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## Computer Programming - I

- N.B. (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** questions from remaining **six** questions.  
 (3) Assume any **data** if **required** and state the assumption.

10.30 to 1.30

1. (a) What is object oriented programming paradigm ? List the basic concepts of it ? 10  
 Explain each concept.  
 (b) What is the output of the following programs :— 10

```
(i) #include<iostream.h>
void main()
{
    int i=1,j=1;
    for (;;)
    {
        if(i>3) break;
        else j+=i;
        cout<< j << endl;
        i+=j;
    }
}

(ii) #include<iostream.h>
void main()
{
    int k=3, l=4, m;
    m=++k + l--;
    cout<<"Value of m"<<m<<endl;
    m=k++ + --l;
    cout<<"Value of m"<<m<<endl;
}
```

2. (a) Write a program that simulates a simple calculator. It reads two integers and one character. If the character is a +, the sum is printed; if it is a -, the difference is printed; if it is \*, the product is printed, if it is a /, the quotient is printed and if it is a %, the remainder is printed. (Hint : Use a switch statement.) 10  
 (b) Write a program that calculates the square roots of a quadratic equation. 10
3. (a) Explain storage class with one programming example. 10  
 (b) Write a program to read elements of a square matrix and print the trace (i.e., the sum of the main diagonal elements) of a two-dimensional square array of integers. 10  
 For example, it would return 46 for the array

11	22	33
40	20	60
35	25	15



4. (a) Explain recursion and write a recursive program for calculating factorial of a given number N. 10
- (b) Write a program that reads a positive integer n and then prints a triangle of asterisks in n rows. If n=4, then the output would be 10

```
*
* *
* * *
* * * *
```

5. (a) Explain Call-by-value and Call-by-reference with example. 10
- (b) Write a program to find area of circle, area of rectangle and area of triangle using function overloading. 10
6. (a) Write a program that reads any positive integer n and prints the digits in words. 10  
(For example, if input is 1235 then output is **one two six five**).
- (b) Write a program to check whether a given string is palindrome or not. 10
7. (a) What is virtual function? What is the need of virtual function? 5
- (b) What do you mean by dynamic initialization of variables? How it is achieved? Give an example. 5
- (c) Explain the difference between a constructor and a destructor in C++. 5
- (d) Explain Bit wise operators in C++. 5