Please check that this question paper contains 9 questions and 2 printed pages within first ten minutes.

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Uni. Roll No. .....

EVENING

20 MAY 2024

Program: B.Tech. (Batch 2018 onward)
Semester: 1/2
Name of Subject: Programming for Problem Solving
Subject Code: ESC-104
Paper ID: 15935
Scientific calculator is Not Allowed

Time Allowed: 03 Hours **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately. For programs, it is expected that suitable assumptions are made and stated wherever micro-level requirement related to the code to be developed is not mentioned.

Part – A **[Marks: 02 each]**

Q1

a) "Sematic and logical errors are not the same". State your points of difference in this context.

b) State role of pointers with example.

c) What are basic steps of a recursive program?

d) Give at least four differences between break and continue statements.

e) Why do programmers make use of user-defined functions?

f) What will be the output of following code?

```
int main ( )
{
  printf("%d\n",sizeof("A"));
   printf("%d\n",sizeof('A'));
   int x=10;
   printf("%d\n",x++);
   int y=9;
   printf("%d\n",++y);
   return 0;
}
```


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Part – B **[Marks: 04 each]**

Q2 Explain various components of computer system with the help of a block diagram.

Q3 What all things happen at the backend when a program has to be executed? Illustrate your answer with a diagram.

Q4 When should one apply **call by value** and when **call by reference** should be preferred? Support your arguments very clearly.

Q5 Create a user-defined function to find the factorial of any positive integer number read through the keyboard. Make use of parameter passing and return type concepts.

Q6 Construct a flowchart and write an algorithm to find reverse of digits of a positive number read through the keyboard.

Q7 Develop a code that accepts an array and then finds and display sum of the elements of the array.

Part – C **[Marks: 12 each]**

Q8 Compare in detail selection sort with insertion sort algorithm. Also implement one selection and one insertion sort algorithm.

OR

Discuss in detail various naming convention of variables and various data types (including range, size in bytes, examples etc.)

Q9 Develop a menu driven code that does the following:

If '**A**' is entered, user-defined function '**Swap**' must be able swap two numbers without using a third temporary variable.

If '**B**' is entered, user-defined function '**mul**' must be able to multiply two positive numbers which are read through the keyboard.

If any other 'character' is entered, code must be able to terminate with a suitable message.

[Make use of parameter passing and return type concepts while developing code.]

OR

Create a structure **'Student'** that contains the fields like: **studentID**, **name**, and **age**. Write a program that allows the user to perform the following tasks:

Input student details (studentID, name, age) for '**n**' students (where '**n**' is read through the keyboard).

Display the details of all students in the record.

Find and display details of student who is oldest.

In your program, make use of an array of structures and functions.

[Consider '**age**' in terms of years has to be a positive number and of integer data type only].

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