# C5-R3: OBJECT ORIENTED METHODOLOGY

**NOTE:**

> 1. Answer question 1 and any FOUR from questions 2 to 7.
> 2. Parts of the same question should be answered together and in the same sequence.

**Time: 3 Hours**                                                    **Total Marks: 100**

**1.**
a) Explain the reasons for software crisis.
b) Explain java virtual machine and its uses.
c) Describe the problems of procedural approach of programming.
d) Explain the architecture of CORBA.
e) Why do we need garbage collection? Explain.
f) What are the advantages and disadvantages of java sockets?
g) Give reasons for Java being so popular.

**(7x4)**

**2.**
a) What is inheritance? How is it implemented in Java?
b) What's wrong with the following program?

```
public class SomethingIsWrong {
public static void main(String[] args) {
Rectangle myRect;
myRect.width = 40;
myRect.height = 50;
System.out.println("myRect's area is " + myRect.area());
}
}
```

c) The following code creates one array and one string object. How many references to those objects exist after the code executes? Is either object eligible for garbage collection?

```
...
String[] students = new String[10];
String studentName = "Peter Parker";
students[0] = studentName;
studentName = null;
```

**(6+6+6)**

**3.**
a) Discuss how an OOL can be used to implement a design developed using OOT methodology.
b) Explain difference between call by reference and call by value. Which is more efficient?
c) Describe polymorphism and multithreading as defined in Java.

**(6+6+6)**

**4.**
a) Write a class that implements the CharSequence interface found in the java.lang package. Your implementation should return the string backwards. Select any one sentence of your choice. Write a small main method to test your class; make sure to call all four methods.
b) Suppose you have written a time server that periodically notifies its clients of the current date and time. Write an interface the server could use to enforce a particular protocol on its clients.

c) What is wrong with the following interface? Fix the interface.
```
public interface SomethingIsWrong {
    void aMethod(int aValue) {
        System.out.println("Hi Mom");
    }
}
```

**(6+6+6)**

**5.**

a) Will the following program compile? If not, why not?
```
public class Problem {
String s;
static class Inner {
    void testMethod() {
        s = "Set from Inner";
        }
    }
}
```
What do you need to do to make it compile? Why?

b) Use the Java API documentation for the `Box` class (in the `javax.swing` package) and answer the following questions.
   i)   What static nested class does `Box` define?
   ii)  What inner class does `Box` define?
   iii) What is the superclass of `Box`'s inner class?
   iv)  Which of `Box`'s nested classes can you use from any class?
   v)   How do you create an instance of `Box`'s `Filler` class?

c) Compile and run, what is the output of the following class?
```
public class Class1 {
protected InnerClass1 ic;
        public Class1() {
          ic = new InnerClass1();
        }
        public void displayStrings() {
          System.out.println(ic.getString() + ".");
          System.out.println(ic.getAnotherString() + ".");
        }
        static public void main(String[] args) {
            Class1 c1 = new Class1();
          c1.displayStrings();
        }
        protected class InnerClass1 {
          public String getString() {
              return "InnerClass1: getString invoked";
          }
          public String getAnotherString() {
              return "InnerClass1: getAnotherString invoked";
          }
        }
    }
```

**(6+6+6)**

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**6.**
a) Sometimes it may happen that you try to forward a method to a super, but (occasionally) it does not work, why?
b) Discuss how the encapsulation gives rise to modularity.
c) What are some of the alternatives to inheritance?

**(6+6+6)**

**7.** Write brief on any **three** of the following:
   i) Virtual Reality
   ii) TCP/IP Server Socket
   iii) AWT and its uses
   iv) Salient features of Eiffel

**(3x6)**