University of Barishal

Department of Computer Science and Engineering

Course Title: Object Oriented Programming

Course Code: CSE-2107

2nd Year 1st Semester Final Examination

Admission Session: 2021-2022

Time: 3 Hours   Marks: 60

N.B.: Answer any **FIVE** questions out of the followings. All parts of each question must be answered consecutively. Right side of the question shows the maximum marks.

1.a) Explain the principles of Object-Oriented Programming with real life examples.   4

b) What is Constructor in Object Oriented Programming? Can it possible to write multiple   5
constructors inside a class with different names? Explain your answer.

c) Write down the difference between methods overwrite and overloading. Explain those with   3
example.

2.a) What are access modifiers in Object Oriented Concept? Explain with some programs.   4

b) Find and fix errors in the following code segment.   4

public abstract class Bike { private string Model {get; set;} protected abstract void Display(); } Public class Honda4: Hond { }	public sealed class Hond { public int Speed {get;set;} = 160 protected override void Display() { Console.WriteLine(Model); } }	class Program { public static void Main (){ Bike bike = new Bike(); Bike bike = new Hond(); bike.Display(); Console.WriteLine(bike.Speed); } }

c) Write a Java program to create a class Person with attributes name, age, and gender. Add a   4
method displayDetails() to print the person's details. Create an object of the Person class in the
main method and demonstrate its usage.

3.a) Correct the code to eliminate the compile time error thrown.   2

```
class Palindrome {
    public static void main(String[] arr){

        String palindrome = new String ("Rod saw I was Dor");
        int len = palindrome.length();
        String dest = new String();
        for(int i = (len - 1); i >= 0; i--) {
            dest.append(palindrome.chartAt(i));
        }
        System.out.format("%s%n", dest.toString());

    }
}
```

b) Define an interface Animal with methods eat() and sleep(). Create classes Dog and Cat that   5
implement the Animal interface. Write a program (Do not write full code) to demonstrate
interface implementation by creating objects of both classes and calling the methods.

c) Design class Book with attributes title, author, and price. Implement multiple constructors to   5
initialize a book object with:

- Only the title.
- Title and author.
- Title, author, and price.

Demonstrate the use of constructor overloading in the main method.

4.a) Object-Oriented Programming (OOP) organizes code using classes and objects, focusing on encapsulating data and behavior, while Procedural Programming uses functions to execute tasks sequentially and operate on data directly. Explain with necessary examples.   **3**

b) Create a class BankAccount with private attributes accountNumber, balance, and accountHolder. Provide getter and setter methods to securely access and modify these attributes. Write a Java program structure (do not write full code) to demonstrate encapsulation with proper validations in the setter methods (e.g., balance cannot be negative).   **6**

c) What do you know about friendly function? Explain with an example.   **3**

5.a) Explain the role of the Java Virtual Machine (JVM) in the execution of Java programs. Include its key components, such as the Class Loader, Execution Engine, and Garbage Collector, and describe how each contributes to Java's platform independence.   **4**

b) What is a static variable? Explain the static method with a proper example.   **3**

c) A company stores the monthly sales data of its employees. The data includes both integer values (number of units sold) and occasional null values when data is missing. To handle this scenario, the company uses Java Wrapper Classes (like Integer) instead of primitive types to allow null values.   **5**

Now you need to develop a scenario to answer the following question. Explain the purpose of using Wrapper Classes in Java and why they are preferred over primitive data types in certain scenarios, such as the one above.

6.a) What is a Java Package and How is it used? Give example.   **4**

b) Create a class Calculator with a method divide(int a, int b) that performs division and throws an ArithmeticException if b is zero. Write a program (without full-code) to handle this exception using a try-catch block, and display an appropriate error message.   **4**

c) What is a random-access file? How is it different from a sequential file? Why we need a random-access file?   **4**

7.a) Threads can be used to make your Java applications faster. They allow you to run multiple things at the same time. You must think of a good scenario for using threads in real-world and discuss your scenario.   **6**

b) Define a base class Vehicle with attributes make, model, and year, and a method displayInfo(). Create a derived class Car that adds an attribute numberOfDoors. Write a program structure (do not write full code) in Java to demonstrate inheritance by creating objects of both Vehicle and Car.   **6**

8.a) The Collections class of Java Collection Framework has several methods (e.g. sort(), min(), max()) that require natural ordering of the classes to be handled. Explain the two possible conditions that must be satisfied on the classes to be able to use the sort()method to arrange the list of objects these classes.   **5**

b) What is a collection framework in Java? Draw the collection framework at a hierarchical level.   **3**

c) Write short notes on: **4**
- Static binding
- Late/dynamic binding

"Every student can learn, just not on the same day, or the same way."
- George Evans