

B.Tech III Year II Semester (R23) Regular Examinations March/April 2026

MACHINE LEARNING
(Common to CSE, AI and CSE (CS))

Time: 3 hours

Max. Marks: 70

PART - A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) State any two paradigms of Machine Learning. 2M
 - (b) What is the purpose of dividing data into training and testing sets? 2M
 - (c) Mention any two performance measures for regression algorithms. 2M
 - (d) Given two data points $X = (2, 4, 6)$ and $Y = (5, 1, 3)$. Compute Euclidean distance. 2M
 - (e) Write the formula for total error in Bias-Variance trade-off. 2M
 - (f) How is the final class selected in multi-class Bayes classification? 2M
 - (g) Define logistic regression. 2M
 - (h) What is meant by linearly non-separable data? 2M
 - (i) What is agglomerative clustering? 2M
 - (j) What is soft clustering give example? 2M

PART - B

(Answer all the questions: 05 X 10 = 50 Marks)

- 2 (a) Describe learning by rote and learning by induction. 5M
- (b) Compare supervised and unsupervised learning. 5M
- OR**
- 3 Discuss data acquisition and data representation. 10M
- 4 (a) Explain proximity measures and distance measures used in Machine Learning. 5M
- (b) Discuss metric and non-metric similarity functions. 5M

OR

- 5 Given actual and predicted values: 10M

Actual Value	Predicted Value
10	12
15	14
20	18
25	27

- (i) Compute Mean Absolute Error (MAE).
- (ii) Compute Mean Squared Error (MSE).

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6. Given the following dataset for decision tree regression:

10M

X	Y
2	5
4	7
6	9
8	11

- (i) Find the predicted output if all samples belong to one leaf node.
(ii) Compute the mean squared error for the leaf.

OR

7 Describe multi-class classification using Bayes classifier.

10M

8 Describe the logistic regression with an example.

10M

OR

9 Describe the back propagation algorithm used for training an MLP.

10M

10 Explain clustering of patterns with suitable examples.

10M

OR

11 Describe the Rough K-Means clustering algorithm with example.

10M

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