



## UNIVERSITY EXAMINATIONS

**SECOND SEMESTER 2023/2024 ACADEMIC YEAR**

**FIRST YEAR EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN COMPUTER SCIENCE  
BACHELOR OF SCIENCE (ICT) AND BACHELOR OF  
EDUCATION (SCIENCE)**

**COMP 124: PROCEDURAL PROGRAMMING**

***STREAM: R***

***TIME: 2 HRS***

***DAY: TUESDAY [8.30A.M – 10.30A.M]    DATE: 09/04/2024***

**THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES**

**PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.**

**INSTRUCTIONS**

- Answer **ALL** questions in section A and any **TWO** questions in section B
- All questions in section B carry equal marks

**SECTION A (30 MARKS)****QUESTION ONE (30 MARKS)**

- a) Define the following OOPs concepts:
- Encapsulation **(2 Marks)**
  - Polymorphism **(2 Marks)**
- b) Highlight TWO advantages of inheritance in OOP. **(2 Marks)**
- c) Differentiate between a structure and a class and illustrate the appropriate syntax for defining each. **(6 Marks)**
- d) Write the general form of a C++ function definition with an example. **(4 Marks)**
- e) Consider the following program:
- ```
int i;
for (i=1; i<20; i = i+3)
cout << i << endl;
```
- What is printed by the above code segment of C++? **(2 Marks)**
- f) What will be the output of the following program? **(1 Mark)**
- ```
int num1 =1;
if (num1=0)
{
cout<<"the value of num1 has not been altered ";
}
else
{
cout<<"the value of num1 has been altered ";
}
}
```
- g) Explain your answer in f) above. **(2 Marks)**
- h) Write a C++ program that uses a friend function **(6 Marks)**
- i) Identify SIX errors in the following code **(3 Marks)**

```

/calculating the total amount of money earned in n days
#include <iostream>
using namespace std;
int main( )
{
    Int, n;
    int total, rate= 20;
    cout>>"Enter number of days worked: ";
    cin>>n
    total = n * rate;
    cout<<"\n| For rate RM20 per day |";
    cout<<"For"<<"n"<<"days worked, you have earned $ ";
    cout<<total<<endl;
    return 0;
}

```

**Section B each question is worth 20 Marks Answer any TWO questions in this section.**

### QUESTION TWO (20 MARKS)

- a) Below is program that uses while loop.

```

#include <iostream>
using namespace std;
int main()
{
    int i=1;
    while(i<=10)
    {
        cout<<i <<"\n";
        i++;
    }
}

```

Rewrite the above program using do-while loop

**(4 Marks)**

- b) Write a program in C++ that makes use of three classes namely:

employee – stores employee name and Identification number

salary – stores the total salary figure obtained from adding net pay and commission.

result – inherits employee details from employee and net pay and commission from salary and displays the employee details and the total of the month's salary.

The program should create one object called empdetails.

**(7 Marks)**

- c) You have been asked to advice students of Laikipia University why they should use C++ as a programming language over C. Discuss **THREE** reasons you would give them. **(6 Marks)**
- d) Outline **THREE** pre-processor directives used in C++ **(3 marks)**

**QUESTION THREE (20 MARKS)**

- a) Write a program in C++ that accepts two user input numbers: number1 and number2, the program then compares the two numbers and outputs: number1 equals number2 or number1 is less than number2 or number1 is greater than number2 depending on the outcome. **(6 Marks)**
- b) Describe the following **THREE** variable scopes using a simple program example and use comments to illustrate each. **(9 Marks)**
- i. Local variable
  - ii. Global variable
  - iii. Formal parameters
- c) State which of the following statements are true/false. **(5 Marks)**
- i. Classes are public by default while structures are private by default
  - ii. Arrays are a collection of different elements stored with single name
  - iii. Parametrized constructor accepts no arguments
  - iv. Cin is used to display output on the console
  - v. All C++ programs can run on C compiler.

**QUESTION FOUR (20 MARKS)**

- a) Discuss in details **THREE** forms of inheritance. **(6 Marks)**
- b) What is the purpose of implementing constructors and destructors in the creation of a class? Indicate the syntax used for defining each. **(6 Marks)**
- c) Write an object oriented program in C++ that requests the user for two input numbers a and b; the program should divide the two numbers and display the result if the denominator is not zero, if the denominator is zero it should throw an exception. **(8 Marks)**



**QUESTION FIVE (20 MARKS)**

- a) Using Laikipia University grading system, write a program using classes and objects that captures student data. The program should prompt a user to enter a student Name, Age, course and marks in 5 subjects. The program should then display the details entered and calculate the total, average and grade of a student. **(8 Marks)**
- b) Discuss the following in details: **(6 Marks)**
- i. Declaring a two-dimensional array
  - ii. Initializing a two-dimensional array
  - iii. Accessing two-dimensional array elements
- c) Discuss the **THREE** logical operators. **(6 Marks)**

