(Pages : 3) **3834 A (H) P**

Reg. No. : .....

Name : .....

VI Semester B.Tech. Degree Examination, June 2009
Branch : Chemical Engineering
Lab : SOFTWARE ENGINEERING LAB(H) P

Time : 3 Hours Max. Marks : 100

1. a) Write a C++ program to create a file ***stcok.dat*** and save the details of stock such as item name, item code and item price. Calculate the ***area*** of a sphere, rectangle and triangle using a single function named area. Use the function verloading concept of C++. Run the program and show the result for the given input values.

   b) Compute the y-coordinates of a straight line with slope equal to 0.5 and intercept equal to – 2, using MATLAB at the following x values x = 0, 1.5, 3.0, 4, 5, 7, 9, 10.

2. a) Write a C++ program to perform arithmetic operations on two complex numbers using the concept of class.

   b) Use MATLAB to draw a straight line with slope 0.3 and intercept = 5, choosing values of x-coordinate as [0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50]

3. a) Write a menu driven program for performing basic banking operations using concept of class.

   b) Using Matlab create a vector **t** with 15 elements : 2, 4, 6, 8,....., 30 and compute :

   a) $y = \frac{t-1}{t+1}$ b) $z = \frac{Sin(t^2)}{t^2}$

4. a) Write a program in C++ to overload the operator '*' for scalar multiplication of a vector.

   b) The sum of a geometric series $1 + r + r^2 + r^3 + \ldots\ldots + r^n$ approaches the limit $\frac{1}{1-r}$ for $r < 1$ as $n \to \infty$. By creating vector n of 101 elements from 0 to 100 and r as 0.5, find the sum of the geometric series using ***sum*** command in Matlab. Also calculate the limit $\frac{1}{1-r}$ manually and compare the computed sum.

P.T.O.

5. a) Write a program in C++ to sort a given string.

   b) Plot y = sin x, $0 \leq x \leq 2\pi$, using Matlab taking 100 linearly spaced points in the given interval. Label the axis and put "Plot created by ***your candiate code***" in the title.

6. a) Write a program to multiply two matrices.

   b) Write a function file in Matalab to plot a graph of $y = e^{-0.4x} \sin x$, $0 \leq x \leq 4\pi$ taking 50 points in the interval.

7. a) Write a program in C++ to search for a given element in an array and display its position.

   b) For any integer n, write a function '**factorial**' in MATLAB to compute n!.

8. a) Write a program in C++ to swap two numbers using call by reference method

   b) Write a function in Matlab that outputs a conversion table for Celsius and Fahrenheit temperatures. The input of the function should be two numbers T_i and T_f, specifying the lower and upper range of the table in Celsius. The output should be a two column matrix : the first column showing the temperature in Celsius from T_i to T_f in the increments of 1°C and the second column showing the corresponding temperature in Fahrenheit.

9. a) Write a menu driven program in C++ for a four function calculator.

   b) Enter the matrix G and do the following operations using Matlab

$$G = \begin{bmatrix} 2 & 6 & 0 & 0 & 0 & 0 \\ 3 & 9 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 2 & 0 & 0 \\ 0 & 0 & 3 & 4 & 0 & 0 \\ 0 & 0 & 0 & 0 & -5 & 5 \\ 0 & 0 & 0 & 0 & 5 & 3 \end{bmatrix}$$

- Delete the last row and last column of the matrix
- Extract the first 4×4 sub matrix from G.
- Replace G(5, 5) with 4.

10. a) Write a program in C++ to find the sum and average of n numbers using array.

    b) Write a script file in Matlab that computes the value of sin (x) at a given x using n terms of the series expansion of the sine function

$$\text{Sin}(x) = \sum_{k=1}^{n} (-1)^{k-1} \frac{x^{2k-1}}{(2k-1)!}$$

11. a) Write a program in C++ to add two matrices.

    b) Find the solution of the following set of linear algebraic equations by Gaussian Elimination method with the help of Matlab. Verify the result by matrix inverse.

$$x + 2y + 3z = 1$$
$$3x + 3y + 4z = 1$$
$$2x + 3y + 3z = 2$$

12. a) Write a program in C++ using concept of class for performing basic string operations.

    b) Solve the first order linear differential equation

$$\frac{dx}{dt} = x + t \text{ with initial condition } x(0) = 0.$$