_4=[1,1,0,1]$, two cluster C_1 and	10 Marks	L3	C02

		C2, weights $w_{11}=0.3, w_{21}=0.2, w_{31}=0.4, w_{41}=0.5, w_{12}=0.4, w_{22}=0.3, w_{32}=0.2$ and $w_{42}=0.1$. Find the winning cluster using SOM for the input X2 and update the weight once.			
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15.	a.	Explain the properties of Fuzzy set with its functional expressions	10 Marks	L2	C03
	b.	Determine the union, intersection of the fuzzy sets, where $A = \{(X1, 0.3), (X2, 0.5), (X3, 0.8), (X4, 1.0), (X5, 0.7), (X6, 0.2)\}$ and $B = \{(X1, 0.1), (X2, 0.8), (X3, 0.4), (X4, 0.3)\}$	10 Marks	L2	C04
Or					
16.	a.	Explain the features of Membership function.	10 Marks	L2	C03
	b.	Determine the algebraic difference and the bounded difference of the two fuzzy sets, where $A = \{(X1, 0.4), (X2, 0.5), (X3, 0.6), (X4, 0.7)\}$ and $B = \{(X1, 0.5), (X2, 0.4), (X3, 0.3), (X4, 0.2)\}$	10 Marks	L2	C04

17.	a.	Explain fuzzy propositions with examples.	10 Marks	L2	C05
	b.	Explain the stepwise design procedure of a fuzzy logic controller.	10 Marks	L2	C05
Or					
18.	a.	Explain the process of fuzzification and discuss different methods used.	10 Marks	L2	C05
	b.	Explain different defuzzification methods	10 Marks	L2	C05