MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS)

SST 202: OBJECT ORIENTED PROGRAMMING IN JAVA

DATE: 17/8/2021 **TIME: 8:30 – 10:30 AM**

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 (COMPULSORY) (30 MARKS)

a) Define the following

i) Constructor (1 mark)

ii) Object (1 mark)

iii) Method (1 mark)

iv) Class (1 mark)

b) Consider this code fragment and answer the questions below

```
1) int sum = 0;
2) int i = 0;
3) while (i < 10)
4) {
5) sum = sum + i;
6) i++;
7) }
```

```
8)  System.out.print(i);
9)  System.out.print(" ");
10) System.out.print(sum);
```

i) What is the output of executing line 8 and 10 (4 marks)

ii) Re-write the code using a for…..Statement (5 marks)

iii) Draw a flow-Chart to represent the code (5 marks)

c) Give THREE programming statements used to handle decision making in OOP. (3 marks)

d) What is the importance of the following principles used in OOP

i) Inheritance (2 marks)

ii) Abstraction (2 marks)

e) Use a diagram to explain the phases of the LOOP control structure (5 marks)

QUESTION TWO (20 MARKS)

a) Explain the advantages of learning Java Programming Language (5 marks)

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

```
public class Sumbuka{
    public static void main(String s[])
    {
      for (int i = 0; i <20; i++ )
      {
        if (i%2==1)
        System.out.print("i = " + i );
      }}}
```

i) Write the output after running the program (5 marks)

ii) Draw a flow-Chart to represent the program (5 marks)

iii) Re-write the program using a Do..While Statement (5 marks)

QUESTION THREE (20 MARKS)

a) Explain the following terms are used in OOP

i) Polymorphism (2 marks)

ii) Encapsulation (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) 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)

b) Draw a diagram to represent the narrative provided in (a) above (4 marks)

c) 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 of Object Oriented programming applied in this code (4 marks)

ii) Describe a, d, v and o? (6 marks)

QUESTION FIVE (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) Describe the component parts of an ordinary method (4 marks)

c) Using a decision control structure write a program that prints the words “Excellent”, “Outstanding” and “Very Good” for Marks obtained by a student as provided

(6 marks)

Marks	**Comment**
80 - 100	Excellent
60 – 80	Outstanding
50 - 60	Very Good
40 - 50	Good