MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SPECIAL / SUPPLEMENTARY EXAMINATIONS FOR

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BACHELOR OF SCIENCE (STATISTICS AND PROGRAMMING)

SST 202/SIT 223: OBJECT ORIENTED PROGRAMMING IN JAVA

DATE: 27/7/2023   **TIME: 2:00-4:00 P.M**

INSTRUCTIONS:

  i)   **Answer question ONE and other TWO questions**

  ii)   **Write on both sides of the answer sheet**

  iii)   **Do not write in the margins of the answer booklet**

QUESTION ONE (30 MARKS, COMPULSORY)

a)   Define the following

    i)   Object   (1 mark)

    ii)   Class   (1 mark)

    iii)   Inheritance   (1 mark)

    iv)   Polymorphism   (1 mark)

b)   Give a Java declaration statement for each of the following entities

    i)   Registration numbers of a car in Kenya ;   (2 marks)

    ii)   Bank account balance   (2 marks)

    iii)   Calendar year   (2 marks)

c)   Convert the following expressions to a programming statement:

    i) $\sqrt{x^2} + y^2$ (3 marks)

    ii) m^n (3 marks)

    iii) $(\sqrt{x^2} - 4ac)/2a$ (4 marks)

  d) Give THREE programming statements used to handle iteration   (4 marks)

e)   What is the importance of inheritance   (3 marks)

f)   What are the advantages of encapsulation   (3 marks)

QUESTION TWO (20 MARKS)

a)   What is the difference between a constructor and an ordinary method   (6 marks)

b)   Study the code below and answer questions below it

```
double p = 1.0;
int n = 18;
for (int i=1; i<=n; i++) {
if (n%2 == 1) p = p * 2;
System.out.println( p);
    }
```

      i)   What is the output of the program   (3 marks)

      ii)   Rewrite the above code using a while…statement   (5 marks)

      iii)   Draw a flow diagram to represent these structure   (6 marks)

QUESTION THREE (20 MARKS)

a)   Explain the following terms are used in OOP

      i)   Encapsulation   (2 marks)

      ii)   Abstraction   (2 marks)

b)   Draw a diagram to represent the following pseudo code,

      i) Public class A {………..};   (3 marks)

         public class B extends A {……..};

         public class C extends A {……….}

      ii) Public class A {………..};   (3 marks)

         public class B{……..};

         public class C extends A,B {……….}

c)   Using an example explain how to accomplish the following in OOP

      i)   method overriding   (5 marks)

      ii)   method overloading   (5 marks)

QUESTION FOUR (20 MARKS)

a)   Use an example to explain the difference between the following pairs;

      i) Public and private fields   (4 marks)

      ii) a setter and a getter method   (6 marks)

b)   Study the code below and answer the questions provided:

public interface Vegetarian{}

public class Animal{}

public class Deer extends Animal implements Vegetarian{}

Given further that

    Deer d = new Deer();

    Animal a = d;

    Vegetarian v = d;

    Object o = d;

i)   Explain the principles taken care of here   (4 marks)

ii)   What can you say about a, d, v and o?   (6 marks)

QUESTION FIVE (20 MARKS)

a)   What is a constructor?   (2 marks)

b)   Write a programming method to represent the following narrative: Compute and print the weekly pay for a worker. All workers are paid an hourly rate and salary is based on hours times rate. Any work done in excess of 40 hours, is paid at 1.5 times the normal rate.

(6 marks)

c)   Study the table below and answer the questions underneath

	P>=Q	P<Q
X>Y	Cow	Goat
X<=Y	Donkey	Horse

d)   construct a nested if statement to print the string of characters given the conditions

(6 marks)

e)   draw a flow chart for the solution in (i) above   (6 marks)