

CHUKA UNIVERSITY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE AWARD OF APPLIED COMPUTER SCIENCE

ACSC 122: INTRODUCTION TO STRUCTURAL PROGRAMMING USING C

**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) State two logical operators **[2 marks]**
- (b) Explain four reasons why end users need to be involved in development of new system **[4 marks]**
- (c) Explain two problem solving strategies in developing computer programs **[4 marks]**
- (d) Using pointers: -
- i) Write a code that prompts a user to enter an integer value, then it returns the memory location where the value is stored. **[3 marks]**
  - ii) Draw a flow chart of the above code **[3 marks]**
- (e) Scrutinize the following code and write the output. **[5 marks]**

```
#include <stdio.h>
int main ()
{
    int n[ 10 ]; /* n is an array of 10 integers */
    int i,j;

    for ( i = 0; i < 10; i++ )
    {
        n[ i ] = i * 100; /* set element at location i to i *100 */
    }
    for ( j = 0; j < 10; j++ )
    {
        printf("Element[%d] = %d\n", j, n[j] );
    }
    return 0;
}
```

- (f) Draw a program flowchart that finds the area of a circle. The program should only accept the value radius between 7 to 70 inclusively. **[4 marks]**
- (g) Write a C program to display the multiplication table below. **[5 marks]**

1	2	3	4	5
2	4	6	8	10
3	6	9	12	15

4	8	12	16	20
5	10	15	20	25

**SECTION B: ANSWER ANY TWO QUESTIONS**

**QUESTION TWO (20 MARKS)**

(a) Write the extension of the following C files: - **[3 marks]**

- i) Source code
- ii) Compiled source code

(b) Under what condition will the following code print the word “water”? **[3 marks]**

```

If(T<32)
{
printf(“ice\n”);
}
else if (T<212)
{
Printf(“water\n”);
}
else
{
Printf(“steam\n”);
}

```

(c) Using a simple C code, differentiate between global and local variable **[4 marks]**

(d) Write a program that prompts a user to enter two integers A and B, it then tests if A is greater than B. If the condition is not true, it advises you to enter integers where A is greater than B. Otherwise it divides A with B and returns both the dividend and the remainder. (HINT: example if user enters A=90 and B=25, it returns 3 remainder 15) **[5 marks]**

(e) Assuming a customer has to buy FOUR items from a grocery whenever he shops. Using an array, write a program that prompts the cashier to key in the cost of each item bought by the customer. It then gives the total cost to be paid by every customer; and if the customer has bought goods worth Ksh 500 and above it gives a total discount of Ksh 40, else it gives a discount of Ksh 10. **[5 marks]**

**QUESTION THREE (20 MARKS)**

(a) Explain three purpose of system maintenance **[3 marks]**

(b) Write the syntax for invoking a function **[2 marks]**

(c) Explain three decision making statements used in C programming **[3 marks]**

(d) Write a C program that accepts two integer values represented by **a** and **b**. Values assigned should be equal to zero or greater than zero. Values assigned should be less or equal to five. The program should ask the user to enter the values of a and b. If the above conditions are met, the program should sum the two values i.e. a and b, then divide the sum by two and assign the results to a float variable called **xmid**. The program should then display the value of xmid. **[6 marks]**

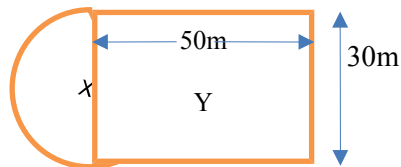
- (e) Assuming 2.6 centimeters = 1 inch. Using switch statement, write a program that prompts a user to enter a number to be converted, then select either select option 1 or option 2. If a user selects option 1 it converts the entered number from centimeters to inches, while if the user enters option 2 it converts from inches to centimeters. **[6 marks]**

#### QUESTION FOUR (20 MARKS)

- (a) A student came across the following programming languages. Help him identify an object-oriented language, fourth generation language, and a fifth-generation language. **[3 marks]**
- i) Small talk
  - ii) Delphi Pascal
  - iii) Mercury
- (b) State the two ways of declaring a comment in C programming **[2 marks]**
- (c) Discuss the role of variable declaration in C programming and write an example statement that declares a variable **[4 marks]**
- (d) Fred is a programming student, who has been asked by his lecturer to calculate simple interest of three individuals. Write a C program to implement this. **[3 marks]**
- (e) Write a program in C that accepts ten user input cat marks, stores them in an array and calculates then display the average mark. **[6 marks]**

#### QUESTION FIVE (20 MARKS)

- (a) State three uses of semicolon in C programming language **[3 marks]**
- (b) Define the following terms as used in C programming. **[2 marks]**
- i) Data type
  - ii) Dry running
- (c) Write the syntax that makes up FOR loop. **[3 marks]**
- (d) Using pie as 3.142, write a program to calculate the volume of a cylinder. The user should enter the diameter of a circle and the height of a cylinder (volume=height x pie x radius<sup>2</sup>) **[6 marks]**
- (e) Figure below shows a playground of a certain institution. Use it to answer the question that follows:



- Using a function for each of the parts labelled X, and Y. write a C program to calculate the total area covered by the playground. Take pie to be 3.14. **[6 marks]**