CBCS SCHEME

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21EC744

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Machine Learning with Python

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain the different types of learning. **(10 Marks)**
b. Discuss how to use machine learning on predictive modeling with the help of block diagram. **(10 Marks)**

OR

2 a. Explain the preceptron learning rule. **(10 Marks)**
b. Explain the adaptive linear neurons and the convergence of learning. **(10 Marks)**

Module-2

3 a. Explain the concepts of over-fitting and under-fitting problem in machine learning. **(08 Marks)**
b. With a neat diagram explain logistic regression. **(07 Marks)**
c. How to choose a classification algorithm? Explain. **(05 Marks)**

OR

4 a. Explain how support vector machine can be used for classification of linearly separable data. **(08 Marks)**
b. Demonstrate K-nearest neighbors with example. **(07 Marks)**
c. Explain sequential feature selection algorithm. **(05 Marks)**

Module-3

5 a. Discuss principal component analysis method. **(10 Marks)**
b. Explain the inner workings of linear discriminate analysis. **(10 Marks)**

OR

6 a. Discuss various performance evaluation metrics. **(08 Marks)**
b. Explain the process of using K-fold cross validation to assess model performance. **(07 Marks)**
c. Discuss about bag of words model. **(05 Marks)**

Module-4

7 a. Develop a python code to create a new SQLite database inside the movie classifier directory and store two example movie reviews. **(10 Marks)**
b. Explain the mathematical formulation of a simple linear regression model with a neat diagram. **(10 Marks)**

OR

8 a. Describe the algorithmic steps involved in fitting a robust regression model using RANSAC. **(08 Marks)**
b. What metrics are commonly used to evaluate the performance of linear regression models? Discuss their significance. **(07 Marks)**
c. Why are regularization techniques like Ridge and Lasso regression important? Write their mathematical formulations. **(05 Marks)**

Module-5

9 a. What is K-means clustering algorithm, and how does it group objects based on similarity? **(08 Marks)**

b. What is hierarchical clustering and demonstrate the working with the help of an example? **(07 Marks)**

c. Mention the steps in K-means ++ algorithm. **(05 Marks)**

OR

10 a. Explain the working of multilayer neural network architecture. **(08 Marks)**

b. Explain the process of backpropagation algorithm weights update during training. **(07 Marks)**

c. What is the MNIST dataset, and why is it widely used in digit classification tasks? **(05 Marks)**

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