Structured Programming Approach - Dec 18

First Year Engineering (Semester 2)

Total marks: 80
Total time: 3 Hours

INSTRUCTIONS
(1) Question 1 is compulsory.
*(2) Attempt any **three** from the remaining questions.*
(3) Draw neat diagrams wherever necessary.

1.a. What is recursion? Write a program to find x^y using recursion. (4 marks)
1.b. State any two library functions string.h along with its syntax, use an example (4 marks)
1.c. What is a pointer? Explain how the pointer variable declared and initialized. (4 marks)
1.d. Write the output for following code

```c
#include <stdio.h>

int main()
{
   int val = 1;
   do {
      val++;
      ++val;
   } while(val++ > 25);
   printf("%d\n", val);
   return 0;
}
```
(4 marks)

1.e. Write a program to validate whether accepted string is palindrome or not. (4 marks)
2.a. Write a program to multiply two matrices after checking compatibility. (10 marks)
2.b. What is file? What are the different functions available to read data from file? Specify the different modes in which files can be opened along with syntax. (10 marks)
3.a. Write a program to find transpose of matrix without making use of another matrix. (10 marks)
3.b. Define a structure consisting of following elements

1. student roll_no
2. student name
3. student percentage

Write a program to read records of 5 students and display same. (10 marks)

4.a. Write a program to calculate summation of series.

$$11! + 22! + 33! + ... + nn!$$ (10 marks)

4.b. Draw the flowchart for finding the roots of quadratic equation. Write the program for same   (10 marks)

5.a. Write a program to implement calculator with following operations using switch case

1. add two numbers
2. Subtract two numbers
3. Multiply two numbers
4. Divide two numbers   (10 marks)

5.b. What do you mean by FILE? What are the different functions available to read data from file? Specify the different modes in which file can be opened along with syntax.   (10 marks)

6.a. Write a program to generate following patterns.

```
1
1  2
1  2  3
1  2  3  4
1   2   3   4   5

1
2  3
3  4  5
6  7  8  9
         .
```
(5 marks)

6.b. Explain call by value and call by reference with example.   (10 marks)