

(Time: $2\frac{1}{2}$ hours)

[Total Marks: 60]

- N. B.: (1) All questions are compulsory.
(2) Make suitable assumptions wherever necessary and state the assumptions made.
(3) Answers to the same question must be written together.
(4) Numbers to the right indicate marks.
(5) Draw neat labeled diagrams wherever necessary.
(6) Use of a Non-programmable calculator is allowed.

1. Attempt any two of the following: 12
 - a. Differentiate between Supervised and Unsupervised Learning.
 - b. Explain the Logistic regression as an important algorithm for classification.
 - c. Write a note on Predictive and Descriptive tasks used in machine learning models.
 - d. Explain the significance of feature engineering in machine learning
2. Attempt any two of the following: 12
 - a. What are errors? Explain with a suitable example.
 - b. Write a detailed note on the matrix used for error analysis.
 - c. Write a note on the Area Under the curve for error detection.
 - d. Explain the difference between feature extraction and feature transformation.
3. Attempt any two of the following: 12
 - a. What is dimensionality reduction in machine learning?
 - b. What is Maximum Likelihood Estimation?
 - c. Explain in detail lasso regressions used in machine learning
 - d. Write a note on the Support Vector Machine.
4. Attempt any two of the following: 12
 - a. Write a short note on the Market Basket Analysis using the Apriori algorithm.
 - b. Explain Hierarchical Clustering with a suitable example.
 - c. Define KNN and mention all the steps of KNN algorithm.
 - d. Why is a random forest algorithm used in machine learning?
5. Attempt any two of the following: 12
 - a. What is perceptron? Explain how many layers it contains.
 - b. Explain Bagging with a suitable example.
 - c. What is the ensemble machine learning model?
 - d. Explain Semi-Supervised and Reinforcement learning with an example.