

MORNING

[Total No. of Questions: 09]
Uni. Roll No.

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[Total No. of Pages: 3]

Program: B.Tech. (Batch 2018 onward)
Semester: 1st/2nd
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

Part – A

[Marks: 02 each]

Q1.

- a) Define an algorithm and list the various desirable characteristics of a good algorithm.
- b) When the if statement does not have an associated else, explain what happens when the condition evaluates to zero with a suitable example.
- c) Write and explain the output of the following program with steps.

```
#include<stdio.h>
int f(int n, int k)
{
    if(n==0) return 0;
    else if(n%2) return f(n/2,
    2*k)+k;
    else return f(n/2, 2*k)-k;
}
int main()
{
    printf("%d", f(20,1));
    return 0;
}
```

- d) The elements of an array are given as 12,7,13,9,10,77,2,8. Identify and write the arrangement of elements after the first pass of the bubble sort method.

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- e) Is it possible to declare more than one array in the same declaration statement? Justify your answer.
- f) By analysing the following program, determine the output? and explain your answer.

```
#include <stdio.h>
int main() {
    int i;
    for(i=0;i<5;i++)
    {int j=3;
    printf("%d",i*j);
    }
    printf("%d",j);
    return 0;
}
```

Part – B

[Marks: 04 each]

- Q2. Demonstrate the concept of break and continue statement with a suitable example.
- Q3. Define a function. List the various advantages of using functions. List and explain various string functions by making use of suitable examples.
- Q4. What is a pointer? How a pointer is declared. Explain with an example, how a variable is accessed using a pointer.
- Q5. Define flowchart. Construct a flowchart and write an algorithm to find the largest digit in a natural number 'n'.
- Q6. Distinguish between searching and sorting. Explain binary search by taking a suitable example to demonstrate its concept.
- Q7. Develop a program 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.

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- Q8. Construct a program to make the following pattern using for **and** while loop and the output of your program must exactly match the pattern given below. **Note:** make two different programs for this one using FOR loop and another using WHILE loop.

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```

OR

Write an algorithm for Insertion and linear search. Also, explain both using a suitable example.

- Q9. Explain the need of recursion in C. What do you mean by base case in recursion, explain by taking a suitable example. Further, write a program in C to print the factorial of a number 'n'.

OR

Define a structure. Explain the main reason for using structures. Design a structure named student to store the data about a student which contains the following elements- rollno, name and score. Write a program to input the data about students, and output the stored data.
