

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

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|---|---|---|-----|----|----|
| 1 | a | Define machine learning. | CO1 | L1 | 2M |
| | b | What is meant by Label Dataset in ML. | CO1 | L1 | 2M |
| | c | List out the performance measures of Regression. | CO2 | L1 | 2M |
| | d | Define MAE and R2. | CO2 | L1 | 2M |
| | e | What is the role of the bias-variance trade-off in decision trees | CO3 | L4 | 2M |
| | f | What assumption does the Naive Bayes Classifier make about features | CO4 | L1 | 2M |
| | g | What is the role of the activation function in a Multi-Layer Perceptron | CO5 | L2 | 2M |
| | h | Mention one key difference between Linear Regression and Logistic Regression. | CO5 | L1 | 2M |
| | i | What is a centroid in K-Means clustering | CO6 | L1 | 2M |
| | j | What is Matrix Factorization in clustering Why is it useful | CO6 | L2 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|---|--|-----|----|----|
| 2 | a | Define Machine Learning What are the advantages of Machine Learning. | CO1 | L1 | 5M |
| | b | How do you select Machine Learning model. | CO1 | L3 | 5M |

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|---|--|---|-----|----|-----|
| 3 | | Explain different Data collection Methods | CO1 | L2 | 10M |
|---|--|---|-----|----|-----|

UNIT-II

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|---|--|--|-----|----|-----|
| 4 | | Explain Euclidian Distance measure with one example. | CO2 | L2 | 10M |
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| 5 | | Classify a new customer as "high-spending" or "low-spending" based on their age and income by using KNN algorithm. | CO2 | L3 | 10M |
|---|--|--|-----|----|-----|

| Customer | Age | Income (Rupees) | Spending Class |
|----------|-----|-----------------|----------------|
| A | 25 | 30,000 | Low |
| B | 45 | 80,000 | High |
| C | 35 | 50,000 | Low |
| D | 50 | 90,000 | High |
| E (New) | 40 | 60,000 | |

UNIT-III

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|---|--|--|-----|----|-----|
| 6 | | Discuss how impurity is measured in decision trees using Gini Index and Entropy with examples. | CO3 | L4 | 10M |
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| 7 | | Apply the Naive Bayes Classifier to a real-world multi-class problem such as spam detection. Outline the model building, prediction, and evaluation steps. | CO4 | L3 | 10M |
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UNIT-IV

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| 8 | | Explain the Perceptron Learning Algorithm with steps. How does the algorithm converge for linearly separable data. | CO5 | L3 | 10M |
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|---|--|--|-----|----|-----|
| 9 | | What happens when data is not linearly separable in SVM Explain how soft margin and Kernel Trick help. | CO5 | L4 | 10M |
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UNIT-V

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|----|--|---|-----|----|-----|
| 10 | | What is Matrix Factorization in clustering How does it help in clustering large datasets. | CO6 | L3 | 10M |
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|----|--|---|-----|----|-----|
| 11 | | What is the Expectation Maximization (EM) algorithm How does it work for clustering data. | CO6 | L3 | 10M |
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