KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE
FIRST SEMESTER 2022/2023
[SEPTEMBER-DECEMBER, 2022]

COMP 305: OBJECT ORIENTED PROGRAMMING II [JAVA]

STREAM: Y3S1 **TIME: 2 HOURS**

DAY: TUESDAY, 9:00 – 11:00 AM **DATE: 20/12/2022**

INSTRUCTIONS

1. ***Do not write anything on this question paper.***
2. ***Answer question ONE and any other TWO questions.***

QUESTION ONE (30 MARKS)

a) Difference between OOPS and procedural programming languages. [5 marks]

b) Describe the main difference between the Java layout managers and layout managers found in other traditional windowing systems. [4 marks]

c) What might go wrong with the following code, what would you need to do to fix it. [4 marks]

```
public class Test {
        int x; int y;
        public Test (int x, int y) {
                x = x;
                y = y;
               }

}
```

d) What will be the result of attempting to compile and run the following code? Explain. (5 marks)

```
abstract class MineBase {
        abstract void amethod();
        static int i;
```

```
}
public class Mine extends MineBase {
        public static void main(String argv[]){
                int[] ar=new int[5];
                for(i=0;i < ar.length;i++)
                        System.out.println(ar[i]);
}
}
```

e) Consider a loan processing system in a bank. Identify the classes and objects in the system and list them. (5 marks)

f) List the advantages and disadvantages of using a collection class ArrayList in place of an array. [2 marks]

g) Write class Car that has two fields: model that represents the model of the car; and year that represents the year of manufacturing. It has accessor methods and toString method that returns a string representing the information of a car. [6 marks]

QUESTION TWO (20 MARKS)

a) With relevant examples describe abstraction and encapsulation. Write a java program that uses abstraction and encapsulation. [7 marks]

b) Write a declaration for an array variable people that could be used to refer to an array of Person objects and write a statement to create such array. [5 marks]

c) Write a Java program that draws an oval that encloses a smaller circle. The circle should be filled with color blue. (8 marks)

QUESTION THREE (20 MARKS)

a) Classify the basic difference between the two approaches to exception handling. (4 marks)

b) Runtime errors are not seen by the compiler as is the case with syntax errors, and are only identified at runtime when a program fails to produce the desired results. Runtime errors trigger exceptions.

i) Give any four common Java exceptions and the corresponding runtime error that triggered each of these exceptions. (8 marks)

ii) Write a Java program that divides two numbers but uses the try-catch block to handle a case where a user tries to divide a number by zero. (8 marks)

QUESTION FOUR (20 MARKS)

a) What is interface? Write a java program to illustrate the use of interface. (10 marks)

b) List the situation in which an action event and item event is generated (3 marks)

c) Write a program that creates an ArrayList, populates it with names of five Kenyan cities, and then displays these names. Afterwards, two of the names are removed from the ArrayList, and the remaining three names are again displayed. (7 marks)

QUESTION FIVE (20 MARKS)

a) Explain when an inner class is appropriate. Give a concrete example of using an inner class. (6 marks)

b) Suppose we have a class, call it Server, which has some desired functionality. Suppose further that we want to be able to replace it with another class, OtherServer, which performs the same task but in a different way. It must be possible to switch between Server and OtherServer without having to recompile the classes that call them. Write a program which solves this problem with the help of polymorphism. (8 marks)

c) With appropriate code illustrations, show how you can use an interface to give different classes a common public interface and clearly demonstrate how objects of the classes can be called using polymorphism. (6 marks)