CBCS SCHEME

USN | | | | | | | | | | |

21AI63

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Machine Learning

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. List and explain the step's to design a learning system in detail. **(08 Marks)**

b. List the different challenges of Machine Learning. **(04Marks)**

c. Explain version space and consider the Enjoyspot concept and Instance give below. Identify the specific hypo thesis using "Find – s" Algorithm.

Example	Sky	Air temp	Humidity	Wind	Water	Forecast	Enjoyspots
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Cold	High	Strong	Warm	Change	No
3	Rainy	Cold	High	Strong	Cool	Same	Yes
4	Sunny	Warm	High	Strong	Warm	Change	Yes

(08 Marks)

OR

2 a. Define machine learning and Explain main types of Machine learning. **(10 Marks)**

b. Consider the "Japanese Economy car" concept and Instance given below, Identify the hypotheses using candidate – Elimination Learning algorithm. **(10 Marks)**

ORIGIN	MANUFACTURER	COLOR	YEAR	TYPE	CLASS
Japan	Honda	Blue	1980	Economy	Yes
Japan	Toyota	Green	1970	Sports	No
Japan	Toyota	Blue	1990	Economy	Yes
Germany	Wolk's Wagn	Red	1980	Sports	No
Japan	Honda	White	1980	Economy	Yes
Japan	Toyota	Green	1980	Economy	Yes
Japan	Honda	Red	1980	Economy	Yes

Module-2

3 a. Explain the different steps to get data in data-preprocessing, with code. **(10 Marks)**

b. Using code snippet, Explain the concepts involved in

i) Data cleaning

ii) Select and train the model

iii) Discover and Visualize the data **(10 Marks)**

OR

4 a. Explain. I) MNIST ii) Performance measure iii) Multi Label classification. **(10 Marks)**

b. Using code snippet, outline the concepts involved in,

i) Measuring accuracy using cross validation.

ii) Confusion Matrix

iii) Precision, F_1 – score and recall **(10 Marks)**

Module-3

5 a. Explain Linear Regression with code snippet. **(10 Marks)**

b. Explain the three different Regularized Linear Models. **(10 Marks)**

OR

6 a. Explain Logistic Regression with code snippet. **(10 Marks)**

b. Explain support vector Machine regression. **(10 Marks)**

Module-4

7 a. Explain the concept of :
i) Bagging and Pasting
ii) Random Forests. **(10 Marks)**

b. Define Boosting. Explain the different variant's of Boosting. **(10 Marks)**

OR

8 a. Explain CART Training Algorithm and regularization Hyper parameters. **(10Marks)**

b. Write a short not on "
i) Entropy
ii) Voting classifier
iii) GINI impurity **(10 Marks)**

Module-5

9 a. Explain Naïve Bayes classifier and Apply the dataset given below.

No.	Color	Legs	Height	Smelly	Species
1	White	3	Short	Yes	M
2	Green	2	Tall	No	M
3	Green	3	Short	Yes	M
4	White	3	Short	Yes	M
5	Green	2	Short	No	H
6	White	2	Tall	No	H
7	White	2	Tall	No	H
8	White	2	Short	Yes	H

(12 Marks)

b. Derive the EM Algorithm in detail. **(08 Marks)**

OR

10 a. Explain Bayesian Belief Network with Example. **(10 Marks)**

b. Explain Gibbs Algorithm. **(10 Marks)**

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