



VIT

Vellore Institute of Technology

REG.NO.:

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2024-2025

SLOT: A2 +TA2

Programme Name & Branch : B.Tech - Information Technology
Course Code and Course Name : BITE410L - Machine Learning
Faculty Name(s) : RAMKUMAR T, BALAKRUSHNA TRIPATHY, USHA DEVI G
Class Number(s) : VL2024250503066, VL2024250503060, VL2024250503070
Date of Examination : 27-01-2025
Exam Duration : 90 minutes

Maximum Marks: 50

General instructions:

- Answer All Questions
- M - Max mark, CO - Course Outcome, BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes
CO1: Understand the various machine learning approaches and data pre-processing techniques.
CO2: Develop the Learning models for the problems using supervised and advanced supervised learning based approaches.

Q. No	Question	M	CO	BL
1.	Compare and contrast Supervised machine learning, and Unsupervised machine learning strategies under the following heads: Learning policy, Representation of models, Algorithms adopted, Example applications.	10	CO1	BL2
2.	Why Re-enforcement Learning (RL) is called so? Illustrate the schematic diagram of a typical RL learner. In what way, the notion of Reinforcement Learning differs from the Supervised and Un-supervised learning paradigms. Discuss with examples.	10	CO1	BL2
3.	Suppose there are two explanatory variables $\{X_1, X_2\}$, each can hold three possible values, and a class label Y , which is binary, i.e. $X_1 \in \{A, B, C\}$, $X_2 \in \{D, E, F\}$, $Y \in \{1, 0\}$. The task is to learn hypothesis 'h' that maps (X_1, X_2) to Y . Compute the total number of hypothesis that a learner would learn from the possible mapping of the input space to the output space. If the learning algorithm is considered as PAC learnable, compute the minimum number of training examples needed for the learning algorithm to achieve a high probability of success in generalizing the unseen instances. The approximation error parameter, ' ϵ ' and the probability of failure, ' δ ' could be considered as 0.10, and 0.05 respectively.	10	CO2	BL3
4.	What do you mean by dimensionality reduction and mention why we need it? State the characteristics of the two main classes of dimensionality reduction methods. Provide a detailed discussion on the different feature selection methods with suitable examples.	10	CO1	BL2
5.	Apply PCA based dimensionality reduction technique for the below dataset and compute the first principal component which explains the most data variance.	10	CO1	BL3

X1	X2
4	11
8	4
13	5
7	14
