KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIT 335: OBJECT ORIENTED PROGRAMMING II (JAVA)

STREAM: Y2S1   **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) Briefly explain the differences between: [2marks each]
   i. OOPS and procedural programming language
   ii. static and non static members,
   iii. protected and default modifiers
   iv. overriding and overloading

(b) What is polymorphism? Give an example to illustrate the use of polymorphic variables in Java.   [4 Marks]

(c) Consider the following class definition:

```
abstract class date {
        private int day; // from 1 to 31
        private int month; // from 1 to 12
        private int year; // from 2000 upwards
        public void advance(); // move to next day
}
```

(i)   Summarize the types of constructors supported by JAVA with example   [3 marks]

(ii)   Implement a constructor that initializes new objects of date class to be set to the 1st of January 2000.   [4 marks]

(iii) Implement setters for day, month and year.   [3 marks]

(d) Using polymorphism, write a code with base class shape and two derived classes class rectangle and class triangle. The code should be able to

calculate either the area of a rectangle or area of a triangle, based on the parameters passed in at the main method. [8 marks]

QUESTION TWO (20 marks)

(a) With reference to encapsulation, answer then following questions.
      i. Explain THREE benefits of encapsulation in Object oriented programming. (3marks)
      ii. Write code that returns factorial of a number entered using encapsulation. [7marks]
(b) With java code illustrations, explain the difference between implementing an interface and a derived class. [6 marks]
(c) Define an abstract method and describe the circumstances in which the use of an abstract method would be appropriate. [5 marks]

QUESTION THREE (20 marks)

(a) Deduce the meaning for the keywords: final, finally, finalize. [5 marks]
(b) Write a program to perform the following functions using classes, objects, constructors where essential
    i. Get as input the marks of 5students in 5 subjects [5 marks]
    ii. Calculate the total and average [5 marks]
    iii. Print the formatted result on the screen [5 marks]

QUESTION FOUR (20 marks)

(a) With illustrations, discuss the use of inheritance in java GUI frameworks [5 marks]
(b) Draw and annotate a class hierarchy that represents various types of faculty at a university. Show what characteristics would be represented in the various classes of the hierarchy. Explain how polymorphism could play a role in the process of assigning courses to each faculty member. [10 marks]
(c) Define a constructor and explain why it is sometimes useful to overload a constructor. [5 marks]

QUESTION FIVE (20 marks)

(a) Write briefly on Abstract classes with an example. [5 marks]
(b) Classify the basic difference between the two approaches to exception handling. [5 marks]
(c) Write a Java program to create a student examination database system that prints the mark sheet of students. Input student name, marks in 6 subjects. This mark should be between and 100. If the average of marks is >= 80 then prints Grade 'A', If the average is =60 then prints Grade 'B'. If the average is = 40 then prints Grade 'C' else prints Grade 'D'. [10 marks]