KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF THE

DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
FIRST SEMESTER, 2023/2024

(AUGUST-DECEMBER, 2023)

BIT 335: OBJECT ORIENTED PROGRAMMING II[JAVA]

STREAM: Y3 S1 **TIME: 2 HOURS**

DAY: TUESDAY,03.00–05:00 PM **DATE:28/11/2023**

INSTRUCTIONS

1. ***Do not write anything on this question paper.***
2. ***Answer Question ONE [Compulsory] and any other TWO Questions***

QUESTION ONE (30 MARKS)

(a) Consider the following while loop:

```
String str = "x";

while (str.length() < len) {

        str = "a" + str + "b";

}
```

i. Assuming len=1, what would be the value of str after executing this code segment? (4 marks)

ii. Assuming len=4, what would be the value of str after executing this code segment? (4 marks)

iii. Covert the while loop into a do-while loop (3 marks)

(b) Describe FIVE features you would expect to be present in an object oriented programming language. Give an example of how each feature is realized in an object oriented programming language with which you are familiar. (10 marks)

(c) List any four keywords associated with exceptions in Java, giving a one sentence description of what each one is for. (4 marks)

(d) With examples, describe the role of the *final* and *super* keywords as used in java. (5 marks)

QUESTION TWO (20 MARKS)

(a) With relevant example java codes, differentiate between super and this references as used in object oriented programming. (6 marks)

(b) Create a Person class that includes fields for last name, first name, and zip code. Include a default constructor that initializes last name, first name, and zip code to "X" if no arguments are supplied. Also include a display function. Write a main() function that instantiates and displays two Person objects: one that uses the default values, and one for which you supply your own values. (6 marks)

(c) With relevant java code examples, differentiate between method overriding and method overloading as used in object oriented programming. (8 marks)

QUESTION THREE (20 MARKS)

(a) The Explain the notion of package access in Java. Explain the negative aspects of package access. (5 mark)

(b) Explain the three ways in which a java program can be designed to process an exception. (4 marks)

(c) Explain why a static method cannot refer to an instance variable. (5 marks)

(e) Study the following simple Java program carefully.

```
class t {
        public static void main(String[] args)) {
         int i = 0, m = 0;
        while (i++ < 10) m += i*i;
        StdOut.println(m);
        }
        }
```

What does the program do when run? (5 marks)

(f) Design and implement an application that reads an integer value and prints the sum of all even integers between 2 and the input value, inclusive. Print an error message if the input value is less than 2. Prompt accordingly. (5 marks)

QUESTION FOUR (20 MARKS)

(a) In an object oriented inheritance hierarchy, each level is a more specialized form of the preceding level. Give an example of a hierarchy found in everyday life that has this property. Illustrate your answer using a diagram. (5 marks)

(b) What will be the output of the following code? (6 marks)

```
Class Q3Main{
public static void main(String args[]){
QuestionTFour() q4;
q4=new QuestionTFour();
q4.init();
q4.count=q4.increment() + q4.increment();
System.out.println(q4.increment());
}
}
class QuestionTFour(){
public int count;
public void init(){
count=1;
}
public int increment(){
count=count+1;
return count;
}
}
```

(c) Discuss the role of a constructor and state any two properties of a constructor. (3 marks)

(d) What does it mean when: (6 marks)

i. a method is declared final
ii. a class is defined as final

QUESTION FIVE (20 MARKS)

a) Imagine you are given the task of designing an airline reservation system that keeps tracks of flights for a commuter airline. List the classes you think would be necessary for designing such a system. Describe the data values and methods you would associate with each class you identify. (8 Marks)

b)

i. Create a class named Student. A Student has fields for an ID number, number of credit hoursearned, and number of points earned. (For example, many schools compute grade point averagesbased on a scale of 4, so a three-credit-hour class in which a student earns an A is worth 12 points.)Include methods to assign values to all

fields. A Student also has a field for grade point average.Include a method to compute the grade point average field by dividing points by credit hoursearned. Write methods to display the values in each Student field. (8 Marks)

ii. Write a class named ShowStudent that instantiates a Student object from the class you created.Compute the Student grade point average, and then display all the values associated with theStudent. (4 Marks)