

(2½ Hours)

[Total Marks: 75]

- 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 **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

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- List and explain the various needs of Machine Learning.
- Differentiate between Supervised and Unsupervised Learning.
- Draw a general architecture of ML systems and explain each phase.
- Explain the concept of Inductive Learning in Machine Learning.
- Explain Predictive and Descriptive task used in machine learning models.
- What is Overfitting in ML? Explain different methods to avoid Overfitting.

2. Attempt any three of the following:

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- Write a short note on Binary Classification in Machine Learning.
- What is K-nearest neighbour method? Explain its need.
- What are advantages and disadvantage of using KNN model?
- Explain the different terminologies related to decision tree.
- What is Decision Tree? Explain the working of Decision Tree Algorithm.
- Describe the concept of Attribute selection Method – Entropy.

3. Attempt any three of the following:

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- Explain the various steps involved in the working of SVM.
- Explain the concept of Hard Margin and Soft Margin associated with SVM.
- Explain the interpretation of Bayes Rule.
- Write a short not on assumptions used in Naïve Bayes Classifier.
- Explain the working of Linear Regression Model.
- Explain the working of Logistic Regression.

4. Attempt any three of the following:

- a. Explain the concept of creating Confusion Matrix for binary classification with an example.
- b. Explain the concept of Accuracy calculation with a suitable example.
- c. Write a short note on F1 Score measure in Machine Learning
- d. Describe the concept of Unsupervised Learning with suitable example.
- e. Write a short note on clusters and outliers in Machine Learning.
- f. What is Hierarchical Clustering? Explain different types of Hierarchical Clustering.

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5. Attempt any three of the following:

- a. Define partition algorithm. Explain the concept with an example of partition algorithm.
- b. What are the different issues of K-means Clustering algorithm?
- c. Explain the concept of Dimensionality Reduction with a suitable example.
- d. Explain how Feature Reduction and Feature Selection is performed in Machine Learning.
- e. What is Association Rule Mining? Explain the basic concepts of Association Rule Mining with an example.
- f. Write a short note on Apriori algorithm.

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