

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)  
Chromepet, Chennai - 600 044.

B.Sc.DS - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER -VI

**22UDSCT6010 - Machine Learning**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

**Section B**

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Explain the design components of a Machine Learning system with an example.
2. What is a supervised learning? How it can be applied for real time problem?
3. Analyze the trade-offs between Ridge Regression and Lasso Regression in terms of feature selection and model complexity.
4. Suppose take a dataset containing house prices and features like area, number of rooms, and location, describe how you would apply Multiple Linear Regression to predict house prices.
5. Explain the working principle of Logistic Regression for binary classification problems.
6. Explain the concept of Random Forests and how it addresses the issue of over fitting in Decision Trees.
7. Suppose in a high-dimensional dataset (e.g., images), explain how Principal Component Analysis (PCA) can help reduce dimensionality before applying clustering.
8. Evaluate the advantages and limitations of the Apriori algorithm with example.

**Section C**

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Discuss the different types of Machine Learning and give one example for each type.
10. Compare Polynomial Regression and Multiple Linear Regression in terms of model complexity, overfitting, and real-world applicability.
11. Explain the working principle of Support Vector Machines (SVMs) for classification, including the concept of hyperplanes and margin maximization.

**Contd...**

12. Compare and contrast K-Means, Hierarchical Clustering, and DBSCAN, highlighting their strengths and weaknesses with real-world examples.
13. Suppose an online retail company wants to implement market basket analysis. Compare different Association Rule Learning algorithms and recommend the most suitable one.

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