Part:1 Short Answers (5 marks for each, you'll have to answer 6 questions)

1. Write a Python code snippet that swaps the values of two variables without using a temporary variable.
2. Describe the purpose of an **"init"** method in a Python class and provide an example of how it is used in object-oriented programming.
3. Write a Python class named "**Rectangle**" with attributes for width and height and a method to calculate its area.
4. Explain the purpose of the **".gitignore"** file in a Git repository. Provide an example of a scenario where you would use it.
5. Describe the concept of ensemble learning in machine learning. Provide an example of an ensemble method and explain how it combines multiple models to make predictions.
6. Explain the concept of bias-variance trade-off in machine learning. How does it impact the performance of a model, and what strategies can be employed to balance bias and variance?
7. Explain the mathematical concept of a kernel function in Support Vector Machines (SVM). How does it transform data into a higher-dimensional space for better separation of classes?

Part 2: Multiple Choice Questions(1 mark for each question, you'll answer 10 questions like this)

1. In Python, which of the following is NOT a primary data type?

   a) int

   b) float

   c) list

   d) class

2. Which of the following best describes the concept of inheritance in OOP?

   a) It allows a class to inherit the properties and methods of another class.

   b) It enables a class to create multiple instances of objects.

   c) It restricts access to specific methods within a class.

   d) It represents the ability of an object to take on multiple forms.

3. What is the purpose of encapsulation in OOP?

    a) To allow a class to inherit from multiple parent classes.

    b) To hide the internal details of an object and expose only what's necessary.

    c) To create objects from classes.

    d) To define a class within another class.

4. What Git command is used to stage changes for the next commit?

    a) git branch

    b) git push

    c) git add

    d) git commit -m

5. Which Git command is used to view the commit history of a Git repository?

    a) git log

    b) git status

    c) git diff

    d) git checkout

6. In machine learning, what is the primary objective of feature selection?

    a) To make a model more complex

    b) To improve model performance

    c) To increase the number of features

    d) To eliminate the need for data preprocessing

Part 3 **of the examination will be a coding exam focused on Python, including Object-Oriented Programming (OOP). This exam will be relatively brief, with a duration of 30 minutes. You will be provided with a Google Colab environment that contains the exam questions. Each question will be for 5 marks, with 4 questions.**

Part 4 **of the midterm examination will involve a take-home assignment on Exploratory Data Analysis (EDA) for a designated dataset. In this section, you must conduct a thorough EDA on the provided dataset. The objective is to analyze and explore the dataset to extract valuable insights and patterns. This section carries a weightage of 20% towards your overall midterm assessment.**