

SL No of QP : 3029

Unique Paper Code **2344002002**
Name of the Paper **Java Programming**
Name of the Course **Generic Elective for Honours: Computer Science**
Semester **III**
Duration of Examination **3 Hours**
Maximum Marks **90**
Students admitted in the year **2022 onwards (NEP)**

Instructions for the Candidates

The paper has two sections. **Section A** is compulsory.

Attempt any *five* questions from **Section B**.

Parts of a question must be answered together.

Section A

- Q. 1 a) What is the difference between a variable and a constant in programming? Provide examples. (3)
- b) What is the significance of the 'this' keyword in JAVA? Explain with an example. (3)
- c) What is multithreading in JAVA? How is it implemented using the Thread class? (3)
- d) What is the difference between an exception and an error in JAVA? Provide examples of each. (3)
- e) What is the significance of FileInputStream and FileOutputStream classes in JAVA? (3)
- f) Write a JAVA program that implements a basic calculator. The program should take two numbers as input and allows the user to select an operation (addition, subtraction, multiplication, division). (3)
- g) Consider the following code in JAVA: (3)
- ```
byte a = 57;
int i, j, k;
i = a >> 4;
j = a << 3;
k = a >>> 5;
```
- What will be the value of i, j and k?
- h) Rewrite the following JAVA code using a for-loop. (3)
- ```
int a = 100;  
while(a != 38) {  
    System.out.println(a+"\\t");  
    a=a-5;  
}
```
- i) Briefly explain any three features of JAVA. (3)
- j) Write a JAVA program that reads the contents of a text file and counts the number of words in the file (3)

Section B

- 2 a) Design a JAVA class Book with attributes like title, author, price, and publisher. Include methods to set and get these attributes, and a method to display the book information. (5)
- b) Identify the valid identifiers in JAVA among the following: (5)
abc_123, _9abc, \$xyz, 9name, %abc
Give reasons.
- c) What is the difference between static and dynamic binding? Provide an example for each. (5)
- 3 a) Consider the following code in JAVA: (5)
- ```
if (category == 'C') {
 System.out.println("This is a Car.");
}
else if (category == 'B') {
 System.out.println("This is a Bus.");
}
else if (category == 'T') {
 System.out.println("This is a Truck.");
}
else if (category == 'M') {
 System.out.println("This is a Motorcycle.");
}
else {
 System.out.println("Invalid category entered.");
}
```
- Rewrite the above sequence using Switch-Case in JAVA.
- b) What are primitive data types in JAVA? List them with their memory sizes and default values. (5)
- c) Write a program to create multiple threads that print numbers from 1 to 10. Assign different priorities to each thread. (5)
- 4 a) Explain the lifecycle of a thread. (7)
- b) Explain the process of file serialization in JAVA. (4)
- c) Write a program in JAVA that determines if a given year is a leap year. (4)
- 5 a) Create a program in JAVA that reads a number from the user and throws an exception if the number is negative. (5)
- b) Using examples illustrate the difference between argument and parameter. (5)
- c) Evaluate the following: (5)  
 $3 + 4 + 9 * 6 / 3 - 8 + 1 + 7 ^ 2 + 8 \% 3$
- 6 a) JAVA allows Conversion and Promotion between data types. Differentiate between the two with the help of examples. (4)
- b) What is an Abstract Class in JAVA? What is its purpose? Explain with the help of an example. (5)
- c) Create a program to count the number of lines, words, and characters in a text file. (6)
- 7 a) Create a class Student in JAVA. The class should store the Name, Roll Number, and Course of the student. Create a child class Undergraduate which should store the Year of Study, Specialization, and GPA of the student. Both classes should provide methods for setting and retrieving the values of the above-mentioned details. Additionally, both classes should have a function to display the stored data. Create two objects for each of these classes and display their details. (12)
- b) How can we ensure in JAVA that an object of a class is not needed to call its function? Explain with help of an example. (3)