

Code No.: R22CS58311OE

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II-M.TECH-I-Semester End Examinations (Regular) - January- 2025
MACHINE LEARNING (OE)
(CSE)

[Time: 3 Hours]

[Max. Marks: 60]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

(10 Marks)

1. a) What is the difference between regression and classification? [1M]
- b) Calculate the mean squared error for predicted values [2.5,0.0,2.1,7.8] and actual values [3.0, -0.5,2.0,7.5]. [1M]
- c) What is the main goal of clustering in unsupervised learning? [1M]
- d) Compute the distance between (2,3) and (5,7) using the Euclidean formula. [1M]
- e) What is the purpose of a confusion matrix in evaluating classification models? [1M]
- f) Calculate the accuracy, precision, and recall for a classifier with a confusion matrix: TP=50, FP=10, FN=5, TN=35. [1M]
- g) Define sparse representation and its importance in machine learning. [1M]
- h) Compute the output of a ReLU activation for [-1,2, -3,4] [-1, 2, -3, 4] [-1,2, -3,4]. [1M]
- i) List three key features of the Scikit-learn library. [1M]
- j) Standardize the dataset [10,20,30] using Scikit-learn. [1M]

PART-B

(50 Marks)

2. Explain the decision boundary for a linear classifier with weights $w = [2, -1]$ and bias $b = -3$. [10M]
- OR**
3. Illustrate the process of how the Nearest Neighbors algorithm makes predictions. [10M]
4. Apply PCA to reduce a dataset with features [2,4], [1,3], [0,0] to one dimension. [10M]
- OR**
5. Analyze the impact of initialization on the results of the K-means algorithm. [10M]
6. Explain why Ensemble methods are less prone to overfitting. [10M]
- OR**
7. Perform a 3-fold cross-validation split for $X = [1,2,3,4,5,6]$. [10M]
8. Train a simple RNN for a sequence prediction task and compute its output. [10M]
- OR**
9. Explain the vanishing gradient problem with an example. [10M]
10. Analyze the impact of missing data on IoT-based model predictions. [10M]
- OR**
11. Explain the effect of scaling features on k-NN classification results. [10M]
