Code: 23DS3501

## III B.Tech - I Semester - Regular Examinations - NOVEMBER 2025

# MACHINE LEARNING
## (CSE - DS)

Duration: 3 hours                    Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
      2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
      3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
      4. All parts of Question paper must be answered in one place.

BL – Blooms Level                    CO – Course Outcome

## PART – A

|      |                                                                      | BL | CO  |
|------|----------------------------------------------------------------------|----|-----|
| 1.a) | Differentiate between Supervised and Unsupervised Learning.          | L2 | CO1 |
| 1.b) | Define deployment in the context of ML projects.                     | L2 | CO1 |
| 1.c) | What is the role of gradient descent in regression?                  | L2 | CO2 |
| 1.d) | What is binary classification in logistic regression?                | L2 | CO4 |
| 1.e) | Interpret attribute selection measure in decision trees.             | L2 | CO2 |
| 1.f) | List any two distance metrics used in KNN.                           | L2 | CO4 |
| 1.g) | What is meant by a margin in SVM?                                     | L2 | CO1 |
| 1.h) | Summarize the role of activation functions in neural networks.       | L2 | CO2 |
| 1.i) | State two differences between similarity and dissimilarity measures. | L2 | CO3 |
| 1.j) | Define divisive hierarchical clustering.                             | L2 | CO3 |

# PART – B

| | | | BL | CO | Max. Marks |
|---|---|---|---|---|---|
| | | **UNIT-I** | | | |
| 2 | a) | Define Machine Learning and explain its need in modern systems. | L2 | CO1 | 4 M |
| | b) | Survey various types of Machine Learning with examples. | L4 | CO1 | 6 M |
| | | OR | | | |
| 3 | a) | Interpret the phases of CRISP-DM methodology. | L3 | CO1 | 6 M |
| | b) | Compare CRISP-DM with the End-to-End ML workflow. | L4 | CO1 | 4 M |
| | | **UNIT-II** | | | |
| 4 | a) | Derive the mathematical equation for simple linear regression. | L3 | CO2 | 5 M |
| | b) | Explain the process of model fitting in simple regression with an example. | L2 | CO2 | 5 M |
| | | OR | | | |
| 5 | a) | Define polynomial regression with an example. | L2 | CO4 | 5 M |
| | b) | Examine any two applications of polynomial regression. | L3 | CO4 | 5 M |
| | | **UNIT-III** | | | |
| 6 | a) | Explain the concept of decision tree induction. | L2 | CO1 | 5 M |
| | b) | Describe the representation of a decision tree with a simple example. | L2 | CO2 | 5 M |

| | | OR | | | |
|---|---|---|---|---|---|
| 7 | a) | Explain any two applications of Naive Bayes. | L4 | CO2 | 5 M |
| | b) | Analyze the impact of different distance metrics on the performance of KNN algorithm, provide examples. | L4 | CO4 | 5 M |

| | | UNIT-IV | | | |
|---|---|---|---|---|---|
| 8 | a) | Explain the relationship between biological neurons and artificial neurons. | L2 | CO1 | 5 M |
| | b) | Draw and explain the structure of an artificial neuron model. | L3 | CO2 | 5 M |
| | | OR | | | |
| 9 | a) | Explain the concept of a feedforward neural network with a diagram. | L2 | CO2 | 5 M |
| | b) | Illustrate the concept of margin and support vectors in SVM. How do the contribute to the classification process? | L3 | CO1 | 5 M |

| | | UNIT-V | | | |
|---|---|---|---|---|---|
| 10 | a) | Explain the K-Means algorithm with suitable pseudocode. | L2 | CO3 | 5 M |
| | b) | Compare and Contrast K-Means and K-Medoids. | L4 | CO4 | 5 M |
| | | OR | | | |
| 11 | a) | Explain the working of agglomerative hierarchical clustering. | L2 | CO3 | 5 M |
| | b) | Demonstrate linkage criteria (single, complete, average) with examples. | L3 | CO4 | 5 M |