



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 223: OBJECT ORIENTED PROGRAMMING IN JAVA

DATE: 17/12/2021

TIME: 2.00-4.00 PM

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) Abstraction (1 mark)
 - iii) Object (1 mark)
 - iv) Class (1 mark)
- b) Consider this code fragment and answer the questions below
 - 1) `int sum = 0;`
 - 2) `int i ;`
 - 3) `while (i < 30)`
 - 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, 9 and 10 (3 marks)
 - ii. Re-write the code using a for.....Statement (4 marks)
 - iii. Draw a flow-Chart to represent the code (5 marks)
- c) Give THREE advantages of declaring variables before using them in a program (3 marks)
- d) Using an example, describe the component parts of a method (5 marks)
- e) Briefly describe the main principles of Object-Oriented Programming (6 marks)

QUESTION TWO (20 MARKS)

- a) Using a diagram in each case explain the following terms used in OOP
 - i. Muti-level Inheritance (2 marks)
 - ii. Multiple Inheritance (2 marks)
 - iii. Hierarchical Inheritance (2 marks)
- b) Study the program code provided and answer the questions below:

```
public class Sumbuaf
    public static void main(String s[])
    {
        for (int i = 0; i < 10; i++ )
        {
            if (i%2==1)
                System.out.print("i = " + i );
        }
}
```

- i. Write the output after running the program (4 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 main characteristics of Object-Oriented Programming Languages (5 marks)
- b) The equation of a circle is given as $(x - a)^2 + (y - b)^2 = r^2$ where a and b are the coordinates of the center (a, b) and r is the radius. A programmer wishes to find the area, circumference and scale of the circle using the Object Oriented technique. Write code for a class to represent this information (5 marks)
- 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) In Object Oriented Programming, what is an Exception? (2 marks)
- c) Explain the source of exceptions in programming (4 marks)
- d) Name any TWO exceptions found in the Java programming Language (2 marks)
- e) Use an example to explain the **Try...Catch Exception Block** (6 marks)

QUESTION FIVE (20 MARKS)

- a) Describe any TWO structured data types (4 marks)
- b) 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)
- c) Write an algorithm that can be used to solve a quadratic equation (6 marks)