1. (a) (i) Explain the term *parameter passing* as used in programming. (2 marks)

(ii) Write a C program that prompts the user to enter an integer. The program should then determine whether the input is odd or even and output appropriate message. (4 marks)

(b) (i) James entered an integer in a Pascal program during execution and the following output was displayed 3.08000E+0.155000E.

I. Outline the cause of the output as displayed. (1 mark)

II. State a possible solution that could make the output easy to read. (1 mark)

(ii) Figure 1 shows a flowchart of a program designed by a student in a programming class. Use it to answer the question that follows.

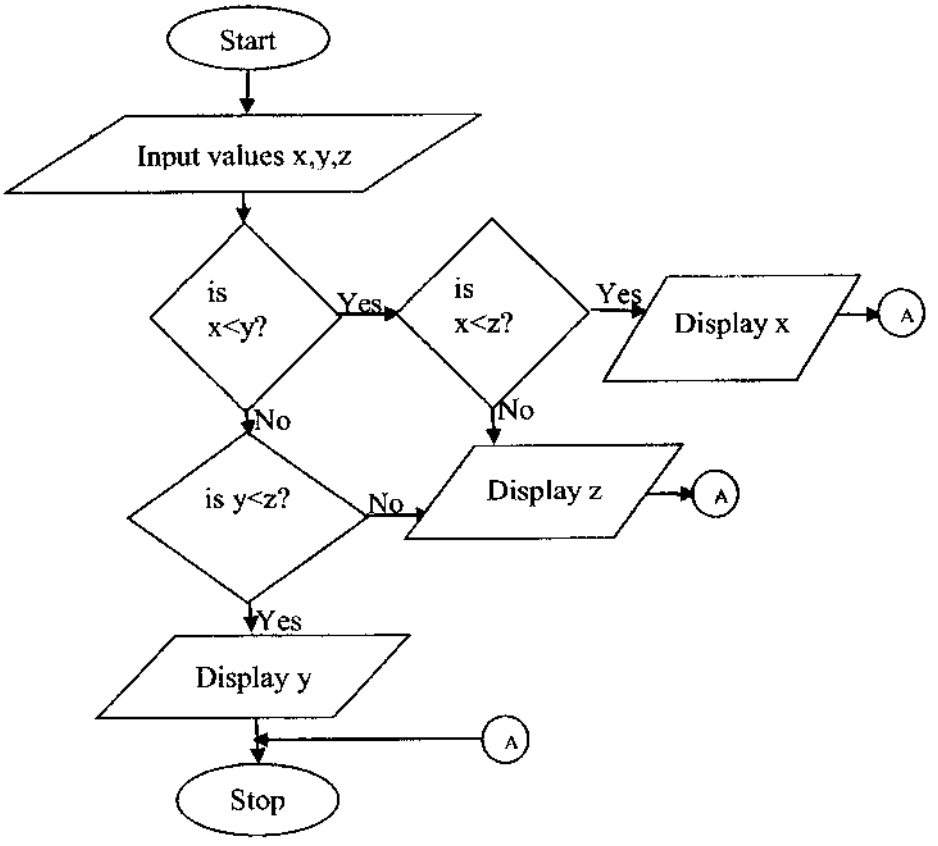

Figure 1

Write a Pascal program that could be used to implement the program logic.

(4 marks)

(c) Differentiate between an *interpreter* and an *assembler* as used in programming. (4 marks)

(d) Write a C program that would prompt the user to enter the length and breadth of a rectangle. The program should then compute and output the area and perimeter of the rectangle. (4 marks)

2. (a) (i) List **two** inbuilt Pascal functions that could be used to store the results of a real expression as an integer. (1 mark)

(ii) With the aid of an example outline the structure of a compound statement as used in Pascal Programming. (1 mark)

(iii) Distinguish between *object oriented programming* and *visual programming* paradigms. (4 marks)

(b) Write a Pascal program that would be used to read 10 scores into an array named D. The program should then compute the average score and display average score and the scores greater than the average. Use a *while...do* loop to read data. (6 marks)

(c) Write a Pascal program that would prompt the user to input values of m , n, p, q and then computes the value of z which is the product of m and n and value of c which is the sum of p and q through a procedure beta. Then program display the results from beta procedure. (4 marks)

(d) With the aid of an example in each case, differentiate between *prefix* and *postfix* decrement operators as used in C programming. (4 marks)

3. (a) (i) State **three** file handling commands that are used in C programming. (3 marks)

(ii) Differentiate between *reset* and *rewrite* procedures as used in Pascal text files. (4 marks)

(b) Explain **two** advantages of a loop control structure as used in programming. (4 marks)

(c) Write an algorithm that could be used to remove an element from a stack. (4 marks)

(d) Write a C program that would accept an integer. If the integer has one digit, the total sum is the integer otherwise the total sum is the digits in the integer. Use a recursive function. (5 marks)

4. (a) (i) Outline **four** properties of an *array* data structure. (2 marks)

(ii) The following is a C program segment. Use it answer the question that follows..

```
#include<stdio.h>
int  & max(int & x, int & y)
{
        if (x>y)
        return x ;
        else
        return y;
}
main()
{
        Max(a,b);
}
```

Interpret the program. (3 marks)

(b) Tom, an IT student was given a task to test a Pascal program under development. Explain **two** characteristics that could help him ascertain that the program contains a function. (4 marks)

(c) (i) Write a Pascal program that could be used to generate squares of even integers between 12 and 30. Use *Repeat .... Until* loop. (4 marks)

(ii) Explain a circumstance that makes *goto* statement unpopular. (2 marks)

(d) (i) Construct a binary tree for the following nodes 20, 10, 21, 5, 9, 4, 17. (2 marks)

(ii) With reference to the binary tree constructed in (i), explain each of the following terms:

I. siblings; (1 mark)

II. ancestors; (1 mark)

III. terminal. (1 mark)