LAB 1
Part I - Short Answer

1. The value of the C++ expression 13+21%4-2 is?
2. What is the output of the following expression? ((5+1)/((2+2+2)/2)).
3. What are logical errors? When and why does it occur?
4. List out different rules for declaring variables in C++?
5. What is type casting? Give 2 examples.
6. List out and explain two forms of decrement operator?
7. Define C++ functions? Write Syntax of function Prototype, Call and Body.
8. What is 2-D array? Write Syntax of 2-D array?
9. What is loop? What are the advantages of loop?
10. Difference between variable declaration and variable initialization?
11. Write a program that inputs three numbers and displays the maximum number**.**
12. Find the OutPut of the Following Program

```
#include<iostream.h>
void main()
{
  for(int i=0;i<=5;i++){

      for(int j=0;j<=i;j++)
         {
            cout<<j;
         }
     cout<<endl;
   }
}
```

13. Find the OutPut of the Following Program

```
#include<iostream.h>
void main()
{   int i,j;
        for(i=1; i<=2;i++)
          for(j=1;j<=3;j++)
                cout<<"outer:"<<i<<"inner:"<<j;
}
```

14. Find the OutPut of the Following Program

```
#include<iostream.h>
#include<conio.h>
```

```
void main()
{       int i,j,s;
        clrscr();
        for(i=1;i<=5;i++)
        {
          for(s=1;s<=5-i;s++)
          cout<<“”;
           for(j=1;j<=i;j++)
          cout<<“*”;
        }
         getch();
}
```

15. What is a recursive function? Give at least one example.

Part II – Coding

In this section you are required to use functions only.

1. (Calculating the Value of π) Calculate the value of π from the infinite series

$$\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \cdots$$

Print a table that shows the value of π approximated by one term of this series, by two terms, by three terms, and so on. How many terms of this series do you have to use before you first get 3.14? 3.141? 3.1415? 3.14159?

2. (Temperature Conversions) Implement the following integer functions:

a) Function celsius returns the Celsius equivalent of a Fahrenheit temperature.

b) Function fahrenheit returns the Fahrenheit equivalent of a Celsius temperature.

c) Use these functions to write a program that prints charts showing the Fahrenheit equivalents of all Celsius temperatures from 0 to 100 degrees, and the Celsius equivalents of all Fahrenheit temperatures from 32 to 212 degrees.

$T_{(°F)} = T_{(°C)} \times 1.8 + 32$

3. Write a program for matrix – matrix multiplication. Use 2-D arrays as a matrix taken from user and also perform necessary checks i.e. (multiplication possible or not).

4. The greatest common divisor (GCD) of two integers is the largest integer that evenly divides each of the two numbers. Write function gcd that returns the greatest common divisor of two integers.

5. Write a program that take a string input from user and find a particular character given by the user and also find the number of times it appear in the string.

6. Write a function that perform each of the following array operations:
   a) Initialize the 10 elements of integer array counts to zeros.
   b) Add 1 to each of the 15 elements of integer array bonus.
   c) Read the 12 values of floating-point array monthlyTemperatures from the keyboard.
   d) Print the five values of integer array bestScores in column format.

   Note: Pass the array by reference

7. Define a function called hypotenuse that calculates the length of the hypotenuse of a right triangle when the other two sides are given. The function should take two arguments of type double and return the hypotenuse as a double.

8. Write a program that read the distance between two cities in kilometers and change it into Meters, Feet, Inches, Centimeters and Millimeters.

9. Write C++ program to print following pattern:

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

10. Write a program to find the HCF and LCM of two numbers given by the user.

11. In a company an employee is paid as under: If his basic salary is less than Rs. 1500, then HRA = 10% of basic salary and DA = 90% of basic salary.
    If his salary is either equal to or above Rs. 1500, then HRA = Rs. 500 and DA = 98% of basic salary. If the employee's salary is input by the user write a program to find his gross salary.