1. (a) Study the following program and then answer the questions that follow.

```
INC COUNT
MOVE TOTAL 20
ADD A, B
```

(i) Identify the programming language used in this program. (1 mark)

(ii) Outline **two** advantages of the language identified in (i). (2 marks)

(b) Distinguish between *local* and *global* variables as used in programming. (4 marks)

(c) Write a program in Pascal language that computes and displays the product of two assigned values 20 and 40. (4 marks)

(d) (i) A college intends to store the following student's details in a computer; name, age and address. Declare a Pascal language record that would store these details. (4 marks)

(ii) Write a program in C language that prompts a user to enter a student's name and age. The program then writes the name and age into a text file. (5 marks)

2. (a) The following are program statements in C language. Use them to answer the question that follows: (2 marks)

(i) x *=2;

(ii) x%=3.

Given that the value of x is 60. State the output generated when each of the statement is executed.

(b) Differentiate between *rewind()* and *getw()* as used in C programming. (4 marks)

(c) Write a program in Pascal language that prompts a user to enter a character. Then the program determines whether the character input is a vowel or not and displays an appropriate message. Use *case* statement. (5 marks)

(d) (i) Explain **two** statement used to change the flow of execution in a C program loop. (4 marks)

(ii) Write a program in C language that displays even numbers up to a given number input. (5 marks)

3. (a) State **four** sorting techniques used in programming. (4 marks)

(b) (i) Describe the purpose of *writeln;* statement as used in Pascal programming language. (2 marks)

(ii) Write a program in Pascal language that prompt a user to enter the amount of money borrowed and the repayment period. The program then passes these values to a procedure, computes and displays the simple interest at rate of 14% per annum. Hint: interest =money borrowed x period x rate. (5 marks)

(c) Distinguish between *call by reference* and *call by value* as used in programming. (4 marks)

(d) The following Pascal program was created by a student during a practical lesson. Use it to answer the question that follows.

```
Program alpha(input, output);
Var
x:char;
y:integer;
Procedure beta(var x:char; var y:integer);
Begin
y:=ORD(x);
End;
Begin
x:='A';
Beta(x,y);
Writeln('ASCII code for  ',x, 'is' ,y);
End.
```

Interpret the program. (5 marks)

(a) (i) Outline **three** reasons for preparing a program documentation. (3 marks)

(ii) Explain **two** inbuilt Pascal functions used to manipulate an enumerated data type. (4 marks)

(b) Outline the purpose of each of the following operators in a C program: (3 marks)

(i) &&

(ii) ||

(iii) !=

(c) Write a program in C language that prompts a user to enter a positive integer. The program then determines and output the factors of the integer. (5 marks)

(d) Write a program in Pascal language that generates the following output when executed: (5 marks)

```
$$$$
$$$$
$$$$
```

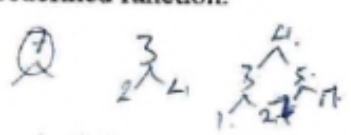5. (a) State the differences between r+ and w+ file commands as used in C programming. (4 marks)

(b) Describe **two** types of file organisation techniques that could be adopted during program writing. (4 marks)

(c) Write a Pascal program that prompts a user to read a number. The program check to determine whether the number is a positive integer. The program then computes and output the square root of the number using a predefined function. (6 marks)

(d) Given the nodes: 6, 2, 5, 1, 7, 4 and 3:

(i) Construct a binary tree. (4 marks)

(ii) Write the output generated when the tree in (i) is traversed using pre-order traversal strategy. (2 marks)

6. (a) (i) Outline **two** operations that could be performed on a stack data structure.

(2 marks)

(ii) Explain the purpose of a packed array in Pascal programming. (2 marks)

(b) (i) Outline **three** factors considered when selecting an appropriate programming language. (3 marks)

(ii) Explain each of the following approaches to programming: (4 marks)

(I) monolithic;

(II) visual.

(c) Differentiate between *bubble* and *selection* sort techniques. (4 marks)

(d) Write a segment code in C programming language that deletes an element from queue data structure. (5 marks)

7. (a) Explain **two** benefits of a compiler in programming. (4 marks)

(b) Outline **four** factors to consider when naming constant identifier. (4 marks)

(c) Write a program in Pascal language that would prompt a user to enter two numbers. The program then computes the sum of the two numbers using a function and displays the results. (6 marks)

(d) The following elements are stored in an array; 45, 34, 65, 30, 25 and 56. Write a program in C language that would search for the element 30 and display an appropriate message. Use linear search technique. (6 marks)

8. (a) Outline six conversion specifiers used in C programming language. (3 marks)

(b) (i) Outline **two** importance of creating subprogram when programming. (2 marks)

(ii) Susan created a documentation for a program. Outline **four** elements that she could have included to it for easy referencing. (4 marks)

(c) Draw a program flowchart that would declare two sides of a rectangle as constant with values 70 and 130 respectively. The program then calculates and output the area of the rectangle. (6 marks)

(d) Write a program in C language that prompts a user to enter three different numbers. The program then determines and displays the largest among the numbers. (5 marks)

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