

# CBCS SCHEME

21AI63



## Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026 Machine Learning

Max. Marks: 100

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

### Module-1

- What is machine learning? Explain with an example why to use machine learning. (04 Marks)
  - Discuss the broad categories of Machine Learning System. (08 Marks)
  - Write Find – s algorithm and apply the algorithm for the given instances below.

Location	Price	Size	Condition	Buy-House
Urban	Expensive	Large	New	Yes
Suburban	Moderate	Medium	Old	No
Urban	Moderate	Small	New	Yes
Urban	Moderate	Large	Old	Yes

(08 Marks)

OR

- Illustrate the basic design issues and approaches to machine learning. (10 Marks)
  - Explain the main challenges of machine learning that can arise when selecting a learning algorithm and training it on data. (10 Marks)

### Module-2

- Explain how do you frame the problem and choose an appropriate performance measures for a dataset in a machine learning project. (06 Marks)
  - Illustrate various methods to prepare the data for machine learning algorithms. (10 Marks)
  - Explain Grid Search Method to fine – tune the model. (04 Marks)

OR

- Explain the various performance measure to evaluate a classifier with an example.
    - Measuring accuracy using cross validation.
    - Confusion Matrix
    - Precision
    - Recall
    - The ROC curve(10 Marks)
  - Explain multilabel classification and multioutput classification with code snippet. (10 Marks)

### Module-3

- What is Gradient Descent. Explain various type of gradient descent with necessary diagrams? (10 Marks)
  - Explain the following w.r.t. logistic regression :
    - Estimating probabilities
    - Training and cost function(10 Marks)

OR

- 6 a. Discuss nonlinear SVM classification. How can you use polynomial kernel, Gaussian RBF Kernel? (10 Marks)
- b. Show that how SVM make predictions using Quadratic programming and Kernelized SVM. (10 Marks)

**Module-4**

- 7 a. Explain how decision trees are trained visualized and used in making predictions. (10 Marks)
- b. Explain CART algorithm. Discuss regularization hyperparameters in decision trees. (10 Marks)

OR

- 8 a. Explain Bagging and posting with an example. (10 Marks)
- b. What is Boosting? Explain A da Boost and Gradient Boosting. (10 Marks)

**Module-5**

- 9 a. What is Bayes Theorem. Describe Brute – Force Map learning algorithm. (08 Marks)
- b. Discuss the Minimum Description length algorithm. (08 Marks)
- c. Explain the steps of Gibbs algorithm. (04 Marks)

OR

- 10 a. Write EM algorithm and explain in detail. (10 Marks)
- b. Explain Naïve Bayes classifier with an example. (10 Marks)

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