Set I

1. a) Name the header file for the following built-in functions:

    i) log()   ii) exp()   iii) getch()   iv) isalnum()

    b) Give the output of the following program:

```cpp
#include<iostream.h>
int z=3;
void moo(int& x, int y)
{
    x+=x+y+z;
    y+=x+y+z;
    z+=x+y+z;
    if (x!=743)
        cout<<x<<','<<y<<','<<z<<endl;
}
void main()
{
    int z=4;
    moo(z, ::z);
    moo(::z, z);
    moo(z, ::z);
}
```

    c)
```cpp
int x=3;
cout<<x<<endl;
x=2*x+1;
cout<<(x-1)<<endl;
cout<<(x+2)<<endl;
x*=2;
cout<<(x-2)<<endl;
cout<<++x<<endl;
```
    i) Give the output of the program segment given above.
    ii) Obtain the same output by using **for** loop.

2. a) i) Write all the possible C++ statements to decrement value of a variable x by 1.
    ii) Write a logical expression to check that a character variable alpha contains lowercase alphabet (without using islower() function).

    b) i) Name all the fundamental data type of C++ for which memory is allocated.
    ii) Name the data types that support two or more type modifiers.
    iii) Name the data type that does not support any type modifiers.

    c) What is type casting? With suitable example show two ways of type casting.

    d) Name the escape sequences given below:
    i) '\b'   ii) '\n'

3. a) In a **switch**-**case** statement, which are the optional components?

    b) i) What is the difference between entry controlled loop and exit controlled loop?
    ii) Name one entry controlled loop and one exit control loop.

c) i) What is conditional operator? What is the other name for conditional operator?

ii)
```
int osum=0, esum=0, num;
for (int k=1; k<=20; k++)
{
    cin>>num;
    if (num%2==1)
        osum+=num;
    else
        esum+=num;
}
cout<<osum<<esum;
```
Replace **if-else** statement by conditional operator.

4. a) i) Mention two differences between local variable and global variable.
   ii) When is scope resolution operator necessary with global variable?

b) i) Write two differences between actual parameter and formal parameter.
   ii) State any two differences between value parameter and reference parameter.

c) i) Differentiate between function prototype and function definition.
   ii) With an example, differentiate between calling function and called function.

5. Write C++ function for the following:
   a) Test whether an integer passed as parameter to a function **int** checkpalindrome(), is a Palindromic number or not. Function returns a value either 1 (one) when the integer is Palindrome or 0 (zero) when the integer is not Palindrome.

   b) An floating point (x) and a integer (n) is passed as parameters to the function named seqsum(). Return value of the function is **double**. The function seqsum() finds the sum of the series given below:

$$1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + ...(-1)^n \frac{x^n}{n!}$$

   c) Calculate HCF and LCM of two integers passed as parameters to function hcflcm(). Return value of the function **void**. If one of the parameters is non-positive then display an error message "HCF & LCM do not exist". The HCF and LCM of two integers is to be displayed inside the function.

   d) Generate and display all the Prime numbers between 2 and n (including 2 and n), where n is passed as a parameter to the function. Return value of the function is **void**. Name of the function is genprime().

Set II

1. a) Name the header file for the following built-in functions:
   - i) `fabs()`   ii) `isalpha()`   iii) `toupper()`   iv) `cos()`

   b) Give the output of the following program:
   ```cpp
   #include<iostream.h>
   int c = 2;
   void func(int a, int& b)
   {
      a += b * c;
      b += c + a;
      c += a * b;
      cout << a << ',' << b << ',' << c << endl;
   }
   void main()
   {
      int c = 2;
      func(c, ::c);
      cout << c << ',' << ::c << endl;
      func(::c, c);
   }
   ```

   c)
   ```cpp
   int x = 4;
   cout << x << endl;
   x = 2 * x - 1;
   cout << (x + 1) << endl;
   cout << (2 * x - 2) << endl;
   x *= 2;
   cout << (x + 2) << endl;
   cout << (5 * (x - 2) / 3) << endl;
   x += 7;
   cout << (x + 3) << endl;
   ```
   - i) Give the output of the program segment given above.
   - ii) Obtain the same output by using **do-while** loop.

2. a) Write C++ statement or expression for the following:
   - i) Increment value of a variable `count` by 1, by using only unary operator.
   - ii) Check that an integer variable `yr` is divisible by 4 but not divisible by 100.
   - iii) All possible ways of calculating square root of a floating point variable `x` and storing the result in another floating point variable `b`.
   - iv) Expression to check that a character variable `alpha` contains only alphabets (without using `islower()`/`isupper()`/`isalpha()` function).

   b) i) Name all the type modifiers supported by C++.
   ii) Name the data types that support at most two type modifiers.
   iii) With suitable example show how will you use two type modifiers with a fundamental data type?

   c) i) Define token.
   ii) Name the token that is included with the C++ compiler. Header files are needed for which kind of token?
   iii) Name any four operators that can work with all fundamental data type (excluding **void**) of C++.

d)
```cpp
#include<iostream.h>
void main()
{
    int a, b, lo;
    cin >> a >> b;
    if (a > b)
        lo = a;
    else
        lo = b;
    cout << lo;
}
```
   i) Replace **if-else** statement by ternary operator.

   ii) Replace **if-else** statement by **switch-case**.

3. a) i) What are the two broad categories of formal parameters?
    ii) State any two differences between the two broad categories of formal parameters.
    iii) What is an alias? Write C++ statement(s) to create an alias of a character variable.

    b) Explain function declaration and function definition with a suitable example.

    c) i) Define local variable.
    ii) Mention any two characteristics of a local variable.

4. Write C++ function for the following:
    a) Find the sum of the digits and the product of digits of an integer passed as a parameter to a function. Display the sum and product inside the function. Return value of the function is **void**.

    b) An floating point (x) and a integer (n) is passed as parameters to the function named seqsum(). Return value of the function is **double**. The function seqsum() finds the sum of the series given below:

    $$\frac{x^2}{2!} - \frac{x^4}{4!} + \frac{x^6}{6!} - ...(-1)^{n+1}\frac{x^{2n}}{(2n)!}$$

    c) Check whether an integer is a Prime or a Composite number. The integer that is to be tested is passed as parameter to the function. If the values stored in the integer is less than 2 then display an error message "Neither Prime nor Composite". If the integer is Prime number then display "Prime" and display "Composite" if the integer is Composite number. Return value of the function is **void**.

    d) Generate and display all the Armstrong numbers between 1 and n (including 1 and n), where n is passed as a parameter to the function. Return value of the function is **void**. Name of the function is genarmstrong().