

**OBJECT ORIENTED PROGRAMMING  
(INFO 2202)**

**Time Allotted : 3 hrs**

**Full Marks : 70**

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

*Candidates are required to give answer in their own words as far as practicable.*

**Group - A  
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) What will be the output of the following code snippet?
- ```
class TestApp {
    protected int x, y;
}
class Main {
    public static void main(String args[]) {
        TestApp app = new TestApp();
        System.out.println(app.x + " " + app.y);
    }
}
```
- (a) 0 1 (b) 1 0  
(c) 0 0 (d) null null
- (ii) What happens if we try to compile and run (if compiled) the following code?
- ```
public static void main(String args[]) {
    int arr[2];
    System.out.print(arr[0]+",");
    System.out.println(arr[1]);
}
}
```
- (a) 0,0 (b) garbage value, garbage value  
(c) Compiler Error (d) Exception
- (iii) Which one of the following is not true?
- (a) A class containing abstract methods is called an abstract class  
(b) Abstract methods should be implemented in the derived class  
(c) An abstract class cannot have non-abstract methods  
(d) A class must be qualified as 'abstract' class, if it contains one abstract method.

## B.TECH/IT/4<sup>TH</sup> SEM/INFO 2202/2021

- (iv) Exposing only necessary information to clients ( main programs, classes) is known as
- |                 |                       |
|-----------------|-----------------------|
| (a) Abstraction | (b) Encapsulation     |
| (c) Data hiding | (d) Hiding complexity |
- (v) Consider the following code fragment  
Rectangle r1 = new Rectangle();  
r1.setColor(Color.blue);  
Rectangle r2 = r1;  
r2.setColor(Color.red);  
After the above piece of code is executed, what are the colors of r1 and r2 (in this order)?
- |                              |                               |
|------------------------------|-------------------------------|
| (a) Color.blue and Color.red | (b) Color.blue and Color.blue |
| (c) Color.red and Color.red  | (d) Color.red and Color.blue  |
- (vi) Which statement is not true in java language?
- (a) A public member of a class can be accessed in all the packages  
(b) A private member of a class cannot be accessed by the methods of the same class  
(c) A private member of a class cannot be accessed from its derived class  
(d) A protected member of a class can be accessed from its derived class.
- (vii) Java compiler translates Java source code into \_\_\_\_\_
- |                             |                  |
|-----------------------------|------------------|
| (a) Assembler language      | (b) Byte code    |
| (c) Platform dependent code | (d) Machine code |
- (viii) Which one of the following is not true?
- (a) A class containing abstract methods is called an abstract class  
(b) Abstract methods should be implemented in the derived class  
(c) An abstract class cannot have non-abstract methods  
(d) A class must be qualified as 'abstract' class, if it contains one abstract method.
- (ix) Predict the output
- ```
class Test extends Exception{ }  
class Main {  
    public static void main(String args[]) {  
        try {  
            throw new Test();  
        }  
        catch(Test t) {  
            System.out.print("Got the Test Exception. ");  
        }  
        finally {  
            System.out.print("Inside finally block. ");  
        }  
    }  
}
```
- |                                                  |                             |
|--------------------------------------------------|-----------------------------|
| (a) Got the Test Exception. Inside finally block | (b) Got the Test Exception. |
| (c) Inside finally block                         | (d) Compiler Error          |

(x) Predict the output:

```

class Base extends Exception {}
class Derived extends Base {}
public class Main {
    public static void main(String args[]) {
        // some other stuff
        try {
            // Some monitored code
            throw new Derived();
        }
        catch(Base b) {
            System.out.println("Caught base class exception");
        }
        catch(Derived d) {
            System.out.println("Caught derived class exception");
        }
    }
}

```

(a) Caught base class exception

(b) Caught derived class exception

(c) Compiler Error because derived is not throwable

(d) Compiler Error because base class exception is caught before derived class

### **Group - B**

2. (a) "Java is a purely object oriented language but C++ is not so" - Justify the statement.

(b) What do you mean by Polymorphism, Abstraction and Encapsulation. Explain with code example.

**3 + (3 × 3) = 12**

3. (a) What is association? What are the different types of association present in Java. Explain with code example.

(b) Consider the following piece of code:

```

int a[][]=new int[5][];
for(i=0;i<5;i++){
    a[i]=new int[i*2];
}

```

x=a.length;

y=a[2].length;

what will be the value of x and y after executing this code? Explain.

How constructor is different from any other method? Explain with code. What is the purpose of using finalize method in Java?

**(3 + 4) + (3 + 2) = 12**

**Group – C**

4. (a) What is the difference between interface and abstract class? Explain with code example.
- (b) Using an example explain what is Dynamic Method Dispatch and why it is a Runtime Polymorphism?
- (c) What is constructor overloading? Explain with example.

**4 + (3 + 2) + 3 = 12**

5. (a) What Restrictions Are Placed On The Location Of A Package Statement within A Source Code File? Does Importing a package imports its sub-packages as well in Java? What is the default package in Java?
- (b) Can we create an object or reference for an interface? Can we create an object or reference for an abstract class?
- (c) Write a Java program to define a class TimeOp having three static methods Timeadd(), Timedifference() inside it to perform respective operations on time data and return the result to the caller. Define another class Time having three private variables hour, minute and second in it and also required constructors (one parameterless and one parameterized constructors are must) and display methods to print the time data in (hr:min:sec) format. Demonstrate the use of these classes from main() method.

**(2 + 1 + 1) + 2 + 6 = 12**

**Group – D**

6. (a) What is the major difference between String and StringBuffer? Explain with example.
- (b) What do you mean by wrapper class in Java? What is stream? What are System.in, System.out and System.err refer to?

**4 + (3 + 2 + 3) = 12**

7. (a) Write a Java program to count the number of words and lines present in a text file whose name is inputted by the user.
- (b) You will be given two integers p and q as input, you have to compute  $p^q$ . If p and q are not bit signed integers or if is zero, exception will occur and you have to report it. Read sample Input/Output to know what to report in case of exceptions. (InputMismatchException exception is thrown by an instance of the Scanner class to indicate that a retrieved token does not match the pattern for the expected type, or that the retrieved token is out of range.)

**6 + 6 = 12**

**Group - E**

8. (a) What are the disadvantages of Applet over Swing?  
(b) What are the different packages a java applets require to extend and why? Write a Java code to create an applet which will display a message taken from its container web document at different locations on the applet window after 1 sec interval.

**4 + (2 + 6) = 12**

9. (a) Draw and explain the Java Thread Lifecycle including the suspended states.  
(b) Why Thread sleep() and yield() methods are static?  
(c) Which is more preferred – Synchronized method or Synchronized block? Justify with example.

**5 + 2 + 5 = 12**

| Department & Section | Submission Link                                                                                                                                                     |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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