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MID TERM EXAMINATIONS- March 2025

Programme	:	B. Tech	Semester	:	Winter Semester 2024-25
Course	:	Programming in Java	Code	:	CSE3002
Faculty Name	:	03 March 2025, Session I	Slot	:	A11+A12+A13
Time	:	1½ hours	Max. Marks	:	50

Answer all the Questions

Q. No.	Question Description	Marks
1	You are a teacher who wants to calculate the final grade for a student based on their scores in multiple subjects. You need to collect marks for five subjects and calculate the total and average marks, then assign a grade. **Requirements:** • Input marks for five subjects. • Calculate total marks. • Calculate average marks. • Print the final grade based on the average (A: 90+, B: 80-89, C: 70-79, D: 60-69, F: below 60).	10
2	You are tasked with creating a Java class called `Book` that models a book object with the following attributes: • `title`: a `String` representing the title of the book. • `author`: a `String` representing the author of the book. • `price`: a `double` representing the price of the book. • `yearPublished`: an `int` representing the year the book was published. The class should have the following features: 1. **Constructor overloading**: o One constructor should accept all four attributes (`title`, `author`, `price`, and `yearPublished`). o Another constructor should accept only `title` and `author` and set `price` to a default value of 0.0 and `yearPublished` to the current year. 2. **Methods**: o A method `displayDetails()` that prints the details of the book in a user-friendly format. o A method `applyDiscount(double percentage)` that applies a discount to the book price by the given percentage. 3. **Main Method**:	10

- In the main method, create objects of the `Book` class using both constructors, apply a discount on one of them, and print the details using `displayDetails()`.

3 How can you restrict your program to not to create more than one instance? Implement code for the same. **10**

4 Create an interface `Shape` with a method `double area()`. Define two classes: `Circle` and `Rectangle`. Each class should implement the `Shape` interface. The `Circle` class should have a constructor that accepts a radius, and the `Rectangle` class should have constructors that accept width and height. The `area()` method should calculate and return the area of the shape. **10**

Requirements:

1. Define an interface `Shape` with a method `double area()`.
2. Implement the class `Circle` with a constructor accepting a radius and calculating the area.
3. Implement the class `Rectangle` with a constructor accepting width and height and calculating the area.

5 Why should we use array list instead of array? Explain with proper examples. **10**