

M.Sc. Comp. Sci (Sem-II) 75:28 dt: 15/01/25

(2^{1/2} Hours.)

[Total Marks: 75]

- N. B.: (1) All questions are compulsory.
(2) Numbers to the right indicate marks.
(3) Make suitable assumptions wherever necessary and state the assumptions made.
(4) Answers to the same question must be written together.
(5) Mixing of Sub-Questions is not allowed.
(6) Draw neat labelled diagrams wherever necessary.

1. Attempt any three of the following: 15
 - a. What is statistical learning?
 - b. State the Difference between supervised and unsupervised learning.
 - c. Write a short note on Linear Regression.
 - d. Explain the problem of Overfitting with example.
 - e. What is Linear Discriminant Analysis? Explain in detail.
 - f. Describe the Concept of Classification. State its applications along with examples.
2. Attempt any three of the following: 15
 - a. Describe the Cross Validation and its type.
 - b. Explain the Bootstrap technique in detail.
 - c. Write a brief note on Principal Components Analysis (PCA).
 - d. Compare & contrast Lasso and Ridge Regression.
 - e. What is Best Subset Selection technique? Explain in detail.
 - f. What is Partial Least Square approach in Dimension Reduction Method?
3. Attempt any three of the following: 15
 - a. Describe the concept of Generalized Additive Models.
 - b. What are Constraints and splines?
 - c. Explain the concept of Decision Trees.
 - d. Write a short note on Random Forest.
 - e. Explain in brief about Classification Trees.
 - f. What is Overfitting Problem in Decision Trees?
4. Attempt any three of the following: 15
 - a. Write a short note on Support Vector Machine (SVM).
 - b. Explain the concept of Unsupervised Learning.
 - c. Define Clustering. State its applications.
 - d. What do you mean by K-Means Clustering?
 - e. Discuss the Practical issues in Clustering.
 - f. Write a short note on Hierarchical Clustering.
5. Attempt any three of the following: 15
 - a. What are Parametric & Non-Parametric methods of Estimating value of function 'f'?
 - b. Differentiate between Linear & Non-Linear Regression.
 - c. What is k-Fold Cross-Validation?
 - d. Explain the concept of Boosting and Bagging.
 - e. Discuss the comparison of linear regression with k-Nearest neighbours.
 - f. Write in brief about Logistic Regression.