Name_____ Index No_____

2920/103
STRUCTURED PROGRAMMING
November 2014
Time: 3 hours

Signature_____

Date_____

THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN INFORMATION COMMUNICATION TECHNOLOGY

MODULE I

STRUCTURED PROGRAMMING

3 hours

INSTRUCTIONS TO CANDIDATES:

*Write your **name** and **index number** in the spaces provided above.*
***Sign** and write the **date of examination** in the spaces provided above.*
*Answer **FIVE** of the following **EIGHT** questions in the spaces provided in this paper.*
Candidates should answer the questions in English.

For Examiner's Use Only

Question	1	2	3	4	5	6	7	8	Total Score
Candidates Score									

This paper consists of 20 printed pages.

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

1. (a) State **two** activities that take place during subprogram maintenance. (2 marks)

(b) (i) Outline **four** functions of a computer *compiler*. (4 marks)

(ii) State **two** advantages of *bubble sort* algorithm as used in computer programming. (2 marks)

(c) Differentiate between *technical documentation* and *user documentation*. (4 marks)

(d) Write a C program that could be used to generate the following output. Use for loop control structure. (8 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

2. (a) Define the term *list* as used in programming. (2 marks)

(b) (i) Describe each of the following terms as used in programming:

I. structured programming; (2 marks)

II. web scripting programming. (2 marks)

(ii) Under what circumstance would a programmer choose to use fifth generation programming language. (2 marks)

(c) The following is a Pascal program structure declaration. Use it to answer the question that follows.

```
Struct account
{
      Char accname[20];
      Int accno;
      Char acctype[7];
      Float lastdep;
      Float accbalance;
};oldmember, newmember;
```

Interpret the program segment. (4 marks)

(d) Write a Pascal program that reads the following data from an input text file and then the Program generates the output shown below computing the highest mark and average mark.

Input file

Student name	Mathematics	English	Computer
Charlyn Nicholson	50	70	50
Charles Peter	50	80	45
Catherine Brian	80	90	69

Output file

Student name	Mathematics	English	Computer	Highest Average
Charlyn Nicholson	50	70	50	
Charles Peter	50	80	45	
Catherine Brian	80	90	69	

(8 marks)

3. (a) List **six** parts of a program documentation manual. (3 marks)

(b) (i) Describe each of the following types of computer program errors:

I. user acceptability (2 marks)

I. logical (2 marks)

(ii) With the aid of an example, distinguish between *formal* parameters and *actual* parameters as used in programming. (4 marks)

(c) Use the following Pascal program statements to answer the question that follows.

```
Procedure add(n:integer);
    Begin
        Statement 1;
        Statement 2;
        Statement 3;
    End;
    Function even(i:integer;j:integer);
    Begin
        Statement 1;
        Statement 2;
        Statement 3;
    End;
    Var k,L,M,:integer;
    Const pi=3.14;
    Type array days[1..7] of integer;
```

Arrange the statements in the correct Pascal program order. (3 marks)

(d) Write a Pascal program that prompts the user to enter an 8 character password. The program should then output "Strong password" if four of the characters entered are numbers else "Weak password". Use *if* and *for* control structures. (6 marks)

4. (a) Outline the function of each of the following commands as used in a Pascal program:

(i) reset; (1 mark)

(ii) rewrite. (1 mark)

(b) Explain the function of each of the following statements as used in Pascal programming.

(i) ord(); (2 marks)

(ii) succ(); (2 marks)

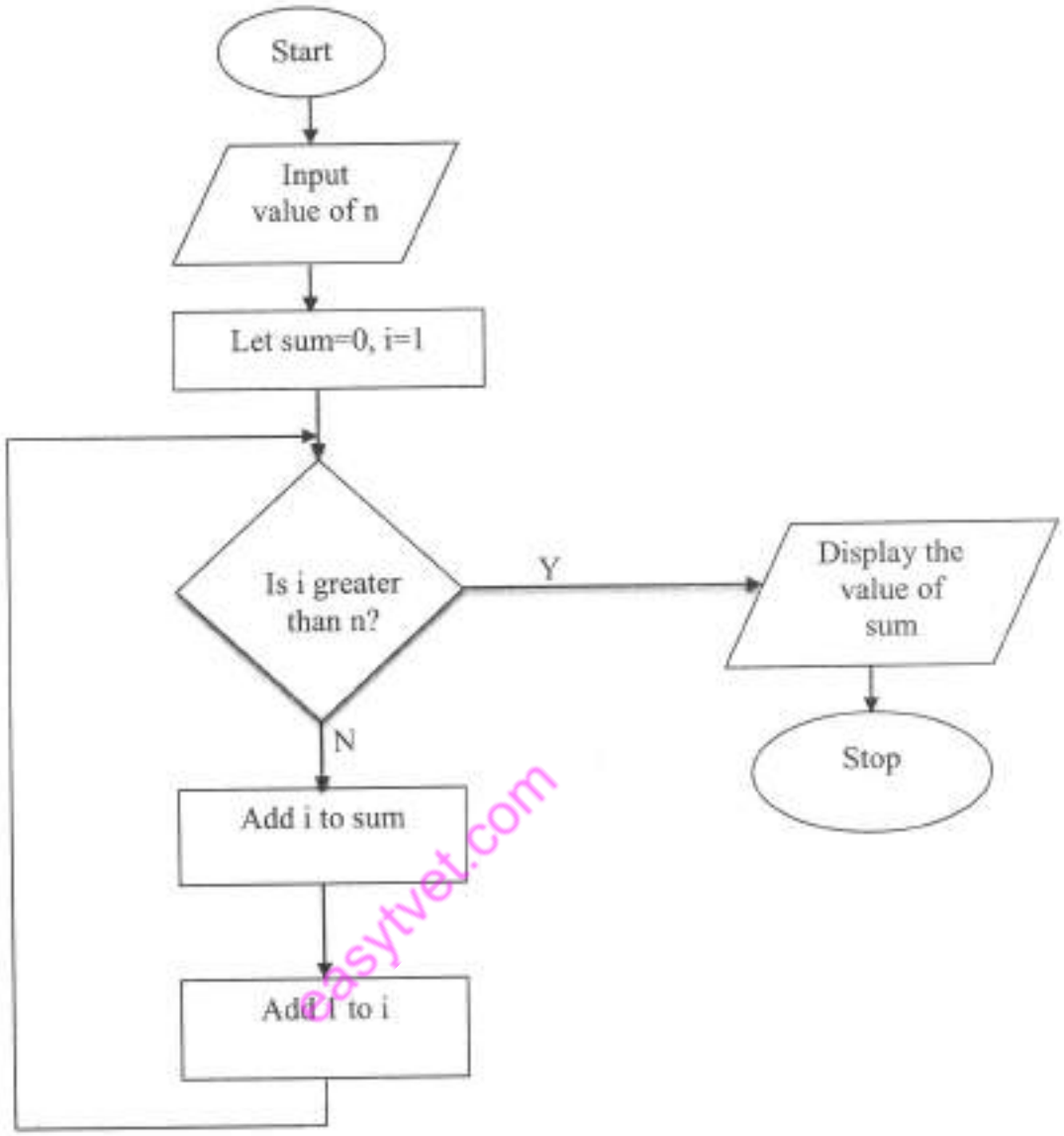
(iii) chr(). (2 marks)

(c) Given that a=10, b=30, c=5 determine the value of :

(i) (a*b/c)>(b*c/a) (2 marks)

(ii) (a+c)*b != a*(b+c) (3 marks)

(d) Code the following flowchart into a Pascal program. (7 marks)



5. (a) Define the term *argument* as used in programming. (2 marks)

(b) Figure 1 shows a binary tree. Use it to answer the question that follows.

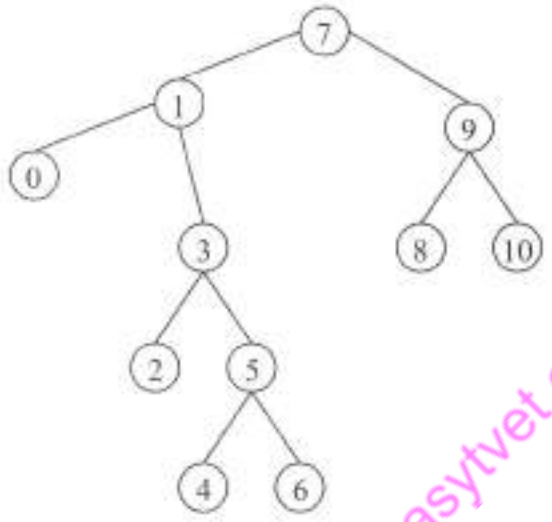


Figure 1

Explain the output using each of the following traversing methods:

(i) preorder; (3 marks)

(ii) inorder. (3 marks)

(c) With the aid of a flowchart, explain the flow of instructions in a *while.... do* control structure. (4 marks)

(d) The following is a grading system in a particular school. Use it to answer the question that follows.

Score	Grade
80 and above	A
70 – 79	B
60 – 69	C
50 – 59	D
Below 50	E

Write a Pascal program that accepts marks for five subjects, computes and outputs the average and the appropriate grade. (8 marks)

6. (a) Outline the function of each of the following statement as used in Pascal programming:

(i) append str(); (1 mark)

(ii) new(). (1 mark)

(b) Describe each of the following data structures:

(i) queue; (2 marks)

(ii) stack. (2 marks)

(c) (i) Distinguish between *monolithic* and *procedural* programming approaches. (4 marks)

(ii) With the aid of an example in each case, outline the function of each of the following string functions as used in Pascal:

I. pos(); (2 marks)

II. insert(). (2 marks)

(d) Figure 1 shows a diagram of a triangle. Use it to answer the question that follows.

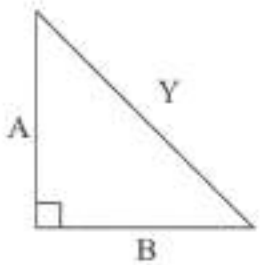


Figure 1

Write a Pascal program that prompts the user to enter the values of A and B and calculates and outputs the value of Y through the use of a function.

Hint $Y = \sqrt{A + B}$ (6 marks)

7. (a) (i) Outline **two** ways of declaring an array in a Pascal program. (2 marks)

(ii) Differentiate between *source code* and *object code* as used in computer programming. (4 marks)

(b) Justifying your answer, outline the importance of a *procedure* in a Pascal program. (2marks)

(c) (i) Outline **three** advantages of *quick sort* algorithm as used in computer programming. (3 marks)

(ii) Catherine would like to write a program that computes the factorial of a number. Justifying your answer, explain the most appropriate subprogram that she could use for the task. (3 marks)

(d) Write a C program that prompts the user to enter an integer and a symbol. The program should then generate a pattern depending on the symbol and integer entered through the use of a function. For example if integer 5 is entered and symbol @ is entered the following output is generated. (6 marks)

@@@@@
@@@@
@@@
@@
@

8. (a) Under what circumstance would a *repeat... until* control structure be used in a program. (3 marks)

(b) Distinguish between *extreme data* and *abnormal data* as used in program testing. (4 marks)

(c) (i) Identify all the errors in the following program. (3 marks)

```
# include(stdio.h)
Int main<>
[
     Integer x,y,z
     If ((x>y)$$(x>z))
          Printf("x is greater  than y and Z");

     Else If ((y>x)$$(y>z))
          Printf("y is greater  than x and Z");

     else
          Printf("z is greater  than x and y");


];
```

(ii) Outline the steps that would be followed to sequentially search for element 20 from the list of numbers below. (5 marks)

0, 21, 30, 10, 20, 9.

(d) Nicholson would like to write a program that computes and outputs the sum of all the multiples of 5 in the range 1 to 100. Write a pseudo code to represent the logic of the program. (5 marks)