SAMPLE PAPERS

DIPLOMA FIFTH SEMESTER EXAMINATION 2025 (JUT)

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

DIPLOMA WALLAH

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Full Marks: 70 marks | Time: 3 Hours

Instructions:

- Question No. 1 is compulsory.

- Answer any **FOUR** questions from the remaining (Q.2 to Q. 7 marks).
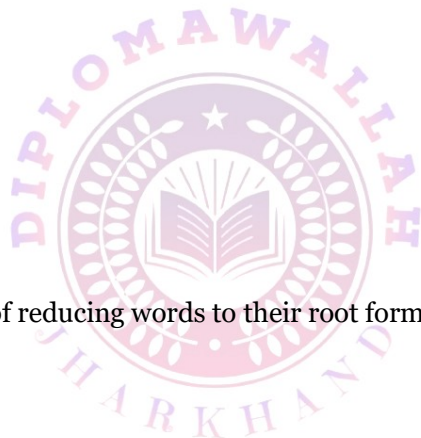

Q.1 Multiple Choice Questions (Compulsory)

1. Which Python library is primarily used for creating static, animated, and interactive visualizations?

    a) NumPy

    b) Pandas

    c) Matplotlib

    d) Scikit-learn

2. In Git, which command is used to upload local repository content to a remote repository?

    a) git pull

    b) git push

    c) git commit

    d) git init

3. Which cloud service model provides a virtual machine and operating system but requires the user to manage applications?

    a) SaaS (Software as a Service)

    b) PaaS (Platform as a Service)

    c) IaaS (Infrastructure as a Service)

    d) FaaS (Function as a Service)

4. What does the 'K' in K-Means clustering represent?

a) Number of iterations

b) Number of clusters

c) Number of data points

d) Number of outliers

5. Which activation function maps the output values strictly between 0 and 1?

a) ReLU

b) Tanh

c) Sigmoid

d) Linear

6. The problem where a model performs well on training data but poorly on unseen test data is known as:

a) Underfitting

b) Overfitting

c) Regularization

d) Normalization

7. In NLP, the process of reducing words to their root form (e.g., "running" to "run") is called:

a) Tokenization

b) Stop Word Removal

c) Stemming

d) Vectorization

Q.2

A) Define Artificial Intelligence (AI). Explain the different types of AI (Narrow, General, Super AI). [7 Marks]

B) What is Machine Learning (ML)? Explain the Machine Learning Workflow/Pipeline with a neat block diagram. [7 Marks]

Q.3

A) Differentiate between Supervised, Unsupervised, and Reinforcement Learning with examples. [7 Marks]

B) What is Data Preprocessing? Explain the steps to handle Missing Values and Outliers in a dataset. [7 Marks]

Q.4

A) Explain Linear Regression. Differentiate between Simple Linear Regression and Multiple Linear Regression. [7 Marks]

B) What is a Decision Tree? Explain key terms like Root Node, Entropy, and Information Gain. [7 Marks]

Q.5

A) Define Deep Learning. Explain the architecture of an Artificial Neural Network (ANN) including Input, Hidden, and Output Layers. [7 Marks]

B) What is Cloud Computing in AI? Explain the difference between IaaS, PaaS, and SaaS service models. [7 Marks]

Q.6

A) Explain the Confusion Matrix and how to calculate Accuracy, Precision, Recall, and F1-Score. [7 Marks]

B) What is Natural Language Processing (NLP)? Explain the steps of text processing: Tokenization, Stemming, and Stop Word Removal. [7 Marks]

Q.7 Short Notes

(Answer any FOUR. 4 × 3.5 Marks = 14 Marks)

A) Docker Architecture (Client, Daemon, Images, Containers)

B) Python Libraries (NumPy & Pandas)

C) The 5 Vs of Big Data

D) Activation Functions (ReLU, Sigmoid, Tanh)

E) Sentiment Analysis

SOLUTIONS & ANSWER KEY (PAPER 1)

MCQ Key:

1-(c), 2-(b), 3-(c), 4-(b), 5-(c), 6-(b), 7-(c)

Model Answers (Hints):

- **2A (AI Types):** Narrow AI (Specific task, e.g., Alexa), General AI (Human-like), Super AI (Surpasses human).

- **2B (ML Pipeline):** Data Collection -> Preprocessing -> Training -> Evaluation -> Deployment.

- **4B (Decision Tree):** Root Node (First split), Leaf Node (Outcome), Entropy (Measure of impurity), Info Gain (Reduction in entropy).

- **5A (ANN):** Input Layer (Receives data), Hidden Layer (Processing/Weights), Output Layer (Prediction). Difference from Biological neuron (Dendrites/Axons vs Inputs/Weights).

📄 **SAMPLE PAPER 2**

Course: Artificial Intelligence & Machine Learning

Full Marks: 70 | Time: 3 Hours

Instructions:

1. **Question No. 1 is compulsory.** (7 MCQs × 2 Marks = 14 Marks)