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

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 22AM5PCIML **Max Marks: 100**
Course: Introduction to Machine Learning **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

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

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**

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