2609N546

Candidate's Seat No :_____

B.Sc Sem.-6 (Rep) Examination

CC 308

Computer Science

Time : 2-30 Hours] **September-2024** **[Max. Marks : 70**

Q1(A) Explain how polymorphism works in Java. Provide a code example demonstrating method overriding and dynamic method dispatch. (7)

Q1(B) Implement a custom LinkedList class in Java. Include methods to add, remove, and traverse elements. Explain your approach. (7)

OR

Q1(A) Create a Java program that demonstrates the producer-consumer problem using wait() and notify() methods. Explain how your implementation handles thread synchronization. (7)

Q1(B) Write a Java program that demonstrates custom exception handling by creating a user-defined exception. Explain when and why you would use custom exceptions. (7)

Q2(A) Write a Java program to read a file line by line and reverse the contents of each line before writing it to a new file. Discuss the potential exceptions and how you handle them. (7)

Q2(B) Explain the concept of generics in Java. Write a generic method that can take a list of any type and print its elements. Provide an example with different data types. (7)

OR

Q2(A) Compare and contrast HashMap, LinkedHashMap, and TreeMap. Implement a use case scenario where each of these would be the most appropriate choice. (7)

Q2(B) Explain lambda expressions in Java. Write a program to filter a list of strings using a lambda expression and print only those strings that start with a specific letter. (7)

Q3(A) Discuss how memory is managed in Java. Explain the roles of the stack, heap, and garbage collection in memory management. How does the JVM handle memory leaks? (7)

Q3(B) Explain the difference between synchronized and Lock in Java concurrency. Provide a code example showing how to use ReentrantLock and explain its advantages over synchronized. (7)

OR

Q3(A) Explain the concept of serialization in Java. Write a program to serialize and deserialize an object. Discuss what happens if a class is modified after it has been serialized. (7)

Q3(B) Explain the significance of functional interfaces in Java 8. Write a program that uses a functional interface to perform a calculation on a list of numbers. (7)

Q4(A) Explain the life cycle of a Java applet, and discuss the significance of each method (init(), start(), stop(), destroy()). (7)

Q4(B) Explain double buffering in Java applets and why it is used. Create an applet that demonstrates double buffering. (7)

OR

Q4(A) Describe how threads can be managed within an applet. Write an applet that runs an animation using threads. (7)

Q4(B) Discuss the security restrictions placed on Java applets by the Java security model. How do these restrictions impact applet development? (7)

Q5 MCQ Attempt any seven out of twelve.(2 Marks each) **(14)**

1) What will be the output of the following code?

```
public class Main {
  public static void main(String[] args) {
    int x = 5;
    int y = 10;
    int z = (++x * y--) / x;
    System.out.println(z);
  }
}
```

A) 10 B) 12 C) 11 D) 9

2) Which of the following is true about Java?
A) Java supports operator overloading.
B) Java supports multiple inheritance through classes.
C) Java is a platform-independent language.
D) Java uses pointers.

3) Which of the following is not a valid method of the String class in Java?
A) length()
B) substring(int startIndex, int endIndex)
C) equalsIgnoreCase(String anotherString)
D) toLower()

4) What will be the output of the following code?

```
public class Test {
  public static void main(String[] args) {
    int x = 10;
    x = x++ * 2 + 3;
    System.out.println(x);
  }
}
```

A) 20 B) 23 C) 24 D) 25

5) Which of the following statements is true regarding a static variable in Java?
A) It is shared among all instances of a class.
B) It is declared within a method and has local scope.
C) It can only be accessed within its own class.
D) It can be overridden by subclasses.

6) What will happen if you try to compile and run the following code?

```
public class Test {
  public static void main(String[] args) {
    int x = 5;
    if (x > 10)
      System.out.println("x is greater than 10");
    else;
      System.out.println("x is less than or equal to 10");
  }
}
```

A) Compilation error

B) x is less than or equal to 10
C) No output
D) x is greater than 10

7) Which of the following is a checked exception in Java?
A) NullPointerException
B) ArrayIndexOutOfBoundsException
C) ClassCastException
D) IOException

8) Which of the following is not a keyword in Java?
A) strictfp
B) const
C) goto
D) friend

9) What will be the output of the following code?

```
public class Test {
   public static void main(String[] args) {
      String s1 = "Hello";
      String s2 = new String("Hello");
      if (s1 == s2) {
         System.out.println("s1 == s2");
      } else {
         System.out.println("s1 != s2");
      }
   }
}
```

A) s1 == s2
B) s1 != s2
C) Compilation error
D) s1 equals s2

10) Which of these operators can be used to concatenate two strings in Java?
A) +
B) &
C) |
D) *

11) Which of these can be a valid return type of a method in Java?
A) void
B) int
C) double
D) All of the above

12) Which of these methods is used to find the length of a string in Java?
A) size()
B) length()
C) getLength()
D) getSize()

BEST OF LUCK