

--	--	--	--	--	--	--	--	--	--	--	--

**B. TECH.**  
**YEAR: 3<sup>rd</sup> SEMESTER: VI<sup>th</sup>**  
**MAJOR EXAMINATION: 2025-26**  
**Introduction to Machine Learning**

TIME: 3 Hrs.

MAX MARKS: 50

**Note: Attempt ALL questions.**

Q1.	Attempt any <u>Five</u> parts of the following. (Unit I – Unit IV)	Marks	COs	BL	PO	PI Code
(a).	Define supervised learning with one example.	2	1	1	1	1.1.1
(b).	What is a sigmoid function?	2	2	1	1	1.1.1
(c).	Define clustering in machine learning.	2	3	1	1	1.2.1
(d).	What is overfitting?	2	3	2	2	2.1.1
(e).	Define decision tree.	2	4	1	1	1.1.1
(f).	What is reinforcement learning?	2	4	1	1	1.2.1
(g).	Define validation in machine learning.	2	2	2	2	2.2.1
<b>Q2.</b>	Attempt any <u>Two</u> parts of the following. (Unit I)					
(a).	Explain the main components of a learning system and their interaction.	5	1	2	1	1.2.1
(b).	Differentiate between supervised, unsupervised, and reinforcement learning with real-world applications.	5	1	4	2	2.1.2
(c).	Explain the approximation–generalization tradeoff and relation among bias, variance, and learning curves.	5	1	4	2	2.2.2
<b>Q3.</b>	Attempt any <u>Two</u> parts of the following. (Unit II)					
(a).	Explain linear classification and differentiate it from linear regression.	5	2	2	1	1.2.1
(b).	Explain logistic regression and the role of the sigmoid function in binary classification.	5	2	3	2	2.1.1
(c).	What is regularization? Explain its need with examples.	5	2	3	3	3.1.1
<b>Q4.</b>	Attempt any <u>Two</u> parts of the following. (Unit III)					
(a).	Explain the K-Means clustering algorithm with steps and convergence criteria.	5	3	3	2	2.2.1
(b).	Explain hierarchical clustering and differentiate between agglomerative and divisive approaches.	5	3	4	2	2.2.2
(c).	Explain ensemble learning and discuss bagging and random forests.	5	3	3	3	3.2.1

<b>Q5.</b>	Attempt any <b>Two</b> parts of the following. (Unit IV)					
(a).	Explain decision trees and describe the process of learning decision trees.	5	4	3	2	2.1.1
(b).	Compare tree models and rule-based models in machine learning.	5	4	4	2	2.2.2
(c).	Explain reinforcement learning and its main components with an example.	5	4	3	3	3.1.1

**BL** – Bloom’s Taxonomy Levels (1- Remembering, 2- Understanding, 3- Applying, 4- Analysing, 5- Evaluating, 6- Creating)

**CO** – Course Outcomes

**PO** – Program Outcomes

**PI Code** – Performance Indicator Code