



Object Oriented Programming : المادة

المرحلة: الاجازة

المدة: 90 دقيقة

السنة المنهجية: الاولى - الدورة الثانية

الاستاذ: د يوسف الاتات

الاختصاص: علم البيانات

Question 1 – Theoretical Questions (4 pts)

1. Define the following concepts:

- a) Constructor
- b) Method overloading
- c) Access modifier
- d) Polymorphism

2. What is the difference between:

- a) public and private in Java?
- b) method overloading and method overriding?

Question 2 – Code Analysis (4 pts)

Consider the following program:

```

class Shape {
    public void draw() {
        System.out.println("Drawing a shape");
    }
}

class Circle extends Shape {
    @Override
    public void draw() {
        System.out.println("Drawing a circle");
    }
}

public class Test {
    public static void main(String[] args) {
        Shape s = new Circle();
        s.draw();
    }
}

```

Questions:

- 1. What will be the output of the program?
- 2. Which OOP concept is illustrated in: Shape s = new Circle();
- 3. Why is the method draw() executed from the Circle class?
- 4. What would happen if the draw() method did not exist in Shape?

Question 3 – Classes and Objects (5 pts)

We want to manage books in a small library.

1. Create a class Book containing:

- code
- title
- price

2. Add:

- A constructor
- getters/setters
- A display() method

3. Write a class TestBook allowing:

- Creation of 3 books
- Storing them in an array
- Displaying only books whose price is less than or equal to 50.

Question 4 – Inheritance and Polymorphism (4 pts)

Consider the following class:

```
class Employee {  
    protected String name;  
  
    public Employee(String name) {  
        this.name = name;  
    }  
  
    public void display() {  
        System.out.println("Name : " + name);  
    }  
}
```

Required work:

1. Create a class Teacher inheriting from Employee and containing:
 - subject
2. Redefine the display() method to show all information.
3. Create a class Administrator inheriting from Employee and containing:
 - officeNumber
4. In main, create an array of Employee containing teachers and administrators, then display their information.

Question 5 – Exception Handling and Collections (3 pts)

1. Write a program that:
 - asks the user for an integer age
 - displays the age
 - handles the case where the user enters a non-numeric value using try-catch
2. What is the difference between:
 - ArrayList<Book>
 - and
 - Book[] ?