

**BACHELOR OF TECHNOLOGY (CBCS - 2023)**  
**B. Tech. Sem-V Computer Science & Engineering AI & ML : WINTER: 2025**  
**SUBJECT: MACHINE LEARNING**

Day : Monday  
Date : 08/12/2025

**W-30733-2025**

Time : 02:30 PM-05:30 PM  
Max. Marks : 60

**N.B.**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate **FULL** marks.
- 3) Assume suitable data **WHEREVER** necessary.
- 4) Draw neat diagrams **WHEREVER** necessary.

Q.1 Describe the steps involved in developing a machine learning application. (10)

**OR**

Q.1 What are the main types of machine learning algorithms, and how are they categorized? (10)

Q.2 The following table records the numbers of balls that Amit took for scoring runs. In how many balls is he likely to score a century? (10)

Runs Scored	Number of Balls
8	10
35	20
47	31
54	23
11	5
85	47
84	35
93	67
89	73
2	1

**OR**

Q.2 Consider following table for binary classification: Calculate the root of the decision tree using Gini index (10)

Sr. No.	Customer Income	Gender	Car Type	Class
1	High	M	Family	C1
2	High	M	Sports	C1
3	High	M	Family	C2
4	Low	M	Family	C2
5	Low	F	Family	C2
6	Low	F	Sports	C1
7	Low	F	Sports	C2
8	High	M	Family	C1
9	High	F	Family	C2
10	High	F	Family	C2
11	High	F	Sports	C2
12	Low	M	Sports	C2
13	Low	F	Family	C2
14	Low	M	Sports	C1

**P.T.O.**

Q.3 What is XGBoost; and what makes it a popular choice for gradient boosting? (10)

OR

Q.3 Compare and contrast bagging and boosting techniques in terms of their underlying principles and performance characteristics (10)

Q.4 Describe the basis of the kernel trick and how it allows SVM to handle non linearities. (10)

OR

Q.4 Discuss one-versus-all (OvA) and one-versus-one (OvO) strategies for multiclass classification with SVM. (10)

Q.5 Describe the Density - Based Spatial Clustering of Applications with Noise (DBSCAN) algorithm and how it works. (10)

OR

Q.5 Two clusters have the following data points. Calculate their intra - cluster distance also calculate total inertia of the data point assignment. (10)

Height	Weight	Assigned Cluster
185	72	2
170	56	1
168	60	1
179	68	2
182	72	2
188	77	2
180	71	2
180	70	2
183	84	2
180	88	2
180	67	2
177	76	2

Q.6 What is Singular Value Decomposition (SVD) and how does it differ from PCA and LDA? (10)

OR

Q.6 Describe the steps involved in performing LDA for dimensionality reduction. (10)

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