CBCS SCHEME

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21AI63

Sixth Semester B.E./B.Tech. Degree Examination, June / July 2026
Machine Learning

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. Define Machine Learning. Explain in detail online versus batch learning. **(10 Marks)**

b. What are the key challenges encountered in the development and implementation of machine learning models? **(10 Marks)**

OR

2 a. Describe in detail all the steps involved in designing a learning systems. **(10 Marks)**

b. Describe Find – s Algorithm. Explain its working by taking the enjoy sport concept and training instances are given below.

Day	Sky	Air Temp	Humidity	Wind	Water	Forecast	Enjoy sport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

(10 Marks)

Module-2

3 a. Explain the process to discover and visualize the data to gain insights. **(10 Marks)**

b. Explain Grid Search and Randomized search with respect to fine tune your model. **(10 Marks)**

OR

4 a. What are the performance measures to evaluating a classifier? Explain in detail. **(10 Marks)**

b. Explain : i) Multiclass classification ii) Multi output classification **(10 Marks)**

Module-3

5 a. What is Gradient Descent? Explain stochastic Gradient Descent with neat diagram. **(10 Marks)**

b. Explain : i) Ridge Regression ii) Lasso Regression **(10 Marks)**

OR

6 a. Explain Linear SVM classification and its types. **(10 Marks)**

b. Explain SVM Regression. **(10 Marks)**

Module-4

7 a. Explain : i) The CART Training Algorithm ii) Gini Impurity **(10 Marks)**

b. Define Stacked Generalization. With neat diagram, explain Aggregating predictions using a blending predictor. **(10 Marks)**

OR

8 a. Explain i) Voting classifier ii) Bagging and pasting **(10 Marks)**

b. What is Hypothesis Boosting? Explain Adaboost and Gradient boosting. **(10 Marks)**

Module-5

9 a. Define Maximum A Posterior (MAP), Maximum Likelihood (ML) hypothesis. Derive the h_{MAP} and h_{ML} using Bayesian Theorem. **(10 Marks)**

b. Explain Naïve Bayes classifier with an example. **(10 Marks)**

OR

10 a. Describe the concept of Minimum Description Principle (MDL). Obtain the equation for h_{MDL}. **(10 Marks)**

b. Explain Bayesian belief Network and Conditional Independence with an example. **(10 Marks)**

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