

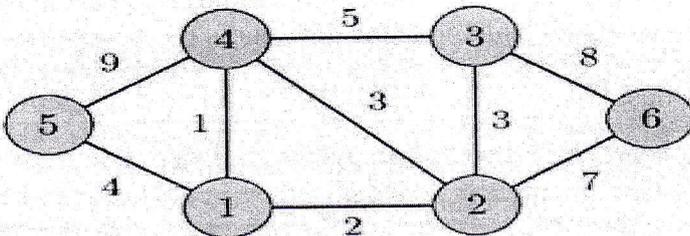
~~Nov-Dec~~ 2025
Jan/Feb

(B. Tech.) Program: Computer Engineering Scheme : IIB
Regular Examination: LY Semester: VII
Course Code: CE 701 and Course Name: Machine Learning

Date of Exam: ~~29/11/2025~~ 03/02/26 Duration: 02.5 Hours Max. Marks: 60

Supplementary

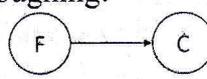
Instructions:
 (1) All questions are compulsory.
 (2) Draw neat diagrams wherever applicable.
 (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level										
Q 1	Solve any two questions out of three: (05 marks each)	10												
a)	Explain different distance Metrics used in Clustering		CO5	U										
b)	Explain the concept of Decision Boundary and Margin used in Support Vector Machine (SVM) along with equation of a hyperplane.		CO4	U										
c)	Calculate Accuracy, Precision, Recall, Sensitivity and Specificity for the following example. <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Predicted Class</th> <th colspan="2">Actual class</th> </tr> <tr> <th>Cancer=yes</th> <th>Cancer=no</th> </tr> </thead> <tbody> <tr> <th>Cancer=yes</th> <td style="text-align: center;">9</td> <td style="text-align: center;">21</td> </tr> <tr> <th>Cancer=no</th> <td style="text-align: center;">14</td> <td style="text-align: center;">956</td> </tr> </tbody> </table>		Predicted Class	Actual class		Cancer=yes	Cancer=no	Cancer=yes	9	21	Cancer=no	14	956	CO3
Predicted Class	Actual class													
	Cancer=yes	Cancer=no												
Cancer=yes	9	21												
Cancer=no	14	956												
Q 2	Solve any two questions out of three: (05 marks each)	10												
a)	A dataset contains 300 samples. Explain how the samples will be split in 5-fold and 10-fold cross-validation. Show fold sizes.		CO3	U										
b)	 <p>Apply Minimum Spanning Tree Technique of clustering to form clusters. Show all computations step-by-step.</p>		CO4	Ap										

Seat No.:

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

Supplement ~~Regular~~ Examination: LY Semester: VII
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c)	What is rule-based classification in machine learning, and how does it differ from other classification methods like decision trees or support vector machines?		CO5	U
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	i) Describe the Architecture of RBF Network and its applications. (6mk) ii) Consider the following Bayesian network, where F = having the flu and C = coughing: $P(F) = 0.1$  $P(C F) = 0.8$ $P(C \neg F) = 0.3$ Write down the joint probability table specified by the Bayesian network. (4mk)		CO4	Ap
b)	Describe Linear Regression and multiple linear regression with suitable example. (6 mk) Explain various performance measures used in Linear Regression. (4mk)		CO2	U
c)	Explain the need of Dimensionality Reduction (2mk). Write the algorithm steps of principle component analysis and Linear Discriminant Analysis.(8mk)		CO6	U
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Describe stumping, bagging, subbagging and boosting approach of ensemble Learning Models with suitable block diagrams and examples.		CO3	U
b)	Illustrate two applications of clustering, classification and regression. (5mk) Describe in detail Machine Learning Model development steps for the case study of house price prediction. (5mk)		CO1	U
c)	Given the points A(3, 7), B(4, 6), C(5, 5), D(6, 4), E(7, 3), F(6, 2), G(7, 2) and H(8, 4), Find the core points and outliers using DBSCAN. Take Eps = 2.5 and MinPts = 3.		CO5	Ap
