KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR OF SCIENCE IN APPLIED COMPUTER SCIENCE/SOFTWARE ENGINEERING
FIRST SEMESTER, 2023/2024
(AUGUST-DECEMBER, 2023)

ACMP 222/SOEN 240: OBJECT ORIENTED PROGRAMMING (JAVA)

STREAM: Y2 S1   **TIME: 2 HOURS**

DAY: FRIDAY, 09:00–11:00 AM   **DATE: 24/11/2023**

INSTRUCTIONS
1. *Do not write anything on this question paper.*
2. *Answer Question ONE [Compulsory] and any other TWO Questions.*
3. *Answer to every question should be started on a <u>fresh page</u>*

QUESTION ONE [30 MARKS]

(a) Define java and explain why java is important to the internet. (3 marks)
(b) What is data type? Explain the different data types of java. (4 marks)
(c) With examples, discuss iteration statements in detail. (6 marks)
(d) Write a java program to sort the inputted numbers in descending order using array. (8 marks)
(e) What do you understand by multidimensional array? Explain with example and show how it is declared and initialized. (3 marks)
(f) Write a java method to accomplish the following [6 marks]
    i. Accepts two integers as arguments: e.g max and min
    ii. Determines the largest value amongst the two arguments passed to it
    iii. Returns the largest

QUESTION TWO [20 MARKS]

a) Explain the selection statements with an example [5 marks]
b) Differentiate the following terms as used in Java.
    i. break and continue statements [2 marks]
    ii. print and printf. [2 marks]
    iii. local variable and class variable [2 marks]
    iv. static method and instance method [2 marks]
    v. actual parameter and formal parameter [2 marks]
c) Write a java program to multiply two square matrices. [5 marks]

QUESTION THREE [20 MARKS]

a) What is an array? Illustrate how arrays may be declared   [5 marks]

b) Write a Java program that determines the student's grade . the program will read three types of scores(quiz, mid-term and final scores) and determine the grade based on the following rules:
                                                                                               [10 marks]

   if the average score >=90% grade A
   if the average score >= 70% and < 90% grade B
   if average score >=50% and <70% grade C
   if the average score <50% grade F

c) Typecasting is a very important functionality in programming.
   i. Define the term typecasting and its importance in programming.   [2marks]
   ii. Study the code below and state the outcome of each   [3 marks]
      i. float f =1000.34f;
              int i = (int)f;
      ii. double d =1000.34;
              int i = (int)d;

QUESTION FOUR [20 MARKS]

a) Using syntax explain for loop   [4 marks]

b) Study the following portion of programming statements as shown below and state the likely outcome.

```
String s1 = "Welcome to Java";
String s2 = "Welcome to Java";
String s3 = "Welcome to C++";
```

   i.   System.out.println(s1.equals(s2));   [1mark]
   ii. System.out.println(s1.equals(s3));   [1mark]
   iii. System.out.println(s3.length( ));   [1mark]
   iv. System.out.println(s1.startsWith("o"));   [1mark]
   v.   System.out.println(s1.charAt(2));   [1mark]
   vi. System.out.println(s3.toUpperCase( ));   [1mark]

c) Write a java method named calculateCylinder that will ask the user for the height and radius of a cylinder and then print out the volume of the cylinder ($2\pi r$ 2h). You may use the value 3.14159 or the constant Math.PI in your method.   [10 marks]

QUESTION FIVE (20 MARKS)

(a) Compare and contrast the if-single selection statement and the while repetition statement. (4 marks)
(b) What does the following java program print? Explain.   (6 marks)

```
1  public class Mystery2
2  {
3     public static void main( String args[] )
4     {
5        int count = 1;
6
7        while ( count <= 10 )
8        {
9           System.out.println( count % 2 == 1 ? "****" : "++++++++" );
10          ++count;
11       } // end while
12    } // end main
13
14 } // end class Mystery2
```

(c) The factorial of a nonnegative integer n is written as n! (pronounced as "n factorial") and is defined as follows:

$$n! = n \cdot (n-1) \cdot (n-2) \cdot \ldots \cdot 1 \quad \text{(for values of } n \text{ greater than or equal to 1)}$$

and

$$n! = 1 \quad \text{(for } n = 0)$$

For example, 5! = 5 . 4 . 3 . 2 . 1, which is 120.

Write a java application that reads a nonnegative integer and computes and prints its factorial.   (10 marks)