

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 5 – EXAMINATION – SUMMER 2026

Subject Code: 3154203

Date: 09/06/2026

Subject Name: Machine Learning Essentials

Time: 02:30 PM TO 05:00 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.**

- Q.1**
- (a) What is a feature? Explain role of feature engineering in machine learning. **03**
 - (b) Define central tendency of data. Explain mean, median and mode of data. **04**
 - (c) Discuss different types of machine learning. **07**
- Q.2**
- (a) Give three different examples of unlabelled data for unsupervised learning. **03**
 - (b) Differentiate predictive model and descriptive model. **04**
 - (c) Explain quantitative data and qualitative data with suitable examples. **07**
- OR
- Q.2**
- (c) Explain different data visualization techniques with suitable examples. **07**
- Q.3**
- (a) List applications of clustering algorithms. **03**
 - (b) Explain SSE and its use in the context of k-means clustering algorithm. **04**
 - (c) Explain how Confusion matrix and related measures can be used to evaluate performance of a supervised learning based model. **07**
- OR
- Q.3**
- (a) List applications of association rule mining. **03**
 - (b) Explain Hierarchical clustering and its types. **04**
 - (c) Explain different approaches under k-fold cross validation method. **07**
- Q.4**
- (a) What is the main goal of ensemble learning in machine learning? **03**
 - (b) How does boosting improve model performance over iterations? **04**
 - (c) Compare various feature selection approaches. **07**
- OR
- Q.4**
- (a) What is a random forest classifier? **03**
 - (b) How does bagging reduce variance in a model? **04**
 - (c) Compare feature construction and feature extraction. **07**
- Q.5**
- (a) Define activation function in Artificial Neural Network. **03**
 - (b) Explain logistic regression in brief. **04**
 - (c) Discuss how decision tree based classifier can be developed for a real world application. Explain strengths and weaknesses of decision tree based classifiers. **07**

OR

Q.5	(a) Define kernel in Support Vector Machine.	03
	(b) Explain bias-variance trade-off in brief.	04
	(c) Discuss how simple linear regression based prediction model can be developed for a real world application. Explain strengths and weaknesses of simple linear regression based prediction models.	07
