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LNCT UNIVERSITY, BHOPAL

Enrollment No. LNCABC21111

AI.-404

B.TECH (AIML) IV SEMESTER (NEW BATCH) EXAMINATION [JUNE-205] MACHINE LEARNING AND PATTERN RECOGNITION

Maximum Marks: 70 **Time Allowed: 3Hours**

Note:- Attempt all questions. Internal choices are given.

(SECTION –A)

1. Short Answer Type Questions (Attempt Any Five) [5x6=30]

i. Define function approximation in the context of machine learning. How does it relate to model training?

ii. Compare classification and regression in supervised learning. When would you use each?

iii. Compare prediction accuracy vs. model interpretability. Why might a business prefer a simpler model even if it's less accurate?

iv. What are the assumptions of linear regression? Name at least three.

v. What is the interpretation of the coefficients in a logistic regression model?

vi. What is a decision boundary in LDA? How does it change when moving from LDA to QDA?

vii. What is a learning system in machine learning? Provide a real-world example.

(SECTION –B)

2. Long Answer Type Questions (Attempt Any Four) [4x10=40]

i. A model trained on customer churn data has high training accuracy but poor test performance. What could be the issue? Suggest fixes.

ii. When would you choose a parametric model over a non-parametric one? Discuss pros and cons.

iii. How are the coefficients estimated in linear regression? Briefly explain the Ordinary Least Squares (OLS) method.

iv. A bank wants to predict loan default risk using customer data (income, credit score, employment status)

a) Formulate a logistic regression model for this problem.

b) How would you evaluate model performance? Discuss ROC-AUC and classification metrics.

v. Explain how LDA handles dimensionality reduction. What is the role of eigenvalues in LDA?

vi. Compare L1 (Lasso) and L2 (Ridge) regularization. When would you use each?