PROGRAMMING IN JAVA

Assignment 03

TYPE OF QUESTION: MCQ

Number of questions: 10 Total marks**: 10 × 1 = 10**

QUESTION 1:

Which of the following is true about the `super` keyword in Java?

a. **`super` can be used to call a parent class constructor.**

b. **`super` is used to access private variables of the parent class.**

c. **`super` is used to call a static method in the parent class.**

d. **`super` can only be used inside a static method.**

Correct Answer:

a. **`super` can be used to call a parent class constructor.**

Detailed Solution:

The `super` keyword is used to refer to the immediate parent class. It is commonly used to invoke the parent class constructor or access its non-private methods and variables. However, it cannot access private members of the parent class or be used in static methods.

QUESTION 2:

What is the output of the following Java program?

```
class StaticScopeDemo {
  static int x = 5;

  public static void main(String[] args) {
      int x = 10;
      {
          int x = 15; // Compilation Error
          System.out.println(x);
      }
  }
}
```

a. **15**

b. **Compilation Error**

c. **5**

d. **10**

Correct Answer:

b. **Compilation Error**

Detailed Solution:

The block within `main()` tries to declare a local variable `x` that has the same name as an already existing variable in the same scope, which causes a compilation error. Variable names must be unique within the same scope

QUESTION 3:

What will be the output of the following program?

```
class Parent {
  void display() {
    System.out.println("Parent display");
  }
}

class Child extends Parent {
  void display() {
    System.out.println("Child display");
  }
}

public class Main {
  public static void main(String[] args) {
    Parent obj = new Child();
    obj.display();
  }
}
```

a. **Parent display**

b. **Child display**

c. **Compilation Error**

d. **Runtime Error**

Correct Answer:

b. **Child display**

Detailed Solution:

This is an example of **method overriding**. The display() method in the Child class overrides the method in the Parent class. When the method is called, Java uses dynamic method dispatch to execute the Child class implementation.

QUESTION 4:

Which of the following statements about abstract classes in Java is correct?

a. **Abstract classes can be instantiated directly.**

b. **An abstract class must contain at least one abstract method.**

c. **A class inheriting from an abstract class must implement all its abstract methods unless it is itself abstract.**

d. **Abstract classes can be marked as `final`.**

Correct Answer:

c. **A class inheriting from an abstract class must implement all its abstract methods unless it is itself abstract.**

Detailed Solution:

Abstract classes cannot be instantiated directly. They may or may not contain abstract methods. A subclass inheriting an abstract class must provide implementations for all abstract methods unless it is also declared abstract.

QUESTION 5:

What will be the output of the following Java program?

```
public class NptelExample {
  public static int fun(int n) {
      if (n == 0) {
          return 1;
      }
      return n * fun(n - 1);
  }

  public static void main(String[] args) {
      System.out.println(fun(5));
  }
}
```

a. 5

b. 24

c. 120

d. Runtime Error

Correct Answer:

c. 120

Detailed Solution:

The fun method is a recursive function that calculates the factorial of a number. For fun(5), the computation is 5 * 4 * 3 * 2 * 1 = 120.

QUESTION 6:

Which of the following is NOT true regarding the final keyword in Java?

a. **A final method cannot be overridden in a subclass.**

b. **A final variable can only be assigned once.**

c. **A final class can have subclasses.**

d. **A final variable can be assigned during declaration or in the constructor.**

Correct Answer:

c. **A final class can have subclasses.**

Detailed Solution:

A class marked as final cannot be extended, meaning it cannot have subclasses. The other statements about the final keyword are correct.

QUESTION 7:

What is the output of the following Java program?

```
class Test {
    static int count = 0;

    public Test() {
        count++;
    }

    public static void main(String[] args) {
        Test obj1 = new Test();
        Test obj2 = new Test();
        Test obj3 = new Test();
        System.out.println("Count: " + Test.count);
    }
}
```

a. **Count: 0**

b. **Compilation Error**

c. **Runtime Error**

d. **Count: 3**

Correct Answer:

d. **Count: 3**

Detailed Solution:

The `count` variable is static, meaning it is shared among all instances of the class. Each time a `Test` object is created, the constructor increments `count`. Since three objects are created, the output is `Count: 3`.

QUESTION 8:

Which of these is NOT an example of method overriding in Java?

a. **A subclass defining a method with the same name but different parameters than a superclass method.**

b. **A subclass providing a new implementation for a method in the superclass.**

c. **A subclass defining a method with the same name and parameters as a superclass method.**

d. **Using the super keyword to call the superclass version of an overridden method.**

Correct Answer:

a. **A subclass defining a method with the same name but different parameters than a superclass method.**

Detailed Solution:

If a method in a subclass has the same name but different parameters, it is method overloading, not method overriding. Method overriding requires the same name and parameters.

QUESTION 9:

What is the output of the following Java program?

```
class Parent {
    String message() {
        return "Parent";
    }
}

class Child extends Parent {
    String message() {
        return "Child";
    }
}

public class Main {
    public static void main(String[] args) {
        Child p = new Parent();
        System.out.println(p.message());
    }
}
```

a. **Parent**

b. **Child**

c. **Compilation Error**

d. **No error and nothing is printed**

Correct Answer:

c. **Compilation Error**

Detailed Solution:

There will be a compilation error: Type mismatch: cannot convert from Parent to Child

QUESTION 10:

What is the output of the following program?

```
public class Nptel {
    public static int fun(int n) {
        if (n == 0) {
            return 0;
        }
        return n + fun(n - 1);
    }

    public static void main(String[] args) {
        System.out.println(fun(5));
    }
}
```

a. 5

b. 10

c. 15

d. Runtime Error

Correct Answer:

c. 15

Detailed Solution:

The fun function calculates the sum of the first n natural numbers using recursion. For fun(5), the computation is 5 + 4 + 3 + 2 + 1 = 15.