K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

August ~~May – June~~ 2025
(B. Tech.) Program: EXTC Scheme I/II/~~IIB~~/III: IIB
Supplementary ~~Regular~~ Examination: TY/ Semester: VI
Course Code: EXC602_and Course Name: Machine Learning__
Date of Exam: 31/07/2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Define Machine Learning. Differentiate between Linear Regression and Logistic Regression.		CO1	U
b)	In a Covid test of 1000 patients, there were 45 positive tests, of which 30 patients had Covid and 15 were falsely tested positive. Of the 955 negative tests there were 5 that were incorrect, these patients had Covid but were tested negatively. Draw the confusion matrix and calculate the accuracy and precision from the matrix.		CO3	An
c)	What is Learning Rate? Explain its importance in Machine Learning.		CO5	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Write expression for hypothesis, cost function and for parameter using gradient descent for logistic regression. Write short note on feature scaling.		CO2	U
b)	Illustrate Support Vector Machine with neat labelled sketch.		CO6	U
c)	Write a note on Anomaly detection.		CO5	U
Q.3	Solve any **two** questions out of three. (10 marks each)	20		
a)	For a sunburn dataset given below, construct a decision tree using Gini Index.		CO6	An

Name	Hair	Height	Weight	Location	Class
Swati	Blonde	Average	Light	No	Yes
Sunita	Blonde	Tall	Average	Yes	No
Anita	Brown	Short	Average	Yes	No
Lata	Blonde	Short	Average	No	Yes
Radha	Red	Average	Heavy	No	Yes
Maya	Brown	Tall	Heavy	No	No
Leena	Brown	Average	Heavy	No	No
Rina	Blonde	Short	Light	Yes	No

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b)	Define overfitting and under fitting. How to evaluate a ML model for overfitting or under fitting, Explain it using diagram. What measures need to be taken in case of overfitting and under fitting?		CO4	U
c)	Given the data, reduce the dimension from 2 to 1. X1={4,8,13,7}; X2={11,4,5,14)		CO3	A
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	Write a note on DBSCAN clustering algorithm. Discuss the parameters required. Differentiate between DBSCAN and k means clustering algorithm.		CO3	U
b)	What are the types of Machine Learning? Explain each type in brief with appropriate examples. Write applications of Machine Learning.		CO2	U
c)	Tenure in years (x) and profit in percentage in stock market (y) is given in following table. Calculate the profit for tenure of 2.3 in percentage after 3 iterations. Assume α =0.1and initial values of parameters as zero.		CO6	A

x	2	2.6	1.8	3.2	4	1
y	3.8	4.5	3.88	4.9	5	3.6

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