

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VI EXAMINATION – SUMMER 2026

Subject Code:3161710

Date:26-05-2026

Subject Name: Artificial Intelligence 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.

- Q.1**
- | | | |
|-----|--|-----------|
| (a) | How to calculate inverse of a matrix? | 03 |
| (b) | Enlist the applications of supervised and unsupervised machine learning. | 04 |
| (c) | With a suitable example explain how regression is helpful for experimental analysis. | 07 |

- Q.2**
- | | | |
|-----|---|-----------|
| (a) | How is matrix theory useful in solving machine learning problems? | 03 |
| (b) | Explain normal equation for regression with multiple variables. | 04 |
| (c) | Explain cost function representation in logistic regression analysis. | 07 |

OR

- | | | |
|-----|---|-----------|
| (c) | What is cost function? Explain cost function representation in single variable linear regression. | 07 |
|-----|---|-----------|

- Q.3**
- | | | |
|-----|---|-----------|
| (a) | What is feature scaling in regression? | 03 |
| (b) | What is hypothesis in machine learning? | 04 |
| (c) | Explain implementation of linear regression using Gradient descent algorithm. | 07 |

OR

- Q.3**
- | | | |
|-----|---|-----------|
| (a) | What are Support Vectors in SVMs? | 03 |
| (b) | How is SVM different from logistic regression? Explain SVM formulation for separable training data. Also discuss issues with inseparable dataset. | 04 |
| (c) | Write a short note on Principal component analysis method for dimensionality reduction. | 07 |

- Q.4**
- | | | |
|-----|---|-----------|
| (a) | How are decision trees useful for classification of datasets? | 03 |
| (b) | What is Hinge loss function in SVM? | 04 |
| (c) | Graphically explain overfitted and underfitted model. | 07 |

OR

- Q.4**
- | | | |
|-----|---|-----------|
| (a) | Implement AND logic using artificial neural network. | 03 |
| (b) | Why dimensionality reduction important in machine learning? | 04 |
| (c) | Write a short note on back propogation algorithm in ANN. | 07 |

- Q.5**
- | | | |
|-----|---|-----------|
| (a) | What is a neuron in ANN? | 03 |
| (b) | How to initialize Weights and Biases in Neural Networks? | 04 |
| (c) | Explain how K-Means algorithm is used in clustering data. | 07 |

OR

- Q.5**
- | | | |
|-----|--|-----------|
| (a) | Implement OR logic using artificial neural network. | 03 |
| (b) | What is Stochastic gradient descent? | 04 |
| (c) | Compare Adaboost ensemble learning method with Random forest method. | 07 |
