

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E.

Branch: Artificial Intelligence and Machine Learning

Course Code: 22AM5PCIML

Course: Introduction to Machine Learning

Semester: V

Duration: 3 hrs.

Max Marks: 100

Date: 23.02.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

- 1 a) Define Machine Learning. List and explain the types of machine learning in detail with appropriate examples. **10**
- b) List and justify the main challenges in Machine learning with example. **10**

UNIT - II

- 2 a) A generic optimization algorithm is capable of finding optimal solution to wide range of problems. Elaborate its technique and types in detail. **10**
- b) Define Regularized Regression. Compare shrinkage model and feature selection model. **10**

UNIT - III

- 3 a)

| Feature | Example 1 | Example 2 | Example 3 | Example 4 |
|----------------|-----------|-----------|-----------|-----------|
| X ₁ | 4 | 8 | 13 | 7 |
| X ₂ | 11 | 4 | 5 | 14 |

10

Using the given data calculate Mean, Covariance matrix and Eigenvalues.

- b) Elucidate Linear and Non-Linear Support Vector Machine in detail. **10**

UNIT - IV

- 4 a) Why is tree pruning useful in decision tree induction? Is it drawback of using a separate set of tuples to evaluate pruning, justify. **10**
- b) Define CART. Along with its algorithm, explain the process of decision tree constructing precisely. **10**

OR

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

- 5 a) Illustrate the Decision tree pruning and rule extraction procedure with example. **10**
- b) Elaborate the aspect hyperparameters. “Regularization of hyperparameters task is performed to tune the model” Does the said action serve its purpose, justify. **10**

UNIT - V

- 6 a) Illustrate the following **10**
- i) Hierarchical clustering.
 - ii) Agglomerative hierarchical clustering
 - iii) Divisive hierarchical clustering
- b) Explain the following aspects **10**
- i) Bagging and pasting
 - ii) Boosting

OR

- 7 a) Define voting classifiers. Differentiate between hard and soft voting classifiers. **10**
- b) Divide the given dataset: $\{(1,2), (3,4), (2,3), (3,7), (2,3), (9,10), (1,3), (3,1)\}$ into 2 clusters using k-means clustering algorithm. **10**
