

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

MORNING

03 JAN 2025

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Uni. Roll No.

Program: B.Tech.

Semester: 1,2/ (2018)

Name of Subject: Programming for Problem Solving

Subject Code: ESC-104

Paper ID: 15935

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

Part – A

[Marks: 02 each]

Q1.

- a) Define an algorithm and explain the characteristics of a good algorithm.
- b) Analyze the following pseudocode and determine its output when the input value of x is 10, what will be printed?

START

READ x

IF x > 10 THEN

PRINT "x is greater than 10"

ELSE IF x = 10 THEN

PRINT "x is equal to 10"

ELSE

PRINT "x is less than 10"

ENDIF

END

- c) Discuss an array in C, and how does it differ from a variable? Provide an example of declaring and initializing an array of integers.
- d) Show an example of declaring and initializing a pointer to an integer.

- e) Illustrate the difference between call by value and call by reference.
- f) What will be the result of fibonacci(4)?
- ```
int fibonacci(int n) {
 if (n <= 1)
 return n;
 else
 return fibonacci(n - 1) + fibonacci(n - 2);
}
```

**Part – B****[Marks: 04 each]**

- Q2. Explain the steps involved in compiling and executing a C program.
- Q3. Write a C program to implement a simple calculator using switch-case.
- Q4. Compare and contrast linear search and binary search with suitable examples.
- Q5. What are structures in C? Write an example to declare and initialize a structure.
- Q6. Implement a program to sort an array using the bubble sort technique.
- Q7. Demonstrate the code if you have a function that calculates the square of a given number and returns the result. A programmer uses this function in a program to find the area of a square by calling `calculateSquare(sideLength)`. The program will print the result using `printf("Area of the square is: %d", area);`. What would be the output if `sideLength` is 5?

**Part – C****[Marks: 12 each]**

- Q8. Write a program to evaluate a mathematical expression involving arithmetic operators, considering operator precedence. Explain the logic used to handle precedence and associativity.

OR

Explain the process of developing a program from an algorithm. Write a detailed algorithm, flowchart, and C program to calculate the factorial of a given number

- Q9. Develop a program to demonstrate how to use pointers to swap the values of two variables. Include comments in the code explaining each step.

OR

Design a structure to store student details (name, roll number, marks) and write a program to display the details of students scoring above 75%.

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