Department of Computer Science and Engineering, CBIT
List of problems for BE ¼ CSE-2 Lab internal exam

1. a) Write a C++ program to evaluate the following function to 10^{-3} accuracy?

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \ldots\ldots\ldots\ldots$$

   b) Write a C++ program to implement subtraction and division between complex numbers using class concept?

2. Define a base class called **Shape.** It contains two float values that could be used to compute the area of figures. It also contains a member function *getdata()* to initialize the base class data members and area() that compute and display the area of the figures. From the base class **Shape** derive two specific classes called **triangle** and **rectangle**. Make the area() function in the base class as a virtual function and redefine this function in the derived classes to suit their requirements.

   Using these three classes design a program that will accept dimensions of a triangle or a rectangle interactively and display the area. (the two values in the class are lengths of two sides in the case of rectangle and height and base in the case of triangle)

3. a) Write a C++ program to demonstrate multilevel inheritance

   b) Write a C++ program to create a text file "std.out" into which class objects containing student rno, name, marks in S1, S2, S3 are written at a time.

4. a) Write a C++ program to demonstrate the concept of function overloading.

   b) Write a C++ program to implement addition and multiplication operations with complex numbers using class concept? Include constructors.

5. a) Write a C++ program to evaluate the following function to 10^{-3} accuracy?

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} \ldots\ldots\ldots\ldots$$

   b) Write a C++ program to implement addition and division between complex numbers using class concept?

6. a) Write a C++ program to demonstrate the functions with default arguments?

   b) Define a class to represent a Matrix and include the following member functions
   - to create a matrix of size **mxn** (use constructor)
   - to add the given matrices
   - read and display the matrix elements

7. Write a class **"List"** to represent a vector. Include the following members
    - Allocate the memory using new operator
    - Read and display the elements
    - Search for a particular element is there or not?

8. a) Write a C++ program to demonstrate inline functions?
   b) Define a class to represent a matrix and include the following member functions
    - to create a matrix of size **mxn** (use constructor)
    - to multiply the matrices of size **MxN** and **PxQ**
    - read and display the matrix elements

9. Define a class "**BANK"** to represent a bank account. Include the following members:
   Data members : Account holder's name, account type, account number and balance
   Member functions : Deposit an amount, search for an account holder's details, balance Enquiry of a particular account.
   Write a main program to test the program for **10** bank customers.

10. Define a class template "**Complex**" with the following members
    - Real and imaginary parts
    - Constructor to initialize complex number
    - Add two complex numbers using a friend function
    - Subtract two complex numbers using a friend function
    - Display the complex number

    Write the main program to test the above class

11. Define a class to represent a bank account. Include the following members:
    Data members : Account holder's name, account type, account number and balance
    Member functions : Deposit an amount, search for an account holder's details, balance enquiry of a particular account.

    Write a main program to test the program for **N** bank customers. Use new operator to create customers.

12. Write a class "**LIST** " to represent a vector. Include the following members
    - Allocate the memory using a constructor with new operator
    - Release the space using destructor.
    - Read and display the elements
    - Search for a particular element is there or not?

    Write the main program to test the above class

13. Define a class "**Complex**" with the following members
    - Real and imaginary parts
    - Constructor to initialize complex number
    - Add two complex numbers using a member function
    - Subtract two complex numbers using a friend function
    - Display the complex number

    Write the main program to test the above class

14. a) Write a C++ program to implement string manipulation operations
    b) Write a C++ program to overload the operator **+** between two vectors of size **N**.

15. Define a class template "**Complex**" with the following members
    - Real and imaginary parts
    - Constructor to initialize complex number
    - Multiply two complex numbers using a member function
    - Subtract two complex numbers using a friend function
    - Display the complex number

    Write the main program to test the above class

16. Define a class "**Bank**"to represent a bank account. Include the following members:
    Data members : Account holder's name, account number and balance
    Write a program to write 10 customers bank records into the file "bank.dat"
    Include exception handling wherever applicable.

17. Define a class template "**Complex**" with the following members
    - Real and imaginary parts
    - Constructor to initialize complex number
    - To overload the Pre and post increment operator
    - Display the complex number

    Write the main program to test the above class

18. a) Write a function template to implement bubble sort algorithm
    b) Write a C++ program to demonstrate constructors and destructors

19. Define a class template "**Complex**" with the following data and operations:
    - Real and imaginary parts
    - Constructor to initialize complex number
    - To overload the Pre and post decrement operator
    - Display the complex number

    Write the main program to test the above class

20. Define a class to represent **matrix** and include the following data and operations:
    - Matrix and its size
    - Overload the + operator using member function
    - Overload the – operator using a friend function
    - Read and display of matrix elements

    Write the main program to test the above class

21. a) Write a C++ program to demonstrate exception handling with multiple handlers
    b) Define a class to represent "**student**" with the following
    - name, class, rank, marks in three subjects
    - function to read the data
    - display the student rno, name and percentage

    Write the main program to test the above class with 5 students

22. Define a class template "**Complex**" with the following members
    - Real and imaginary parts
    - Constructor to initialize complex number
    - To overload + operator using a member function
    - To overload - complex numbers using a friend function
    - Display the complex number
    - Write the main program to test the above class

    Write the main program to test the above class

23. Define a class "**MATRIX**"to represent matrix and include the following data and operations:
    - Matrix and its size
    - Overload the ++ operator using member function
    - Overload the – operator using a friend function

    Write the main program to test the above class

24. Write a class template "**List**" containing the following data and member functions:
    - List of elements
    - Size
    - Function to initialize the list
    - Function to sort the list
    - Display the list

    Write the main program to test the above class

25. a) Write a C++ program to demonstrate exception handling with multiple handlers
    b) Define a class to represent "**student**" with the following
    - name, class, rank, marks in three subjects
    - function to read the data from
    - display the student rno, name and percentage

    Write the program to write the rno, name and percentage of each student to the file "**std.out**" line by line.

26. a) Write a C++ program to demonstrate exception handling
    b) Define a class to represent "**student**" with the following
    - name, class, rank, marks in three subjects
    - function to read the data from the text file "**std.in**"
    - display the student rno, name and percentage

    Write the program to implement the above operations for 10 students

27. Write C++ program hat read the bank records from the text file "**bank.dat**" and display the information on the screen. (each record contains the fields of depositor name, account number and account balance). Include exception handling wherever applicable.

28. a) Write a program to demonstrate constructors and destructors.
    b) Write a C++ program to demonstrate virtual functions?

29. a) Write a C++ program that reads a text from the keyboard and displays the following information on the screen in two columns:
    - number of lines, number of words, vowels and number of characters

    (strings should be left justified and numbers should be right justified)

30. a) Write a function template to sort a given list of N elements
    b) Write a C++ program to create a text file "data.txt" which asks the user to type from the keyboard and writes to that file one line at a time.

31. a) Write a C++ program to demonstrate constructors and destructors.
    b) Define a class String and use the operators ==, > to compare two strings

32. a) Write a template function to find the maximum value contained in an array?
    b) Write a C++ program with the following:
    - a function that opens a given file and displays the contents
    - a try block to detect and throw an exception when the file doesn't exist
    - appropriate catch block to handle the exception thrown