



**AUTUMN END SEMESTER EXAMINATION-2023**

**3<sup>rd</sup> Semester B.Tech**

**OBJECT ORIENTED PROGRAMMING USING JAVA**

**CS20004**

**(For 2023 (L.E) & 2022 Admitted Batches)**

Time: 3 Hours

Full Marks: 50

*Answer any SIX questions.*

*Question paper consists of four SECTIONS i.e. A, B, C and D.*

*Section A is compulsory.*

*Attempt minimum one question each from Sections B, C, D.*

*The figures in the margin indicate full marks.*

*All parts of a question should be answered at one place only.*

**SECTION-A**

1. Answer the following questions: [1 × 10]

- (a) Explain the term abstraction and encapsulation with respect to object oriented programming.
- (b) Can an interface be extended? If yes - explain with an example.
- (c) Explain the use of super keyword in java with small example.
- (d) What will be the output of the following java code

```
class Break {
    public static void main(String args[]) {
        boolean t = true;

        first: {
            second: {
                third: {
                    System.out.println("Before the break.");
                    if(t) break second; // break out of second block
                    System.out.println("This won't execute");
                }
                System.out.println("This won't execute");
            }
            System.out.println("This is after second block.");
        }
    }
}
```

- (e) Describe the mechanism of dynamic method dispatch.
- (f) Differentiate checked and unchecked exception in java.
- (g) Describe any two component of an event.
- (h) Explain the functionality of ResultSetMetaData.
- (i) Describe the term thread synchronization.
- (j) Why string class is called as immutable? Explain with one example.

### **SECTION-B**

- 2. (a) Everything is treated as object in java but still primitive data types are used. Explain any two advantage associated with primitive data types over object. Write a java program to add two complex number. [4]
- (b) Describe the term nested class. Explain the property of inner class. Can inner class access the private variable of outer class, if yes - explain with an example. [4]
- 3. (a) Create a class Rectangle having data members as length and width and a method as find\_Area(). Derive a class Box from rectangle which will have a data member as height and a method called find\_Volume(). All the field must be initialize through constructor. Display the result by calling the find\_Area() method through the object of both the classes and the volume method through the object of Box class. [4]
- (b) Explain the term dynamic method dispatch in java. Explain its functionality with a suitable example. [4]

### **SECTION-C**

- 4. (a) It is said that a package is both the naming and visibility control mechanism. How visibility control mechanism can be implemented through package in java? Write a program for the same showing the [4]

working of protected and default access specifier using inheritance.

- (b) Implement an Interface volume with a method `calc_Vol()` and a data member `PI` whose value is initialized as 3.14. Two classes `Cylinder` and `Cone` implement the above interface. Write an application class `Demo` where the volume of above two objects are calculated. Hint: The volume of `Cylinder` and `Cone` is  $\pi r^2 h$  and  $\frac{1}{3}(\pi r^2 h)$  [4]
5. (a) Where we use the keyword `throw` and `throws` in exception handling. Write a program in java to create a user defined exception called `Invalid_Age`. Throw the exception when the user entered age is less than zero or greater than 100. [4]
- (b) Write a program in java which will accept a string and a character from the keyboard and the program will do the following operations: [4]
- (i) The accepted character is repeated how many times in the string.
- (ii) Check whether the string is palindrome or not.
6. (a) Write a program in java which will display the content of a file in reverse order. The name of the file will be accepted from keyboard. The program will first check whether the file is exist or not otherwise throw necessary exception message. [4]
- (b) Create a swing application to calculate the Factorial and square of a given number. Create a text field to take the number as user input for these operations. Create two buttons namely `FACTORIAL` and `SQUARE`. When the user will click on any button, the result will be displayed on another text field. [4]

## SECTION-D

7. (a) Write a JDBC application program that display the content of a particular RollNo from the table named Student which consists of three column called RollNo, Name and marks. The RollNo will be accepted from the keyboard. [4]
- (b) What is thread synchronization in java? Explain the same with a suitable example. [4]
8. (a) Create a swing application having 3 label RollNo, Name and Marks and three text field. The application will also have a Insert Button. When the user will enter value in all three text field and click on the Insert Button, the corresponding values will be submitted to the database table. [4]
- (b) Write a program which will accept a string from the keyword and check whether it is a valid password or not as per the below rules: [4]
- (i) Must have at least 5 characters
  - (ii) Consist of only lowercase letters and digits
  - (iii) Must contain at least three digits

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