



## UNIVERSITY EXAMINATIONS

### EXAMINATION FOR SEPTEMBER/DECEMBER 2019/2020 FOR BACHELOR OF SCIENCE IN COMPUTER SCIENCE/BACHELOR OF BUSINESS IN INFORMATION TECHNOLOGY

### RCS 102 OBJECT-ORIENTED PROGRAMMING

DATE: DECEMBER 2019

TIME: 2 HOURS

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#### GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination paper during Exam time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

#### SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room and NOT on your person.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material before or during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet(s) in the order you answered them.**
8. **Write your REGISTRATION No. clearly on the answer booklet(s).**
9. **DO NOT use your PHONE as a CALCULATOR.**
10. **YOU are ONLY ALLOWED to leave the exam room 30minutes to the end of the Exam.**

## SECTION A (Compulsory-30 MARKS)

### QUESTION ONE [30 MARKS]

- a. Define program portability and explain how java uses the concept of JVM to achieve program portability. [5 Marks]
- b. 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]
- c. 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. [10Marks]
- d. With syntax and examples explain two major types of control structures used in java [10marks]

## SECTION B (Answer Any TWO questions -30 MARKS)

### QUESTION TWO [15 MARKS]

- a. Differentiate the following terms as used in Java.
  - i. next and nextLine. [2marks]
  - ii. print and printf. [2marks]
  - iii. static variable and instance variable [2marks]
  - iv. static method and instance method [2marks]
  - v. actual parameter and formal parameter [2marks]
- b. 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. [5Marks]

### QUESTION THREE [15 MARKS]

- a. 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. [5Marks]
- b. 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]

- c. Typecasting is a very important functionality in programming.
- i. Define the term **typecasting** and its importance in programming. **[3marks]**
  - ii. Study the code below and state the outcome of each **[4marks]**
    - i. `float f =1000.34f;`  
`int i = (int)f;`
    - ii. `double d =1000.34;`  
`int i = (int)d;`

**QUESTION FOUR [15 MARKS]**

- a. 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]**

- b. 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-KSH8,350	KSH0-KSH16,700
15%	KSH8,351-KSH33,950	KSH16,700-KSH67,000
28%	KSH33,951-KSH82,250	KSH67,001-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. **[9marks]**

**QUESTION FIVE (15MARKS)**

- a. Define the term constructor and explain its purpose in object oriented programming. **[3marks]**
- b. State three different types of constructor present in java. **[3marks]**
- c. Write statements that perform the following one-dimensional-array operations:
  - i. Set the 10 elements of integer array **counts** to zero. **[2marks]**
  - ii. Add one to each of the 15 elements of integer array **bonus**. **[3marks]**
  - iii. Display the five values of integer array **bestScores**. **[4marks]**