

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
III B. Tech I Semester Regular Examinations November -2025
MACHINE LEARNING
(AI&DS)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions. Part B Answers any one each unit.

1		PART-A	(20Marks)
	a)	Name the three Paradigms for Machine Learning .	[2]
	b)	Define Model Selection and Model Evaluation in the ML stages	[2]
	c)	What is the difference between a Metric and a Non-Metric Proximity Measure?	[2]
	d)	Define KNN Regression .	[2]
	e)	Give an example of an Impurity Measure used in Decision Trees.	[2]
	f)	What is the optimality property of the Bayes Classifier ?	[2]
	g)	Define Linear Regression in the context of linear discriminants.	[2]
	h)	Explain the role of the Bias Term in a Perceptron Classifier.	[2]
	i)	What is Spectral Clustering ?	[2]
	j)	Differentiate between Partitional and Soft Clustering	[2]
		PART-B	(50Marks)
		Unit - I	
2	a)	Define Machine Learning and explain its different types . Give a real-world application for each type.	[5]
	b)	Describe the concept of Learning by Induction . How is it related to Search and Learning ?	[5]
		(OR)	
3	a)	Detail the six Stages in Machine Learning from Data Acquisition to Model Prediction.	[5]
	b)	Explain the process of Matching in ML systems and the different Types of Data handled in machine learning.	[5]
		Unit - II	
4	a)	Describe the procedure for calculating Proximity Between Binary Patterns using different measures.	[5]
	b)	Explain the Mean Squared Error (MSE) and Root Mean Squared Error (RMSE) for evaluating Regression Algorithms .	[5]
		(OR)	
5	a)	Discuss the Performance of Classifiers . Explain why accuracy alone might be insufficient, and mention other key metrics.	[5]
	b)	Analyze the advantages and disadvantages of K-Nearest Neighbor (K-NN) Classifier compared to the Radius Distance Nearest Neighbor Algorithm .	[5]
		Unit - III	
6	a)	Explain the Bias-Variance Trade-off in model training.	[5]
	b)	Describe how Random Forests use Bootstrap Aggregation (Bagging) to improve both classification and regression performance.	[5]
		(OR)	
7	a)	Discuss Regression Based on Decision Trees .	[5]
	b)	Explain the concepts of Multi-Class Classification and how the Naive Bayes Classifier (NBC) can be extended to solve such problems.	[5]
		Unit - IV	
8	a)	Differentiate between Logistic Regression and Linear Regression .	[5]

	b)	Detail the steps of the Backpropagation Algorithm for training a Multi-Layer Perceptron (MLP) .	[5]
		(OR)	
9	a)	Describe the Perceptron Learning Algorithm .	[5]
	b)	Explain the concept of Soft Margin in Support Vector Machines (SVM) and how it allows the model to handle the Linearly Non-Separable Case without relying on the kernel trick.	[5]
		Unit - V	
10	a)	Explain the process of Divisive Clustering .	[5]
	b)	Describe the Rough Clustering concept and the mechanism of the Rough K-Means Clustering Algorithm .	[5]
		(OR)	
11	a)	Explain the working of the Expectation Maximization (EM)-Based Clustering algorithm.	[5]
	b)	Discuss Matrix Factorization and Spectral Clustering .	[5]
