No. of Printed Pages : **8**

A10.5-R5.1 : MACHINE LEARNING USING PYTHON

DURATION : 03 Hours **MAXIMUM MARKS : 100**

OMR Sheet No. :						

Roll No. : | | | | | | | **Answer Sheet No. :** | | | | | | |

Name of Candidate : _____ **; Signature of Candidate :** _____

INSTRUCTIONS FOR CANDIDATES :

- Carefully read the instructions given on Question Paper, OMR Sheet and Answer Sheet.
- Question Paper is in English language. Candidate has to answer in English language only.
- There are **TWO PARTS** in this Module/Paper. **PART ONE** contains **FOUR** questions and **PART TWO** contains **FIVE** questions.
- **PART ONE** is Objective type and carries **40** Marks. **PART TWO** is Subjective type and carries **60** Marks.
- **PART ONE** is to be answered in the **OMR ANSWER SHEET** only, supplied with the question paper, as per the instructions contained therein. **PART ONE** is **NOT** to be answered in the answer book for **PART TWO**.
- Maximum time allotted for **PART ONE** is **ONE HOUR**. Answer book for **PART TWO** will be supplied at the table when the Answer Sheet for **PART ONE** is returned. However, Candidates who complete **PART ONE** earlier than one hour, can collect the answer book for **PART TWO** immediately after handing over the Answer Sheet for **PART ONE** to the Invigilator.
- **Candidate cannot leave the examination hall/room without signing on the attendance sheet and handing over his/her Answer Sheet to the invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper.**
- After receiving the instruction to open the booklet and before answering the questions, the candidate should ensure that the Question Booklet is complete in all respects.

DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

PART ONE

(Answer all questions; each question carries ONE mark)

1. Each question below gives a multiple choice of answers. Choose the most appropriate one and enter in the "OMR" answer sheet supplied with the question paper, following the instructions therein. (1x10)

1.1 Which of the following is not a Python data structure ?

(A) List

(B) Dictionary

(C) DataFrame

(D) Tuple

1.2 What does the try-except block in Python handle ?

(A) Functions

(B) Modules

(C) Exceptions

(D) Loops

1.3 What is the primary purpose of NumPy in Python ?

(A) Data manipulation

(B) Data visualization

(C) Array manipulation

(D) Exception handling

1.4 Which machine learning model is best suited for classification tasks ?

(A) Naive Bayes

(B) Linear Regression

(C) K-means

(D) Principal Component Analysis

1.5 In deep learning, what is the primary function of a convolutional layer in CNNs ?

(A) To reduce overfitting

(B) To perform backpropagation

(C) To extract features from input data

(D) To generate predictions

1.6 Which of the following is a common evaluation metric for classification models ?

(A) Mean Squared Error

(B) R-squared

(C) Accuracy

(D) Adjusted R-squared

1.7 What is the function of the read_csv() method in the pandas library ?

(A) Load text files

(B) Load Excel files

(C) Load CSV files

(D) Load HTML files

1.8 Which of the following is an unsupervised learning algorithm ?

(A) Random Forest

(B) Gradient Boosting

(C) K-Means Clustering

(D) Logistic Regression

1.9 In Natural Language Processing (NLP), what does sentiment analysis involve ?

(A) Recognizing named entities

(B) Analyzing emotions in text

(C) Text classification

(D) Parsing syntax

1.10 In Python, which library is commonly used for data visualization ?

(A) NumPy

(B) Pandas

(C) Seaborn

(D) SciPy

2. Each statement below is either TRUE or FALSE. Choose the most appropriate one and enter your choice in the "OMR" answer sheet supplied with the question paper, following the instructions therein. (1x10)

2.1 Python supports object-oriented programming.

2.2 Pandas is a library primarily used for machine learning.

2.3 K-means is a supervised learning algorithm.

2.4 In a neural network, backpropagation helps in adjusting weights based on error.

2.5 Gradient Descent is a method used to optimize machine learning models.

2.6 In NLP, named entity recognition identifies people, locations, or organizations in text.

2.7 Supervised learning requires labeled data for training models.

2.8 TensorFlow and PyTorch are used for building neural networks.

2.9 A perceptron is a fundamental building block of deep neural networks.

2.10 NLP is only used for text classification tasks.

3. **Match words and phrases in column X with the closest related meaning/word(s)/phrase(s) in column Y. Enter your selection in the "OMR" answer sheet supplied with the question paper, following the instructions therein.** **(1x10)**

X		Y	
3.1	NumPy	**A.**	Classification algorithm
3.2	Pandas	**B.**	Manipulating arrays
3.3	Seaborn	**C.**	Image recognition
3.4	K-nearest neighbors	**D.**	Handling dataframes
3.5	Support Vector Machine	**E.**	Regression and classification
3.6	Convolutional Neural Networks	**F.**	Visualization library
3.7	Cross-validation	**G.**	Reducing overfitting
3.8	Gradient Descent	**H.**	Optimization technique
3.9	Sentiment Analysis	**I.**	Text classification
3.10	TensorFlow	**J.**	Deep learning framework
		K.	Cross-validation
		L.	NLP
		M.	PyTorch

4. Each statement below has a blank space to fit one of the word(s) or phrase(s) in the list below. Choose the most appropriate option, enter your choice in the "OMR" answer sheet supplied with the question paper, following instructions therein. **(1x10)**

A.	Ensemble Model	**B.**	Neural Network	**C.**	Try	**D.**	Module
E.	Loss	**F.**	NumPy	**G.**	PyTorch	**H.**	List
I.	Validate	**J.**	read_csv()	**K.**	Named Entity Recognition	**L.**	Backpropagation
M.	Supervised Learning						

4.1 The _____ library is used for handling multidimensional arrays in Python.

4.2 In Python, the _____ function is used to catch exceptions during program execution.

4.3 A/An _____ is a machine learning model that combines multiple models to improve accuracy.

4.4 _____ is a type of machine learning where the algorithm is trained with labelled data.

4.5 In deep learning, a _____ consists of layers of artificial neurons used to process complex data.

4.6 In NLP, _____ refers to the process of identifying named entities like persons or organizations.

4.7 Cross-validation is a technique used to _____ a machine learning model.

4.8 A _____ is a collection of code that can be reused in multiple programs in Python.

4.9 The _____ method in pandas is used to load CSV data into a DataFrame.

4.10 Gradient descent is used to minimize the _____ function in machine learning models.

PART TWO

(Answer any FOUR questions)

5. (a) Explain Python's list, dictionary, and tuple data structures and their appropriate use cases.

(b) Discuss the use of NumPy in machine learning and data manipulation. Include examples. **(8+7)**

6. (a) Explain the various types of supervised learning models, including regression and classification.

(b) Discuss how to implement machine learning models in Python using the scikit-learn library. **(8+7)**

7. (a) Explain the concept of Artificial Neural Networks (ANN). Discuss the structure and working of a feedforward neural network.

(b) Explain the backpropagation algorithm and its significance in training deep learning models. **(8+7)**

8. (a) What are the key concepts of Convolutional Neural Networks (CNN) ? Explain their application in computer vision.

(b) Discuss how the TensorFlow library is used to build deep learning models. Also, provide a brief comparison between TensorFlow and PyTorch. **(8+7)**

9. (a) Explain the basic tasks in Natural Language Processing (NLP). Provide examples of applications like sentiment analysis and text classification.

(b) Discuss the role of cross-validation and evaluation metrics in machine learning models. **(8+7)**

- o O o -

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK