Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Make Up Examinations – December 2025

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

School: SOCSE	**Program:** CAI/CEI/COM/CST/ISD	
Course Code : CSE3087	**Course Name:** Applied Machine Learning	
Semester: MK	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**24**	**24**	**26**	**26**	**-**

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**

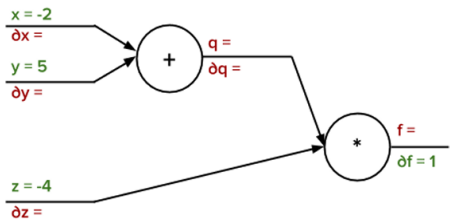
1.	Define Bayes Theorem	**2 Marks**	**L2**	**CO1**
2.	What is meant by feature engineering	**2 Marks**	**L2**	**CO1**
3.	What is Bagging.	**2 Marks**	**L2**	**CO2**
4.	Recall voting classifier.	**2 Marks**	**L2**	**CO2**
5.	What is linear threshold unit.	**2 Marks**	**L2**	**CO3**
6.	What is a perceptron	**2 Marks**	**L2**	**CO3**
7.	List any two activation functions	**2 Marks**	**L2**	**CO3**
8.	What is meant by Divisive hierarchical clustering.	**2 Marks**	**L2**	**CO4**
9.	Define Competitive Learning.	**2 Marks**	**L2**	**CO4**
10.	List any two Outlier Detection methods.	**2 Marks**	**L2**	**CO4**

Part B

Answer the Questions. **Total Marks 80M**

11.	**a.**	Discuss the three main types of Machine Learning (Supervised, Unsupervised, and Reinforcement Learning) with one example each. Explain the two types of features--categorical and numerical--with examples.	**10 Marks**	**L2**	**CO1**
	b.	Discuss one data imputation method used in feature engineering to handle missing values. Illustrate the concept of data imputation using python code.	**10 Marks**	**L3**	**CO1**
		Or			
12.	**a.**	Define Machine Learning and explain its significance in modern applications. Briefly describe the typical ML workflow, highlighting key stages from data collection to model evaluation.	**10 Marks**	**L2**	**CO1**
	b.	Describe the need for data visualization. Illustrate a few of the basic data visualization strategies commonly used.	**10 Marks**	**L3**	**CO1**

13.	**a.**	Describe the AdaBoost algorithm. How does it assign weights to misclassified instances? Discuss the effect of weak learners in the ensemble.	**10 Marks**	**L2**	**CO2**
	b.	What is model stacking in ensemble learning? Explain its architecture and the role of meta-learners with a neat diagram. How is it different from bagging and boosting?	**10 Marks**	**L2**	**CO2**
		Or			
14.	**a.**	Compare and contrast Random Forest and Extremely Randomized Trees (Extra Trees). Discuss their impact on bias-variance tradeoff.	**10 Marks**	**L2**	**CO2**
	b.	Explain Gradient Boosting in detail. How does it differ from AdaBoost? Describe its stages and how residual errors are minimized.	**10 Marks**	**L2**	**CO2**

15.	**a.**	 Demonstrate forward pass and back propagation for the computation graph shown above for the function f=(x+y)*z.	**10 Marks**	**L3**	**CO3**

	b.	Explain the working of perceptron.	**10 Marks**	**L3**	**CO3**
Or					
16.	**a.**	Explain the activation functions; sigmoid, tanh, relu and softmax, in detail with equation and relevant diagrams.	**12 Marks**	**L2**	**CO3**
	b.	Demonstrate how an artificial neuron learns AND gate.	**08 Marks**	**L3**	**CO3**

17.	**a.**	Demonstrate the working of k-means algorithm in detail. Also show how the value of k can be estimated.	**20 Marks**	**L3**	**CO4**
Or					
18.	**a.**	Describe Kohonen Self-Organizing map. Demonstrate how a pattern is learned with the help of an example.	**10 Marks**	**L3**	**CO4**