

Code No: MC2031/20

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURAJADA VIZINAGARAM

MCA III Semester Regular/Supplementary Examinations, November- 2025

Machine Learning with Python

Time: 3 Hours

Max. Marks: 70

Question Paper consists of FIVE units, each carrying 14 marks
Each unit has TWO questions; either of them should be answered
All parts of a question must be answered at one place.

UNIT-I

Marks

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|----|----|---|----|
| 1. | a) | Discuss the types of Machine Learning and their real-world applications. | 7M |
| | b) | Describe the role of Python in Machine Learning. Why is it widely used for ML applications? | 7M |

(OR)

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| 2. | a) | What are the essential Python libraries used for Machine Learning? Briefly describe. | 7M |
| | b) | Explain how Scikit-learn supports model development and evaluation in Python. | 7M |

UNIT-II

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| 3. | a) | Explain the concept of Supervised Learning with suitable examples | 7M |
| | b) | Discuss the key characteristics of k-Nearest Neighbor (k-NN) and Decision Tree algorithms. | 7M |

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| 4. | a) | What is a Regression Model? Explain the difference between Linear and Logistic Regression. | 7M |
| | b) | Define Naive Bayes Classifier and explain its basic working principle. | 7M |

UNIT-III

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| 5. | a) | Define feature scaling and explain why it is necessary in Machine Learning. | 7M |
| | b) | Explain different techniques to handle missing and categorical data in datasets. | 7M |

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| 6. | a) | Describe Principal Component Analysis (PCA) and its importance in reducing data dimensions. | 7M |
| | b) | Compare PCA and LDA with respect to their objectives and working approach. | 7M |

UNIT-IV

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| 7. | a) | Define model evaluation. Explain how cross-validation improves model performance. | 7M |
| | b) | Describe the role of Grid Search in hyperparameter tuning. | 7M |

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| 8. | a) | What is Ensemble Learning? Explain the basic idea of Bagging with an example. | 7M |
| | b) | Describe the concept of Boosting and how it improves weak learners. | 7M |

UNIT-V

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|----|----|--|----|
| 9. | a) | Define text data and explain how it can be represented using the Bag of Words model. | 7M |
| | b) | Explain the concept of term frequency-inverse document frequency (tf-idf) with an example. | 7M |

(OR)

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| 10. | a) | What is Sentiment Analysis? Explain its importance and applications in text mining. | 7M |
| | b) | Define a Recommender System. Explain the difference between content-based and collaborative filtering. | 7M |