PRESIDENCY UNIVERSITY

BENGALURU

Make Up Examinations – December 2025

Date: 26 – 12- 2025   **Time:** 1.00pm to 04.00pm

School: SOCSE	Program: B.Tech	
Course Code: CSE3016	Course Name: Neural Networks and Fuzzy Logic	
Semester: MK	Max Marks: 100	Weightage: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	26	24	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.   **10Q x 2M=20M**

1.	Name few examples of reinforcement learning.	2 Marks	L1	CO1
2.	Outline the schematic representation of single layer perceptron with 3 input and 2 output nodes.	2 Marks	L1	CO1
3.	Recite the equation of sigmoid activation function.	2 Marks	L1	CO1
4.	Define XOR problem with a neat sketch.	2 Marks	L1	CO2
5.	Identify the need for weights adjustments in backward-propagation process.	2 Marks	L1	CO2
6.	Define union and intersection in fuzzy set.	2 Marks	L1	CO3
7.	Recite cardinality and power in a crisp set with an example.	2 Marks	L1	CO3
8.	State associative law of crisp set.	2 Marks	L1	CO3
9.	Define Linguistic hedges.	2 Marks	L1	CO4
10.	Define defuzzification.	2 Marks	L1	CO4

Part B

11.	a.	List various types of neuron architecture and explain any two in detail.	10 Marks	L2	CO1
	b.	Illustrate the realization of AND function using single layer perceptron using LMS rule and step activation function. Assume learning rate to be 0.7	10 Marks	L3	CO1
		Or			
12.	a.	Describe unsupervised and reinforcement learning in detail.	10 Marks	L2	CO1
	b.	Explain the algorithm of single layer perceptron.	10 Marks	L2	CO1

13.	a.	Determine $\Delta W_{ji} = \eta \delta_j X_i$ using backpropagation algorithm.	10 Marks	L3	CO2
	b.	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 kohenen self organization model using above scenario.	10 Marks	L3	CO2
		Or			
14.	a.	Demonstrate the working of multilayer perceptron architecture.	10 Marks	L3	CO2
	b.	Assume that the neural network architecture using Radial basis function of the XOR input pattern. Cluster the first training sample to one of the output units. Let r to be 1.414. 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 X1, X2 and output layer contains two nodes namely Y1 and Y2. The weights between input to output layers are W1, W2, W3, W4 and their values as -0.5, 0.4, 0.4 and -0.5 respectively. Apply RBFNN using above scenario.	10 Marks	L3	CO2

15.	a.	Describe the various membership function distributions of fuzzy set.	10 Marks	L2	CO3
	b.	Max min composition and Max product composition Let A and B be two fuzzy relations expressed in the matrix form, Find C, the composition of two fuzzy relations. Also calculate the max-product composition for the same. A= $\begin{bmatrix} 0.1 & 0.5 & 0.3 \\ 0.4 & 0.8 & 0.7 \\ 0.6 & 0.9 & 0.1 \end{bmatrix}$ B= $\begin{bmatrix} 0.7 & 0.2 & 0.4 \\ 0.3 & 0.1 & 0.5 \\ 0.9 & 0.6 & 0.8 \end{bmatrix}$	10 Marks	L3	CO3
		Or			
16.	a.	Describe the properties of Crisp set in detail.	10 Marks	L2	CO3
	b.	Solve i) A(x)={(x1,0.2),(x2,0.4),(x3,0.1),(x4,0.5)} to measure of Fuzziness of Fuzzy set. ii) Measure Inaccuracy of Fuzzy set B with respect to A. Given A(x)={(x1,0.6),(x2,0.1),(x3,0.3),(x4,0.5)} and B(x)={(x1,0.2),(x2,0.4),(x3,0.9),(x4,0.8)}. Explain the equation for the same.	10 Marks	L3	CO3

17.	a.	Demonstrate Fuzzy Logic Controller architecture with a neat diagram.	10 Marks	L3	CO4
	b.	Determine generalized modus tollens inference rule with example.	10 Marks	L3	CO4
		Or			
18.	a.	Demonstrate various kinds of proposition with suitable example.	10 Marks	L3	CO4
	b.	Let P be a **Ram is intelligent** with the truth value 0.7, q be a **Shyam is intelligent** with the truth value 0.5. Determine the following: i) Ram is not intelligent ii) Both Ram and Shyam are intelligents iii) Either Ram or Shyam is intelligent iv) If Ram is intelligent then so is Shyam v) If Ram is intelligent if and only if so is Shyam vi) If Ram is intelligent then Shyam is not intelligent vii) If Ram is not intelligent then is Shyam intelligent.	10 Marks	L3	CO4