No. of Printed Pages : **1**

Sl. No.

B3.2-R5 : ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

NOTE :

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Total Time : 3 Hours **Total Marks : 100**

1. (a) Define Artificial Intelligence. What are the task domains of Artificial Intelligence ?
(b) List and explain various Artificial Intelligence Applications.
(c) Differentiate between NumPy and Pandas libraries.
(d) What is the difference between supervised learning and unsupervised learning ?
(e) Write a short note on image sampling in computer vision.
(f) What is NLP ? Explain in brief.
(g) Explain the following terms in respect to Machine Learning :
1. Batch size
2. Learning rate
3. Epoch **(7x4)**

2. (a) Differentiate between Online Analytical Processing (OLAP) and Online Transactional Processing(OLTP).
(b) Explain the Role of Artificial Intelligence in Healthcare.
(c) How can we read data from various sources using Pandas ? Explain data frame in Pandas. **(6+6+6)**

3. (a) What is Machine Learning ? What is the need of it ? Briefly explain the issues in machine learning.
(b) Apply k-means clustering on the following data : 2, 3, 4, 10, 11, 12, 20, 25, 30 to group them in two clusters (i.e. K = 2)
(c) Explain feed forward neural network and back propagation in neural network. **(6+6+6)**

4. (a) Enlist Computer Vision applications and explain any two in detail.
(b) Explain how sentiment analysis application can be solved using NLP ?
(c) Why text processing is required before applying into any machine learning algorithm ? How text data can be pre-processed ? **(6+6+6)**

5. (a) Explain Feature selection engineering in detail and enlist types of Feature selection methods. Also explain overfitting and underfitting.
(b) Explain the phases of NLP in detail. **(10+8)**

6. (a) List out types of Artificial Intelligence agents. Explain any two in detail.
(b) Describe Matplotlib library in Python with subplots with the help of a suitable example.
(c) What is the use of MNIST dataset ? What is the size of each image in MNIST dataset ? What are the total number of images in MNIST dataset ? **(6+6+6)**

7. (a) What is convolutional neural networks ? Draw architecture. Explain each components in brief.
(b) What is regression ? Explain linear regression with example. **(10+8)**

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