

# ■ Monthly Exam – Applied AI & Data Science

Date: 7th September 2025

Time: 5:30 PM – 7:00 PM (1.5 Hours)

Total Marks: 80

## ■ Case Study: Predicting Tesla Stock Price Movements

You have recently been hired as a **Data Scientist** at a financial consultancy firm. Your manager has assigned you the task of analyzing **Tesla's stock market data (2010–2020)** to help investors make better trading decisions.

The firm expects you to:

1. Explore the dataset and identify patterns.
2. Build predictive models to forecast stock prices.

Your results will directly contribute to the company's investment strategy.

**Dataset Link:** Tesla Stock Data (2010–2020) – Kaggle

### ***Dataset Description***

The dataset contains daily stock trading information for Tesla, including:

- Date – Trading day
- Open – Price at market opening
- High – Highest price during the day
- Low – Lowest price during the day
- Close – Price at market closing
- Adj Close – Adjusted closing price
- Volume – Total number of shares traded

## ■ Section A – Exploratory Data Analysis (30 Marks, ~30 minutes)

1. Show the **trend of Closing Price** over the years. (5 marks)
2. Find and visualize the **correlation** between Open, High, Low, and Close. (5 marks)
3. Identify the **highest and lowest trading volume days** and discuss what it might mean for investors. (5 marks)
4. Plot the **distribution of Closing Prices**. (5 marks)
5. Report any **missing values or anomalies** and suggest how to handle them. (10 marks)

## Section B – Linear Regression (25 Marks, ~25 minutes)

1. Build a **Linear Regression model** using Open, High, Low, and Volume as predictors. (10 marks)
2. Evaluate the model using **MAE, RMSE, and R<sup>2</sup> score**. (10 marks)
3. Explain which feature contributes the most to predicting the Closing Price. (5 marks)

## Section C – Logistic Regression (25 Marks, ~25 minutes)

1. Create a new variable **Price\_Up**:
  - 1 if next day's Closing Price is higher than today's.
  - 0 otherwise. (5 marks)
2. Build a **Logistic Regression model** to predict Price\_Up. (10 marks)
3. Evaluate the model using **Accuracy, Confusion Matrix, Precision, Recall, and F1-score**. (10 marks)