

Set I

1. Name the header file required for the built-in functions:
 - a) `fabs()`
 - b) `isalnum()`
 - c) `sqrt()`
 - d) `getch()`
2. Find errors, if any, in the program given below and rewrite the complete program after making the necessary corrections (underline the corrections):

```
#include<iostream.h>
void main()

    int sum=0;
    cout>>"Input an integer? ";
    cin>>n;
    for (int k=1; k<=n; k++)
        sum+=k;
    cout<<"Sum="<<s<<endl;
}
```

3. Give the output of the following program:

```
#include <iostream.h>
void main()
{
    int x=1;
    cout<<x<<endl;
    x+=2;
    cout<<x<<endl;
    x++;
    cout<<(x+1)<<endl;
    cout<<(2*x-1)<<endl;
    x+=5;
    cout<<x<<endl;
    cout<<(x+2)<<endl;
}
```

12
3
5
7
9
11

Generate the same output using a C++ loop.

4.
 - a) What is a C++ comment? What are the two ways of writing C++ comment?
 - b) With examples differentiate between entry controlled loop and exit controlled loop.
 - c) Differentiate between run-time error and logical error with suitable example.
5. Write a complete C++ programs for the following:
 - a) Input an integer (n) and a floating point value (x) and find the sum of the sequence given below (without using `pow()` function)
$$1 + \frac{x^2}{1!} + \frac{x^4}{2!} + \frac{x^6}{3!} + \frac{x^8}{4!} + \dots + \frac{x^{2n}}{n!}$$
 - b) Input an integer (n) and check whether the inputted integer is a Prime or Composite. If the integer is a Prime Integer then display "Prime Number" or otherwise display "Composite Number" on the screen.
 - c) Input an integer (n); find the sum of even digits and the product of odd digits. Display the two outputs on the screen. For example if the inputted integer is 456938 then the Sum of even digits is 4+6+8=18 Product of odd digits is 5*9*3=135.

Set II

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

i) log10()

ii) isalnum()

iii) gets()

iv) endl

v) sqrt()

vi) toupper()

- b) Find syntax error(s), if any and rewrite the complete the program after making the necessary changes (underline the errors):

```
#include iostream.h
void ()
{
    int n, sum = 0;
    cin > n;
    for (int c == 2; c <= 2*n; c+=2)
        sum ++ c;
    cout << 'Sum=' << sum << endl;
}
```

2. a) Give the output of the following program:

```
#include<iostream.h>
void main()
{
    int x = 3, y = 4, z = 2;
    x += x + y + z;
    y += x + 2 * y + z;
    z += x + y + 3 * z;
    cout << x << ',' << y << ',' << z << endl;
    x *= y;
    y *= z;
    z += x;
    cout << x << ',' << y << ',' << z << endl;
}
```

- b) Give the output of the following program:

```
#include<iostream.h>
void main()
{
    int s = 0, sum = 0;
    int x =1, p = 1;
    while (x <= 5)
    {
        p *= 2;
        s += p;
        sum += s;
        cout << p << ',' << s << ',' << sum << endl;
        x++;
    }
}
```

- c) Give the output of the following program segment:

```
int a=35;
cout << ++a << ',' << a++ << ',' << a++ << endl;
cout << a-- << ',' << --a << ',' << --a << endl;
```

3. a) Name the keywords which are optional in **switch-case**.
- b) Name **two** operators that work as unary and as well as binary operator.
- c) What is an entry controlled loop? Name one entry controlled loop of C++.
- d) What is a syntax error? When is (are) syntax error(s) detected?

4. a) In the program segment given below, replace **if-else** by **switch-case** and ternary operator:

```
int x, y, lo;
cout << "Input two integer values? "; cin >> x >> y;
if (x <= y)
    lo = x;
else
    lo = y;
cout << "Minimum Value = " << lo << endl;
```

- b) In the program segment given below, replace **if-else** by **switch-case** and conditional operator:

```
int year;
cout << "Input Year? ";
cin >> year;
if (year % 4 == 0 && year % 100 != 0)
    cout << year << " Leap Year";
else
    cout << year << " Not Leap Year";
```

5. a) How many bytes of memory will be allocated to variable of the type:

i) **char** ii) **int** iii) **float** iv) **double**

- b) Name the type modifiers of C++. Name the type modifiers that can be used with data type **float** and **double**.

- c) Identify the data type of the expressions given below:

i) 15/4.0 ii) '2'-48 iii) 2+3.5*7 iv) (**int**)12.5/2.5

- d) What is a comment? With suitable examples show **two** ways of writing comment.

- e) What is type casting? With suitable examples show **two** ways of using type casting.

6. Write complete C++ program for the following:

- a) Input name of a student (string of 20 characters) and Computer Science marks out 100. Calculate grade (Grade is to be stored in a character type variable) on the basis of the table given below:

Marks	Grade
Greater than equal to 95	A
Greater than equal to 85 and less than 95	B
Greater than equal to 70 and less than 85	C
Greater than equal to 60 and less than 70	D
Greater than equal to 50 and less than 60	E
Greater than equal to 40 and less than 50	F
Less than 40	U
Greater than 100 or less than 0 (zero)	Error

Display inputted name and marks and calculated grade. If inputted mark is less than 0 (zero) or more than 100 then display an error message "Error".

- b) Input an integer value n and find the sum of the following series:
 $(1^2) + (1^2 + 3^2) + (1^2 + 3^2 + 5^2) + (1^2 + 3^2 + 5^2 + 7^2) + \dots + (1^2 + 3^2 + 5^2 + \dots + (2n-1)^2)$
 Display the calculated sum on the screen.
- c) Input an integer value n and a floating point (**double**) value x and calculate the sum of the following series (do not use built-in function `pow()`):
- $$1 + \frac{x^2}{1!} + \frac{x^4}{3!} + \frac{x^6}{5!} + \frac{x^8}{7!} + \dots + \frac{x^{2n}}{(2n-1)!}$$
- Display the calculated sum on the screen.
- d) Input an integer (n) and check whether the inputted integer is an Armstrong Number or not. If the integer is an Armstrong Number then display "Armstrong Number" or otherwise display "Not Armstrong Number" on the screen.

Set III

1. a) Name the header file for the following built-in identifiers:
- | | | |
|---------------------------|------------------------|-----------------------------|
| i) <code>tolower()</code> | ii) <code>tan()</code> | iii) <code>isdigit()</code> |
| iv) <code>cin</code> | v) <code>labs()</code> | vi) <code>M_PI</code> |
- b) Find syntax error(s), if any and rewrite the complete the program after making the necessary changes (**underline the errors**):

```
#include<stream.h>
void main[]
{
    int sum = 0;
    cin >> n;
    for (int x = 1; x <= n; 1 += x)
        sum += 2x - 1;
    cout << SUM << endl;
}
```

- c) Give the output of the following program:
- ```
#include<iostream.h>
void main()
{
 int x = 7, y = 5, z = 11;
 x += y += z += x += y += z;
 cout << x << ', ' << y << ', ' << z << endl;
 z += x + y;
 y += z + x;
 x += y + z;
 cout << x << ', ' << y << ', ' << z << endl;
}
```

- d) Give the output of the following program segment:
- ```
int s1 = 0, s2 = 0;
for (int x = 1; x <= 5; x++)
{
    s1 += x * x * x;
    s2 += s1;
    cout << s1 << ', ' << s2 << endl;
}
```

e) Give the output of the following program segment:

```
int t = 10;
cout << ++t << t++ << --t << t-- << t++ << --t << endl;
```

2. a) Write the following expressions in C++:

i) $\frac{\cos(x) + \sec(x)}{\sin(x) - \operatorname{cosec}(x)}$ ii) $\frac{\sqrt{a} + \sqrt{b}}{a^2 + b^2}$ iii) $\frac{\log_{10} x - \log_{10} y}{\log_{10} z}$

b) In the program segment given below, replace **if-else-if** by **switch-case**:

```
int num;
cout << "Input an integer between 0 and 6? "; cin >> num;
if (num == 0)
    cout << "Zero" << endl;
else
if (num == 1 || num == 3 || num == 5)
    cout << "Odd Number" << endl;
else
if (num == 2 || num == 4 || num == 6)
    cout << "Even Number" << endl;
else
    cout << "Input Out of Range" << endl;
```

c) In the program segment given below, replace **switch-case** by **if-else** and ternary operator:

```
int x, y, max;
cout << "Input two integer value? "; cin >> x >> y;
switch (x > y)
{
    case 1 : max = x; break;
    case 0 : max = y; break;
}
cout << "Maximum Value = " << max << endl;
```

d) Replace **while** loop given below by **for** loop:

```
int n, p = 1;
cout << "Input an integer? "; cin >> n;
int c = 1;
while (c <= n)
    p *= c++;
cout << p << endl;
```

What will be the output of the program segment when inputted the value of n is

i) -7 ii) 5

3. a) Name any **three** rules for naming a C++ identifier.

b) Identify **three** incorrect identifier names and explain why, from the list given below:
long, AD_No, INT, comp-sc, CAL29, 2ndfloor, price, cell#

c) Identify the data type of constants / expressions given below:

i) 30.0/4 ii) "30.4/4" iii) 30/4 iv) '4'

d) Mention **two** differences between data type **float** and data type **double**.

- e) Write C++ statements to show the use of C++ type modifiers with the fundamental data types of **int** and **char**.
4. a) What is token? Write two differences between keyword and built-in identifier.
- b) i) Name any two unary operators other + and -.
 ii) Name any two operators that works from right to left other than =.
 iii) Name the two operators that are used to combine two or more logical expression.
 iv) Name any two operators that works from left to right other than >> and <<.
- c) What is type casting? With suitable examples show two ways of type casting supported by C++.
- d) Write C++ logical expression for the following (do not use any C++ built-in functions):
- i) To check that a character variable mychar contains only digit
- ii) To check that an integer variable number is odd but not divisible by 5
- iii) To check that an integer variable marks contains a value between 0 and 100
- iv) To check that a character variable alpha contains uppercase vowel
5. Write complete C++ program for the following:

- a) Local calls are charged according to the table given below:

Local Calls	Charges for Local Calls
1 – 100	No charge
101 – 250	Rs. 3.00 per call + Rs. 10.00 as surcharge
251 – 500	Rs. 4.00 per call + Rs. 25.00 as surcharge
501 and above	Rs. 5.00 per call + Rs. 75.00 as surcharge

- Monthly Phone Rent is Rs. 250, for International Calls charge is Rs. 50 per call. Total Amount Due is calculated as Monthly Phone Rent + Charges for Local calls + Charges for International calls. Input number of local calls (integer value) and number of international calls (integer value) is made in a month. Calculate total amount due and display the result on the screen.
- b) Input three coefficient of a quadratic equation and calculate discriminant. If discriminant is zero then display a message "Real and Equal Roots"; calculate two roots and display the two roots on the screen. If discriminant is positive then display a message "Real and Distinct Roots"; calculate two roots and display the two roots on the screen. If discriminant is negative then display a message "Complex Roots" and do not calculate two roots.
- c) Input an integer value n and a floating point value x and calculate the sum of the following series (do not use built-in function pow()):
- $$1 + \frac{x}{2!} + \frac{x^2}{4!} + \frac{x^3}{6!} + \frac{x^4}{8!} + \dots + \frac{x^n}{(2n)!}$$
- d) Input an integer (n) and check whether the inputted integer is a Palindromic Number or not. If the integer is a Palindromic Number then display "Palindromic Number" or otherwise display "Not Palindromic Number" on the screen.

10. Write a program to input an integer and count the number of digits in that integer. Display the input number and the output on the screen.
11. Write a program to input an integer and find the sum of the digits in that integer. Display the input number and the output on the screen.
12. Write a program to input an integer. Find the sum of the square of the digits in that integer. Display the input number and the output on the screen.
13. Write a program to input an integer and find the sum of the cube of the digits in that integer. Display the input number and the output on the screen.
14. Write a program to input an integer and find the product of the digits (including zero) in that integer. Display the input number and the output on the screen.
15. Write a program to input an integer and find the product of the digits (excluding zero) in that integer. Display the input number and the output on the screen.
16. Write a program to input an integer and find the sum of the reciprocal of the digits (excluding zero) in that integer. Display the input number and the output on the screen.
17. Write a complete C++ program to input n (integer) and input r (integer). Calculate ${}^n P_r$ and ${}^n C_r$. Assume that $n > 0$ and $r > 0$ and $n \geq r$.
18. Write a program to input an integer and check for Palindromic integer. If the integer is a Palindrome then display "Palindrome" otherwise display "not Palindrome".
19. Write a program to input an integer and check for Armstrong integer. If the integer is an Armstrong then display "Armstrong" otherwise display "not Armstrong".
20. Write a program to generate and display first 20 Fibonacci numbers. Assume the first two Fibonacci numbers are 1 and 1.
21. Write a program to input an integer and check for Fibonacci integer. If the integer is a Fibonacci then display "Fibonacci" otherwise display "not Fibonacci".
22. Write a program to input an integer and check for Prime number. If the integer is a Prime number then display "Prime" otherwise display "Composite".
23. Write a program to input two integers; calculate HCF and LCM of two integers; display the HCF and LCM of two integers on the screen.