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

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Uni. Roll No. .....

Program: B.Tech. (Batch 2018 onward)

Semester: 2

Name of Subject: Programming for Problem Solving

Subject Code: ESC-104

Paper ID: 15935

Scientific calculator is Not Allowed

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2 2 AUG 2024

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) Briefly discuss various types of errors with examples.

b) How can one access and manipulate the data stored in that memory location using pointers?

c) Is there any similarity between recursion and iteration? Justify your answer.

d) List differences between switch and if-else statements.

e) "One of the good programming concept is to create user-defined functions". Justify the quoted text.

f) What will be the output of following code?

```
int main ( )
{
  printf("%d\n",sizeof("A"));
   printf("%d\n",10%-3);
   int x=9;
   printf("%d\n",x++);
   printf("%d\n",-10%3);
   return 0;
}
```


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Part – B **[Marks: 04 each]**

Q2 Using a block diagram, explain the key components of a computer system.

Q3 Explain the processes involved in making a basic C program functional by discussing its structure. Provide an example to illustrate.

Q4 What are different ways to pass arguments in functions? Explain at least two with example(s).

Q5 Create a user-defined function to find the sum of digits 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 factorial of a number.

Q7 Develop a code that accepts an array, interchanges the first element with the last element, the second element with the second last element, and so on, and finally prints the new array.

Part – C **[Marks: 12 each]**

Q8 In what ways do searching and sorting algorithms differ? Provide a detailed explanation of each process, supplemented with illustrative examples.

OR

Provide a comprehensive classification of the different types of operators in C with examples.

Q9 Design a menu-driven program that performs the following operations:

If '**X**' is selected, implement a user-defined function '**Reverse**' that reverses the digits of a given integer without converting the number to a string.

If '**Y**' is selected, create a user-defined function '**Power**' that computes the power of a number (base raised to the exponent) using iterative multiplication.

If any other character is selected, the program should terminate and display an appropriate exit message.

[Ensure the use of parameter passing and return type concepts while developing the 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 with a serial number (which is incremented from 1 to '**n**').

Find and display details of student who is eldest.

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; '**studentID**' should have values from 1001 onwards].

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