No. of Printed Pages : 4

Sl. No.

B3.2-R5 : ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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

Roll No. : | | | | | | |

Answer Sheet No. : | | | | | | |

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

INSTRUCTIONS FOR CANDIDATES :

- Carefully read the instructions given on Question Paper, Answer Sheet.
- Question Paper is in English language. Candidate has to answer in English Language only.
- **Question paper contains Seven questions. The Question No. 1 is compulsory. Attempt any FOUR Questions from Question No. 2 to 7.**
- **Parts of the same question should be answered together and in the same sequence.**
- **Questions are** to be answered in the **ANSWER SHEET** only, supplied with the Question Paper.
- **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.

1. (a) What is business intelligence? Briefly discuss.

(b) Briefly discuss some of the examples of AI automation.

(c) How does one perform subset, slice and index operations using NumPy ?

(d) What are the features of good clustering algorithm ? Explain.

(e) What is reinforcement learning and how it is related to deep learning ?

(f) Briefly discuss some of the benefits of facial recognition technology.

(g) How is text data processed and analysed in NLP ? **(7x4)**

2. (a) Explain the concept of intelligent agents in artificial intelligence and their structure, including goal-based agents, utility-based agents, and learning agents.

(b) Explain how AI is being utilized in the development of smart cars, devices, and homes to improve travel and navigation systems.

(c) Discuss the difference between OLAP and OLTP in data analytics and the use of artificial intelligence in these systems. **(6+6+6)**

3. (a) What is the role of modules and packages in Python programming, and how do they aid in organizing code ?

(b) Discuss the Numpy library in Python and its functions, including subsetting, slicing, indexing and broadcasting ? How are these functions used in data analysis ?

(c) What are the capabilities of the Pandas library in Python and how is it used for data manipulation and analysis? Provide an example of how to load and manipulate data frames, and visualize data using matplotlib ? **(6+6+6)**

4. (a) How to evaluate the performance of a Regression and Classification model ? How can a real-world example of a smart car or home demonstrate the deployment of a machine learning model and its performance evaluation using metrics such as confusion matrix or score of the model ?

(b) What is Clustering in Machine Learning and how does it differ from Classification ? In what ways can clustering algorithms be applied in the entertainment industry ?

(c) What is overfitting, underfitting, cross validation, and feature engineering in machine learning ? Provide a case study in the automobile industry where feature engineering and cross-validation have prevented overfitting or underfitting in a machine learning model for regression or classification problems ? **(6+6+6)**

5. (a) What is the difference between Feed Forward Neural Network and Back Propagation in the context of Deep Learning? Provide an example of a Deep Learning model using Image Data ?

(b) How is Convolution Neural Network (CNN) different from other Neural Networks ? How can Tensor Flow be used to build Neural Networks ?

(c) What is Convolution Neural Network ? Briefly discuss. Also discuss, how convolutional layers works. **(6+6+6)**

6. (a) What is the purpose of image representation and analysis in computer vision ? How it is done? Explain.

(b) How does Open CV support face recognition and detection ?

(c) What is involved in training data for a face recognizer and how does it make predictions ? **(6+6+6)**

7. (a) Describe the various applications of NLP such as automatic summarization, sentiment analysis, and text classification and how they are performed and solved using NLP techniques ?

(b) Explain the role of the NLTK library in NLP and how it is used to perform various NLP tasks and operations ?

(c) Explain the process of evaluation of a model in NLP, and how confusion matrix is used to measure the performance of NLP models ? **(6+6+6)**

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SPACE FOR ROUGH WORK