

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-VII EXAMINATION – WINTER 2025

Subject Code:3170924

Date:26-11-2025

Subject Name:AI and Machine Learning

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Elaborate the concept of artificial intelligence.	03
	(b) Give differences between supervised and unsupervised learning.	04
	(c) What is machine learning? Explain overfitting and underfitting phenomena in machine learning with appropriate examples.	07
Q.2	(a) Discuss uni-variate and multivariate linear regression.	03
	(b) Explain the concept of decision trees for classification in machine learning setup.	04
	(c) What is logistic regression approach in machine learning.	07
OR		
	(c) With the help of a schematic diagram, explain the concept of K-means clustering. How KNN is different from K-means clustering?	07
Q.3	(a) Discuss the concept of a hypothesis and hypothesis space in Machine Learning Regression.	03
	(b) Explain Dimensionality Reduction technique.	04
	(c) Which algorithm is more beneficial? Random Forest or Support vector machine (SVM) for a classification task?	07
OR		
Q.3	(a) Explain the concept of Bias-Variance tradeoff in machine learning.	03
	(b) Elaborate the concept of Entropy and Information Gain with respect to Decision Trees.	04
	(c) Elaborate Agglomerative Hierarchical Clustering.	07

- Q.4** (a) Give comparison between conventional set and fuzzy set. **03**
(b) With respect to fuzzy logic elaborate how to write membership values. **04**
(c) Enlist and elaborate operation of fuzzy sets. **07**

OR

- Q.4** (a) What is fuzzification and defuzzification? **03**
(b) Discuss the importance of activation functions in ANNs. What are the common activation functions used for Regression and Classification tasks? **04**
(c) Elaborate Defuzzification methods. **07**

- Q.5** (a) What is Perceptron NN, Multilayer Perceptron NN, Back propagation Neural Networks? **03**
(b) Explain fuzzy logic application with neat and clean diagram. **04**
(c) What is fuzzification and defuzzification? Explain the meaning of universe of discourse. **07**

OR

- Q.5** (a) Explain any one genetic algorithm-based application. **03**
(b) Explain genetic algorithm operator: Reproduction and crossover. **04**
(c) Elaborate genetic algorithm process step by step. **07**
