**Supervised Machine Learning (Part 1) - Practical Assessment**

Total Marks: 20

### **Task 1: Understanding Supervised Learning (5 marks)**

* Define Supervised Learning (2 marks):
  + Provide a concise definition of supervised learning and explain its role in machine learning.
* Types of Supervised Learning (3 marks):
  + Differentiate between classification and regression tasks.
  + Provide two examples for each type, explaining the nature of input features and target labels.

### **Task 2: Classification Algorithms (Decision Trees, Naïve Bayes) (5 marks)**

* Decision Trees (3 marks):
  + Implement a decision tree classifier using Scikit-Learn with a provided dataset.
  + Evaluate the model's performance and discuss the key decisions made by the tree.
* Naïve Bayes (2 marks):
  + Implement a Naïve Bayes classifier with the same dataset.
  + Compare the performance of the Naïve Bayes classifier with the decision tree.

### **Task 3: Regression Algorithms (Linear Regression) (5 marks)**

* Linear Regression Basics (2 marks):
  + Implement a linear regression model using a sample dataset provided.
  + Display and interpret the regression line and coefficients.
* Model Evaluation in Regression (3 marks):
  + Evaluate the linear regression model using appropriate metrics (e.g., Mean Squared Error).
  + Discuss the practical implications of the model's performance.

### **Task 4: Data Understanding with Statistics (5 marks)**

* Descriptive Statistics (3 marks):
  + Calculate and interpret mean, median, and standard deviation for a given dataset.
  + Create visualizations, such as histograms and box plots, to represent the data distribution.
* Statistical Visualization (2 marks):
  + Choose one visualization method (e.g., scatter plot or box plot) to represent relationships or trends in a dataset.
  + Provide a brief explanation of why the selected visualization is suitable.

### **Submission Guidelines (1 mark)**

* Jupyter Notebook Submission (1 mark):
  + Organize the tasks into a Jupyter Notebook with appropriate headings, code cells, and markdown explanations.
  + Include comments in the code cells for clarity.