1(a) Write a C++ program to find the mean value of a given number using friend function.

1(b) Write a C++ program using default arguments to find the simple interest using a function by passing amount, time and rate of interest. The default value for time is 1 year and that of rate of interest is 12%.

1(c) Write a C++ program to find the area of a square, rectangle, circle using function overloading
1(d) Write a C++ program using inline functions to find and print the maximum of three numbers

2(a) Write a C++ Program to exchange the value of data members in two classes using Friend class

2(b) Write a C++ program with a structure to store the student's details like name, roll no, height and weight. Use function and array of structure to get the details of 5 students. Also include a function to sort them in an ascending order using the field height. Print the results in a neat format.

3(a) Create a class that can perform the addition, subtraction, multiplication and division operations. The program should request the user to enter 2 numbers and an operator, perform the evaluation and display the result.

3(b) Write a C++ Program create a class called vector with set of integer values using member functions

i)Assign the values
ii) Display the vector contents
III) Multiply by some scalar values
iv) Display the result

4a) Create a C++ class complex with real and imaginary as data members. Also include constructors to get the values for a complex numbers. Include friend functions to add two complex numbers and multiply two complex numbers . Print the complex number in a+ib format.

4b) Write a C++ program for matrix manipulation with dynamic memory allocation Declare the member functions for constructor, destructor, copy constructor, getdata(to get the matrix elements), putdata (display the matrix elements) and Member functions to add 2 matrices, Multiply 2 matrices (friend function) Use destructor to destroy the memory space

5) Create a **Circle** class with following members.

A data member that stores the radius of a circle
A constructor function with an argument that initializes the radius
A function that computes and returns area of a circle

Create two derived classes **Sector** and **Segment** that inherit the Circle class. Both classes inherit radius and the function that returns the circle's area from Circle. In addition to the members inherited from Circle, Sector and Segment have some specific members as follows:

Sector

1. A data member that stores the control angle of a sector (in radians)
2. A constructor function with arguments that initialize radius and angle
3. A function that computes and returns the area of a sector

Segment

1. A data member that stores the length of a segment in a circle
2. A constructor function with arguments that initialize radius and length
3. A function that computes and returns the area of a segment. Create the main () function to instantiate an object of each class and then call appropriate member functions to compute and return the area of a circle, sector and segment.

Note :

Area_of_circle = pi * r 2

Area_of_Sector=r 2 θ/2

Area_of_segment=r 2 *((r-h)/r) – (r-h) (2rh-h 2) 1/2

Where r is the radius of a circle, θ is the central angle of a sector in radians, h is the length of a segment and ((r-h)/r) is in radians

6a) Write a C++ program to create a class called Rectangle. Accept values length and breadth. Implement the following operations by overloading the operators + and ==. After every operation display the results by overloading the operator <<.

i) Add two rectangle objects, ii) Find area and Perimeter iii) Check whether two rectangle objects are same or not..

6(b) Create a vector class with an array of 10 elements, assign the array elements and display the elements at any particular poition by using subscript operator.

7a) Write a C++ program to create a class called STRING and implement the following operations. Display the results after every operation by overloading <<.

- STRING s1 = "ISE"
- STRING s2 = "MSRIT"
- STRING s3 = s1+s2 (Use copy constructor)
- String compatibility

7(b) create a distance class with two data members feet and inches use meber functions to get the lements and display the values. Use the following operator to display the values after each operations using << operator

i) Increment the values by using Pre Increment ii) Decrement the values using post decrement iii) Assign the values to another object(= operator)

8) a)Write a C++ program to create a class called OCTAL, which has the characteristics of an octal number. Get the Input using >> operator , Implement the following operations by writing an appropriate constructor and an overloaded operator +.

- OCTAL h = x ; where x is an integer
- int y = h + k ; where h is an OCTAL object and k is an integer.

Display the OCTAL result by overloading the operator <<. Also display the values of h and y.

8b)Matrix class add the every elements by 2 and display the result

9) Create a class Shape. It should have no data members. It should have a pure virtual function get_area().

Derive a class Rectangle from the class Shape. It should have two data members – one for holding the width of the rectangle and the other for holding its height. Both of these data members should be of float type. Override the get_area() function inside this class. This function should return the area of the rectangle. (Write a constructor for the class)

Derive another class Ellipse from the class Shape. It should have two data members – one for holding the length of the major axis and other for holding the length of its minor axis. Both of these data members should be of float type. . Override the get_area() function inside this class. This function should return the area of the ellipse. (Write a constructor for the class)

Write a main program to test the above class and display the area of rectangle and ellipse.(using dynamic polymorphism)

10(a) Create a Employee class with the data members empno, name, salary, deptname, Write a C++ Program create a file called “sample.txt “ in Text mode, Read the data from the users and Write an information to the file. Open a file and read the data from the user and display number of lines, words and characters in a file and display it.

b) Write a C++ program write 30 bytes of information to the file named “myfile.dat”. Move the file offset from the current position to the 15 bytes and write again 20 bytes of information to the file. Read the information from the file from beginning and display the contents

11a). Write C++ program to use try catch statements to handle division by zero and out-of-bounds exception.

11b) Write a C++ Program to create a class called Account with the following members

- A Data members to store the account number, name, balance amount
- Method called Deposit and Withdraw

- Create a user defined exception called “Minimum Balance” Which should display the error message “Withdraw amount is more than the balance amount”

- Test the above exception and display the message

12a) Write a C++ program to create a template function for Bubble Sort and demonstrate sorting of integers and doubles

12b) Write a C++ program to create a class called QUEUE with member functions to add an element and to delete an element from the queue. Using these member functions, implement a queue of integers and doubles. Demonstrate the operations by displaying the contents of the queue after every operation.