UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET		
COURSE CODE	:	DCT 1094
COURSE	:	OBJECT ORIENTED PROGRAMMING
SEMESTER/SESSION	:	2-2024/2025
DURATION	:	3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE

QUESTION 1

a) Give **TWO (2)** characteristics of JAVA. (2 marks)

b) Write a Java statement to displays **Welcome to Java**. (2 marks)

c) Evaluate the following Java statement and provide the result:

i. `System.out.println (2 * (5 / 2 + 5 / 2));` (2 marks)

ii. `System.out.println (2 * 5 / 2 + 2 * 5 / 2);` (2 marks)

iii. `System.out.println(2 * (5 / 2));` (2 marks)

iv. `System.out.println(2 * 5 / 2);` (2 marks)

QUESTION 2

a) Define the following terms on objects and classes in Java Programming:

i. Class (2 marks)

ii. State (2 marks)

iii. Behaviour (2 marks)

iv. Constructor (2 marks)

v. Object (2 marks)

b) Create a class named **Patient** with data field:

- ID_number
- age

and a default constructor that sets:

- ID_number = 100;
- age = 56;

Then create **DisplayData** method to display all the data. (10 marks)

QUESTION 3

a) Analyze the following program in Figure 1.

```
public class Rectangle {
    private double length;
    private double width;

    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }

    public double calculateArea() {
        return length * width;
    }

    public double calculatePerimeter() {
        return 2 * (length + width);
    }
    public void displayDimensions() {
        System.out.println("Length: " + length + ", Width: " + width)
    }
}

public class Main {
    public static void main(String[] args) {
        Rectangle rectangle = new Rectangle(5.0, 4.0);
        double area = rectangle.calculateArea();
        double perimeter = rectangle.calculatePerimeter();

        System.out.println("Rectangle Area: " + area);
        System.out.println("Rectangle Perimeter: " + perimeter);

        rectangle.displayDimensions();
    }
}
```

Figure 1

i. Draw a Unified Modeling Language (UML) class diagram. (8 marks)

ii. Determine the output. (6 marks)

b) Analyze the following program in Figure 2.

```
public class IslamicReminder {
    private String title;
    private String text;

    public IslamicReminder(String t, String txt) {
        title = t;
         text = txt;
    }

    public void displayReminder() {
        System.out.println("Islamic Reminder: " + title);
        System.out.println();
        System.out.println(text);
    }

    public static void main(String[] args) {
        IslamicReminder reminder = new IslamicReminder("Peringatan
        Solat:", "#Wajib Solat 5 Waktu Sehari.#");
        reminder.displayReminder();
    }
```

Figure 2

i. Draw a Unified Modeling Language (UML) class diagram. (6 marks)

ii. Determine the output. (6 marks)

QUESTION 4

a) Define the following terms on inheritance and polymorphism in Java Programming:

i. Superclass (2 marks)

ii. Subclass (2 marks)

iii. Overriding methods (2 marks)

b) Polymorphism occurs when a program invokes a method through a superclass variable. Provide an example of Java statement that simulates the polymorphism concept. (6 marks)

c) Consider a superclass called **Vehicle** with attributes **manufacturer** and **year**. Implement a subclass called **Car** that inherits from **Vehicle** and adds attributes **model** and **fuelType**.

Draw a UML diagram representing the relationship between the **Vehicle** superclass and the **Car** subclass. Include the attributes and their types, as well as the arrows indicating the inheritance relationship. (10 marks)

QUESTION 5

a) Consider the following code in Figure 3:

```
class Animal {
  public void eat() {
    System.out.println("I can eat");
  }
}

class Dog extends Animal {
  public void eat() {
    System.out.println("I eat dog food");
  }

  public void bark() {
    System.out.println("I can bark");
  }
}

class Main {
  public static void main(String[] args) {

    Dog labrador = new Dog();

    labrador.eat();
    labrador.bark();
  }
}
```

Figure 3

i. Identify the superclass. (2 marks)

ii. Identify the subclass. (2 marks)

iii. Classify which method is overriding. (2 marks)

iv. Write the output. (4 marks)

b) Write a Java program to create a class called **Employee** with an attribute **salary**. The **Empolyee** class should have a constructor that accepts a double value to initialize the salary attribute. The **Employee** class should have methods called **work()** that prints a message, "Working as an employee!" and **getSalary()** that returns the employee's salary.

Create a subclass called **HRManager** that extends the **Employee** class. The **HRManager** class should have a constructor that accepts a double value and invoke its superclass's constructor to initialize the salary attribute. The **HRManager** class should overrides the **work()** method to display a different message, "Managing employees" and adds a new method called **addEmployee()** that prints a message "Adding new employee". (10 marks)

----------End of question----------