1920/203
STRUCTURED PROGRAMMING
July 2023
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY

MODULE II

STRUCTURED PROGRAMMING

3 hours

INSTRUCTIONS TO CANDIDATES

*This paper consists of **TWO** sections: Section **A** and **B**.*
*Answer **ALL** the questions in section **A** and any **FOUR** from section **B** in the answer booklet provided.*
Candidates should answer the questions in English

This paper consists of 5 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

Turn over

Section A (40 marks)

*Answer **All** the questions in this section*

1. (a) State **four** examples of third generation programming languages. (2 marks)

   (b) Explain the function of a *loader* as used in programming. (2 marks)

2. State the difference between */ operator* and *% operator* as used in a C program. (4 marks)

3. Outline **four** characteristics of a C programming language. (4 marks)

4. Kennedy considered the following factors when choosing a programming language:

   (a) efficiency;

   (b) elasticity of a language

   Explain a reason for each of this consideration. (4 marks)

5. Explain a circumstance that would necessitate the use of each of the following format strings in a C program:

   (a) %d

   (b) %f (4 marks)

6. The following is a program written in C programming language. Use it to answer the questions that follow:

```
#include<stdio.h>
main()
  {
     printf("My country is Kenya");
  }
```

   Explain the function of each of the following in the code:

   (a) main()

   (b) printf() (4 marks)

7. Jared used the following keywords in a C program that he developed.

   (a) goto statement;

   (b) break statement;

   Explain the function of each of the key words in the program. (4 marks)

8. The following is a statement used in a C program. Use it to answer the questions that follow:

```
for (k=1;k<=20;k++)
```

   (a) Identify the logical expression in the statement. (2 marks)

   (b) State the function of the statement k++. (2 marks)

9. With the aid of an illustration, state the difference between a *one-dimensional array* and a *two-dimensional array* as used in C programming language. (4 marks)

10. Describe each of the following data structures as used in programming language.

    (a) stack;

    (b) linked list. (4 marks)

Section B (60 marks)

*Answer any **FOUR** questions in this section*

11. (a) Describe each of the following tools as used in programming:

(i) decision tree;

(ii) flow chart. (4 marks)

(b) Marion intends to develop an application in C programming language. Describe **two** types of software other than the operating system she would require to achieve her goal. (4 marks)

(c) (i) Explain *merge sort* technique as used in C programming. (2 marks)

(ii) The following are elements in an array. Use it to answer the questions that follow.

6	11	16	21	26	31	37

Using a binary search algorithm, write a pseudo-code to find the element 26 in the array. (5 marks)

12. (a) (i) Explain the term *binary file* as used in C programming. (2 marks)

(ii) Outline **two** advantages of using a binary file in C programming. (2 marks)

(b) Sally documented a program that she developed. Explain **three** types of documentations that she could have considered. (6 marks)

(c) Write a program using C programming language that would display all integers from 20 to 50. Use a *for loop* statement. (5 marks)

13. (a) Explain the function of each of the following *function prototype* statements in a C program:

(i) float area(int, int)

(ii) int void sum(int) (4 marks)

(b) State a program development phase where each of the following activities may be performed: (5 marks)

(i) writing the actual program;

(ii) stating the requirements of the program to be developed;

(iii) enhancing the operation of the program;

(iv) checking if the program meets its requirement specifications;

(v) drawing a flowchart to show the logic of a program.

(c) The volume of a sphere is given by $V = \frac{4}{3} \times \pi \times r^3$, where V is the volume and r is the radius. Write a C program that would compute and display the volume of a sphere with a radius 20cm. (6 marks)

14. (a) Outline **three** advantages of sub programs in programming. (3 marks)

(b) With an aid of an example, differentiate between a *single character constant* and a *string character constant* as used in C programming. (4 marks)

(c) The following is a program in C programming language. Use it to answer the questions that follow.

```
#include <stdio.h>
int g;
int main ()
{
int a, b;
 a = 10;
 b = 20;
 g = a + b
printf ("value of a = %d, b = %d and g = %d\n", a, b, g);
return 0;
 }
```

(i) State **two** statements that have been used to initialise variables in the program. (2 marks)

(ii) Explain the function of `\n` in the printf statement. (2 marks)

(iii) Explain the *scope* of each of the following variables declared in the program:

(I) g;

(II) a. (4 marks)

15. (a) State the difference between *"a"* command mode and *"w+"* command mode as used in C programming files. (4 marks)

(b) Explain the function of each of the following in C programming language.

(i) escape sequence;

(ii) nested loop;

(iii) clrscr() command. (6 marks)

(c) Write a C program that would accept a string of 10 characters through an input statement. The program should then print the first character and last character of the string on the screen. (5 marks)

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