

CHUKA



UNIVERSITY

## UNIVERSITY EXAMINATIONS

**THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF  
BACHELOR OF SCIENCE APPLIED COMPUTER SCIENCE**

ACSC 122: INTRODUCTION TO STRUCTURAL PROGRAMMING USING C

STREAMS: BSC (ACSC)

STREAMS: 2 HOURS

DAY/DATE: WEDNESDAY 08/04/2020

2.30 PM – 4.30 PM

**INSTRUCTIONS:**

1. Answer **all questions** in section A and any other **two questions** from section B.
2. No Reference Material is allowed in the exam Room.
3. Write legibly on both sides of question paper.
4. All Mobile phones should be switched off in the exam room.

**SECTION A-COMPULSORY****QUESTION ONE (30 MARKS) [COMPULSORY]**

- (a) Define the following terms as used in C programming (4 marks)
- i) Programming
  - ii) Assembler
  - iii) Interpreter
  - iv) Compiler
- (b) Citing appropriate examples, describe the two main high level languages programming paradigms (4 marks)
- (c) Describe the difference in the meaning of the 5 in `intx[5]`; and the meaning of the 4 in `x[4]`. What are the meaning of [5] and [4] (3 marks).
- (d) Enumerate any six C built in data types (3 marks).
- (e) Write a code that prompts a user to enter three numbers, it then returns the sum, product and the average of the entered numbers (5 marks)
- (f) Consider the following program.
- ```
#include <stdio.h>
Intmain(void)
(
```

```

    INT sum;
    /*COMPUTE RESULT
    Sum=25+37+19

    /* DISPLAY RESULT//
    Printf("the answer is% i/n"sum);

    Return 0;
    }

```

- i. Identify FOUR syntactic errors in the following program (2marks)
  - ii. Rewrite the corrected program, then add product which will display the product of the numbers (3marks)
- (g) Distinguish between each of the following pair of words in programming (6 marks).
- i. Recursion and iteration
  - ii. Syntax and semantic error
  - iii. Source code and compiled source code (give the extensions also)

### **SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION**

#### **QUESTION TWO (20 MARKS)**

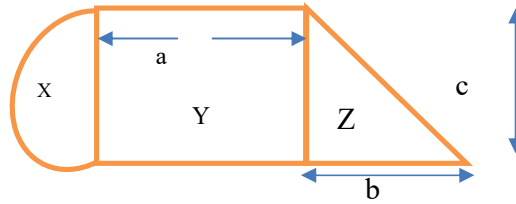
- a) With appropriate examples, describe any two decision making and two looping structure (4 marks)
- b) Write the algorithm pseudo code to be followed by a program that reverses an integer number entered by the user(e.g. if the user enters 10491m the program should output 19401) (4marks)
- c) Write a C program to implement the algorithm in (b) above. (6 marks)
- (d) Design a C program to input employees name, hours worked and rate per hour calculate the basic pay=hours worked\* rate per hour, tax is charged according to basic pay. If basic pay is greater than 20000, a tax of 10 per cent of basic pay is charged, otherwise a tax of 5% is charged.Net salary=basic –tax. The program should display employee name, basic salary, tax and net salary. (6 marks)

#### **QUESTION THREE (20 MARKS)**

- (a) Write the syntax of a DO...WHILE loop, hence explain how it differs with a WHILE loop. (4 marks)
- (b) Explain two rules used when declaring variables. (2 marks)
- (c) Using SWITCH decision making statement, write a C code that prompts a user to enter two integers. The code then prompts a user to select from options 1-3

inclusively. If a user selects option 1 the code returns the sum of the two integers, if the user selects option 2 it returns the product of the numbers; if the user selects option 3 it returns the sum of the squares of the numbers. (6 marks)

- (d) Figure below show standard playground shapes of various institutions. Use it to answer a question that follows:



Using a function for each of the parts labeled X, Y and Z. Write a C program to assist the institutions in calculating the total cost of painting their playgrounds, if  $1\text{m}^2$  is painted using ksh 150 and a user is to enter distances a, b and c of their institution in meters. Take  $\pi$  to be 3.14. (8 marks)

#### QUESTION FOUR (20 MARKS)

- Write a program to enter dimensions of a triangle then use a function to calculate area of a triangle and return the result. (5 marks)
- Use an example to illustrate the difference between local and global variables (4marks)
- In a certain restaurant, a waiter requires one tray to carry three served plates. Write a C code that prompts a waiter to enter the number of served plates to carry, hence it calculates and prints the number of trays to use. Assuming all the served plates are to be delivered at the same time, and no half tray. (*hint: 4 served plates require 2 trays to carry and not 1.33trays as in ordinary calculations*) (5 marks)
- Write a C code to display the factors of a positive integer entered by a user. (Factors are numbers that are divisible by the entered integer. They should be between 1 and that integer inclusively) (6 marks).

#### QUESTION FIVE (20 MARKS)

- Write a C program that is going to write only the values divisible by 3 in descending order, between 1 and 100. (5marks)
- Using an example, explain the following terms as used in C programming. (4marks)
  - Data type
  - Dry running
- Write a code that returns the factorial of a number entered (6 marks)
- Using  $\pi$  as 3.142, write a program to calculate the area of a circle. The user should enter the diameter of a circle ( $\text{area} = \pi \times \text{radius}^2$ ) (5 marks)