



KISII UNIVERSITY

UNIVERSITY EXAMINATIONS

**SECOND YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF
BACHELOR OF SCIENCE IN COMPUTER SCIENCE/SOFTWARE ENGINEERING
FIRST SEMESTER 2022/2023
[SEPTEMBER-DECEMBER, 2022]**

ACMP 222/SPEN 240: OBJECT ORIENTED PROGRAMMING I [JAVA]

STREAM: Y2S1

TIME: 2 HOURS

DAY: THURSDAY, 3:00 – 5:00 PM

DATE: 22/12/2022

INSTRUCTIONS

- 1. Do not write anything on this question paper.***
- 2. Answer question ONE and any other TWO questions.***

QUESTION ONE [30 MARKS]

- Define program portability and explain how java uses the concept of JVM to achieve program portability. [5 Marks]
- Write a complete java program that uses the standard java output stream to print the message “Hello, welcome to Java” five times on screen. [5 Marks]
- Write a java application class that utilizes the for-loop to capture 10 scores from a user via the keyboard input, computes, and prints back the average score. [10 Marks]
- With syntax and examples explain two major types of control structures used in java. [10 marks]

QUESTION TWO [20 MARKS]

- Define the term constructor and explain its purpose in object oriented programming. [5 marks]
- Differentiate the following terms as used in Java.
 - next and nextLine. [2 marks]
 - print and printf. [2 marks]
 - static variable and instance variable [2 marks]
 - static method and instance method [2 marks]
 - actual parameter and formal parameter [2 marks]

- c) Develop a java program that captures a loan applicant's salary and number of years in employment. The program should sent the message "You qualify for a loan" if the applicant earns over Ksh. 20,000 and has been in employment for at least 3 years, otherwise, the program should sent an appropriate loan application rejection message. [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 captures and stores 12 monthly company sales values in an array, computes the total sales for the year, outputs the 12 monthly sales and the annual total. [10 Marks]
- c) The following snippet below describes a user defined method. Define the type of user defined method the snippet is using. Give reasons for your answer. [3Marks]
- d) Typecasting is a very important functionality in programming.
- Define the term typecasting and its importance in programming. [3marks]
 - Study the code below and state the outcome of each [4marks]
 - `float f =1000.34f;`
`int i = (int)f;`
 - `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++";
```
- `System.out.println(s1.equals(s2));` [1mark]
  - `System.out.println(s1.equals(s3));` [1mark]
  - `System.out.println(s3.length( ));` [1mark]
  - `System.out.println(s1.startsWith("o"));` [1mark]
  - `System.out.println(s1.charAt(2));` [1mark]
  - `System.out.println(s3.toUpperCase( ));` [1mark]
- c) Develop a program to provide a solution for a payroll systems of the University staff which will accept the employee PFNo, Name, Department , Grade, the Hourly rate of payment , Hours works and the flat rate of Kshs 10,000 and Kshs 20,000 for entertainment and House allowance respectively [10 marks]

**QUESTION FIVE [20 MARKS]**

- a) Write statements that perform the following one-dimensional-array operations:
  - i. Set the 10 elements of integer array **counts** to zero [3 marks]
  - ii. Add one to each of the 15 elements of integer array **bonus** [3 marks]
  - iii. Display the five values of integer array **bestScores** [4 marks]
  
- d) Assuming you are working in a private or public sector, you are entitled to a salary which has to be taxed based on the following two categories (Intern and Employee) below. Write a Java program that is interactive with the user. The program should prompt the user for the following: - Name of worker -Salary - Gender of Student (Male or Female) -Category (Intern or Employee)

| Marginal Tax Rate | Intern                  | Employee                 |
|-------------------|-------------------------|--------------------------|
| 10%               | KSH 0-<br>KSH8,350      | KSH0-<br>KSH16,700       |
| 15%               | KSH8,351-<br>KSH33,950  | KSH16,700-<br>KSH67,000  |
| 28%               | KSH33,951-<br>KSH82,250 | KSH67,001-<br>KSH137,050 |

The program should then display the details entered and display the tax the worker is supposed to pay. Use switch case and nested if/else in the same program. [10 marks]