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**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR**  
**FIRST YEAR, SECOND SEMESTER, END OF SEMESTER EXAM**  
**FOR THE DIPLOMA IN INFORMATION TECHNOLOGY**  
**DIT 1002- STRUCTURED PROGRAMMING**

Date: 1<sup>ST</sup> AUGUST 2022  
Time: 8:30AM – 11:30AM

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Define the following terms as used in programming:
  - i) Programming language (2 Marks)
  - ii) Object code (2 Marks)
  - iii) Escape sequence (2 Marks)
- b) Differentiate between local variable and global variable.
- c) Explain any THREE advantages of low level programming language. (6 Marks)
- d) Discuss the main features of modular programming highlighting its key advantages. (6 Marks)
- e) Draw a flowchart for a program that calculates the area and the perimeter of a circle then displays results on the screen. (4 Marks)
- f) Write the codes for the above program in C language. (4 Marks)
- g) Suggest, with examples two ways in which constant values can be used in C expression statements. (4 Marks)

**QUESTION TWO (20 MARKS)**

- a) Draw a flowchart of a program that will display the words adult, teen or child based on the age. If age is below 13 years, **child**, age is between 13 and 19, **teen** else **adult**. (5 Marks)
- b) Write the C program code that can be used to develop the above (a) program. (7 Marks)
- c) Discuss the main steps of program development. (8 Marks)

**QUESTION THREE (20 MARKS)**

- a) Define the term Algorithm. (2 Marks)
- b) State FOUR examples of reserved words used in C programming. (4 Marks)
- c) Explain any four rules of naming variables in C language. (8 Marks)
- d) Language processor are key to all programming languages except the machine language. Explain the main types of language translators. (6 Marks)

**QUESTION FOUR (20 MARKS)**

- a) Explain the main advantages of C programming language over other Languages. (6 Marks)
- b) From the following program, suggest the syntax and logical errors that may have been made. (6 Marks)

```

#include<stdio.h>
main()
{
    int , int n2, n3;
    n = 5;
    n2 = n *n
    n3 = n2 * n2;
    printf(" n = %d, n squared = %d, n cubed = %d \ n", n, n2, n3);
    return 0;
}

```

- c) Write a C program using the while loop that displays numbers 1 to 10 on the screen. (8 Marks)

### **QUESTION FIVE (20 MARKS)**

- a) Explain the importance of the following functions in a C program.
- i) Printf() (2 Marks)
  - ii) Scanf() (2 Marks)
- b) C is both 'portable' and 'efficient'. Explain. (6 Marks)
- c) The roots of a quadratic equation  $\mathbf{ax^2 + bx + c = 0}$  can be evaluated as:

$$\mathbf{x1 = (-b + \sqrt{(b^2 - 4ac)})/2a}$$

$$\mathbf{x2 = (-b - \sqrt{(b^2 - 4ac)})/2a}$$

where a, b, c are double type variables and  $b^2 = b * b$ ,  $4ac = 4 * a * c$ ,  $2a = 2 * a$ .

Write a program that calculates the two roots  $\mathbf{x_1, x_2}$  with double precision, and displays the roots on the screen. (10 Marks)