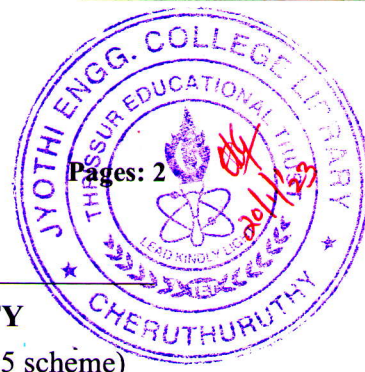Reg No.:_____            Name:_____

# APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
Fifth Semester B.Tech Degree (S,FE) Examination January 2023 (2015 scheme)

**Course Code: ME305**
**Course Name: COMPUTER PROGRAMMING & NUMERICAL METHODS**

Max. Marks: 100            Duration: 3 Hours

## PART A
*Answer any three full questions, each carries 10marks.*

                                                                                   Marks

1   a)   Explain the importance of algorithm and flowcharts in computer programming.   (5)

    b)   Describe the structure of C++ program.   (5)

2   a)   Distinguish between double data type and float data type used in C++.   (5)

    b)   What do you meant by conditional operators? Explain any two conditional operators using suitable examples.   (5)

3   a)   Explain the if-else control statement in C++ using suitable example.   (5)

    b)   Using suitable example, explain one dimensional array in C++ program.   (5)

4   a)   What are the advantages of using inline functions?   (5)

    b)   Explain the concept of function overloading using suitable example.   (5)

## PART B
*Answer any three full questions, each carries 10marks.*

5   a)   Explain the concept of function call-by-reference in C++ programming.   (5)

    b)   Write a C++ program to find the factorial of a given number.   (5)

6   a)   State the advantages of using pointers with suitable examples.   (5)

    b)   Write a C++ program to sort the values of an array in the ascending order.   (5)

7   a)   Explain the concept of class and object using suitable example.   (5)

    b)   Distinguish between private and protected member access in C++.   (5)

8   a)   Using suitable example, explain the concept of inheritance.   (5)

    b)   Distinguish between the member functions declared inside and outside the class definition.   (5)

## PART C
*Answer any four full questions, each carries 10marks.*

9   Solve the following equations by using Gauss elimination method.   (10)

$$10x - 7y + 3z + 5u = 6$$
$$-6x + 8y - z - 4u = 5$$
$$3x + y + 4z + 11u = 2$$
$$5x - 9y - 2z + 4u = 7$$

10  Solve the following equations by using Gauss-Seidal method. (10)

$10x_1 - 2x_2 - x_3 - x_4 = 3$

$-2x_1 + 10x_2 - x_3 - x_4 = 15$

$-x_1 - x_2 + 10x_3 - 2x_4 = 27$

$-x_1 - x_2 - 2x_3 + 10x_4 = -9$

11  Use Lagrange's interpolation formula to find the value of y when x=10, from the following values of x and y. (10)

| x | 5 | 6 | 9 | 11 |
|---|---|---|---|----|
| y | 12 | 13 | 14 | 16 |

12  By the method of least squares find the expected production for the year 2006 from the following data. (10)

| Year (x) | 1961 | 1971 | 1981 | 1991 | 2001 |
|----------|------|------|------|------|------|
| Production (y) (in tonnes) | 8 | 10 | 12 | 10 | 16 |

13  Determine the linear coefficient of correlation for data given below. (10)

| X | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
|---|----|----|----|----|----|----|----|
| y | 0.22 | 0.40 | 0.61 | 0.85 | 1.20 | 1.45 | 1.70 |

14  Evaluate the function u(x,y) satisfying the Laplace equation $\nabla^2 u = 0$ at the pivotal points using the boundary conditions as shown in the figure below. (10)



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