END SEMESTER EXAMINATION, NOV 2024

T. E. SEMESTER V (CBCGS/CBSGS)

Branch:	Computer Engineering	**Q.P. Code:**	ED245CER5SP-2
Subject:	Machine Learning(AI/DS Specialization)	**Duration:**	2 hours
Subject Code:		**Max. Marks:**	60

Instructions: **1. All sections are compulsory**
2. Figures to the right indicate full marks.
3. Assume suitable data if necessary and state the assumptions clearly.

Section-I Short Answer Questions (Answer any 05 questions out of 06) (10 Marks)

Q. No.		Marks	CO	RBT Level	PI
1	Define regression and list three common types of regression models.	02	CO1	U	1.3.1
2	Differentiate between perceptron and sigmoid units in neural networks.	02	CO2	R	1.1.1
3	Describe the concept of overfitting in machine learning models.	02	CO3	R	1.1.1
4	Explain the importance of tuning hyper parameters in machine learning.	02	CO4	R	1.1.1
5	Compare the concepts of Bagging and Random Forests.	02	CO5	U	1.3.1
6	Mention two techniques for hierarchical clustering and their use cases.	02	CO6	U	1.3.1
Section-II	**Descriptive Answer Questions (Answer any 04 out of 06)**			**(20 Marks)**	
1	Discuss the importance of bias and variance tradeoff in machine learning.	05	CO1	AN	3.1.1
2	Explain the perceptron algorithm and discuss its limitations.	05	CO2	R	1.1.1
3	Describe the use of principal component analysis (PCA) for dimensionality reduction.	05	CO3	E	2.2.4
4	What are the main differences between Decision Trees and Random Forests?	05	CO4	E	2.2.4
5	Compare the principles behind Bagging and Stacking ensemble methods.	05	CO5	U	1.3.1
6	Outline the K-means clustering algorithm and its advantages.	05	CO6	U	1.3.1
Section-III	**Long Answer Question (Answer any 03 out of 05)**			**(30 Marks)**	
1	Discuss ethical and legal issues that may arise in machine learning applications.	10	CO2	U	1.3.1
2	Describe the key differences between Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN).	10	CO3	AN	3.1.1

3	Define model evaluation metrics, such as accuracy and F1-score, and explain their importance.	10	CO4	A	2.3
4	Create a decision tree based on the following attributes: education, job experience, skills, industry.	10	CO5	AN	3.1.1
5	Explain how the Expectation-Maximization (EM) algorithm functions in Gaussian Mixture Models.	10	CO6	U	1.3.1