

Name of Course : CBCS B.Sc. (H) Mathematics
 Unique Paper Code : 32357503
 Name of Paper : DSE- I, C++ Programming
 Semester : V
 Duration : 3 hours
 Maximum Marks : 75 Marks

Attempt any four questions. All questions carry equal marks.

1. Write a function, *printgrid*, that takes two parameters, (one parameter is a two-dimensional array and the second parameter is for the number of rows) and print the following grid structure using repetition and controlled statements. After that call the function, *printgrid*, in the main program.

```
#
# #
# 1#
# 1 2 #
# 1 2 3 #
# 1 2 3 4 #
# 1 2 3 4 5 #
# 1 2 3 4 5 6 #
# 1 2 3 4 5 6 7 #
# # # # # # # # #
```

2. Write a function in C++ using the one dimensional array to calculate the following quantity:

$$\sqrt{\frac{|\sum_{i=1}^n (x_i - \bar{x})^3|}{n(n-1)}}$$

where,

x_i denotes the data stored in the cells of array

$\bar{x}$ denotes the average of the data stored in the array

n denotes the number of data stored in the array and $n > 1$

3. Write a program to find the inverse of a 3×3 matrix over the field Z_{23} entered by the user, if the determinant of the matrix is non-zero. The program also finds the sum of the square of the diagonal elements under modulo 23 of the inverse of the given matrix.
4. Write a program which finds the solution of the following system of equations by matrix inversion method.

$$2x + y + 2z = 0,$$

$$2x - y + z = 10,$$

$$x + 3y - z = 5.$$

5. Find the all errors of given program

```
#include<iostream>;
Using Namespace Std :
void Swap(int *x, int *y):
Intmain()
{
    Int a, b, d;
        a = 4;
        b = 2;
    c = c + a;
    j = 1:
    for(k = 1; k<=n, k++)
    {
        cout<<setw(4)<<j;
        j = j + 3
        d = d +Pow(k, 2);
        cout<<"the Value of l in the" <<k<<"th iteration is " <<l<<endl;
    }
    Double p;
    p = Sqrt{c, 3};
    cout<<p<<endl;
    Cout<<"Square root of"<<c<<"is " <<p<<endl;
    int x = 5; y = 10;
    cout<<"Before swap, x: " <<x <<" y: " <<y <<endl;
    swap(&x, &y);
    Cout<<"Main. After swap, x: " <<x <<" y: " <<y <<endl;
    Return 0:
}
void swap (int *px, int *py)
{
    int temp;
    cout<<"Swap. Before swap, *px: " <<*px<<" *py: " <<*py<<endl;
    temp = *pX
    *pX = *pY
    *pY = temp
    cout<<"Swap. After swap, *px: " <<*px<<" *py: " <<*py<<endl;
}
```

Write the correct program of part (a)

Write the equivalent programs by using **while** and **do... while** loops.

6. There are 20 students in a class. Write an appropriate code in C++ using arrays to generate the Internal Assessment Marks of a particular paper based on the following information:
- Maximum Marks of the paper=100
 - Roll Number, Student Name, Test Marks, Assignment Marks and Attendance Percentage are stored in arrays.
 - Maximum Marks for Test = 10% of Maximum Marks of the paper
Maximum Marks for Assignment = 10% of Maximum Marks of the paper
Maximum Marks for Attendance = 5% of Maximum Marks of the paper

Attendance Marks based on Attendance percentage is given in following table:

$67\% \leq \text{Attendance} < 70\%$	1 % of Maximum Marks for Attendance
$70\% \leq \text{Attendance} < 75\%$	2 % of Maximum Marks for Attendance
$75\% \leq \text{Attendance} < 80\%$	3 % of Maximum Marks for Attendance
$80\% \leq \text{Attendance} < 85\%$	4 % of Maximum Marks for Attendance
$85 \leq \text{Attendance}$	5 % of Maximum Marks for Attendance

iv. Internal Assessment Marks = Test Marks + Assignment Marks + Attendance Marks

Print the following details for each student-

Roll Number	Student Name	Test Marks	Assignment Marks	Attendance Marks	Internal Assessment Marks
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