

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

**Course Code: ME305****Course Name: Computer Programming & Numerical Methods(ME)**

Max. Marks: 100

Duration: 3 Hours

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

Marks

- 1 a) What is procedure oriented programming. What are its main characteristics? (5)
- b) Explain the conditional operators used in programming language with examples? (5)
- 2 a) Explain the difference between keyword and identifiers? (5)
- b) With an example explain how a function can be written with the help of function prototype, function calling mechanism and function definition? (5)
- 3 a) How the Boolean, enumeration and constant data types are implemented in programming? (5)
- b) Explain the significance of *continue* statements used in looping structure? (5)
- 4 a) Describe the function overloading mechanism employed in programming languages? (5)
- b) Write a program to print all the prime numbers below 100. (5)

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

- 5 a) Write a program to read a matrix of size m x n and display the transpose of the matrix on the screen. (5)
- b) Write a function to find the biggest among 10 numbers in an array? (5)
- 6 a) Write a program to swap 2 numbers using the concept of pointers? (5)
- b) Write a program to find the factorial of a number by recursive technique? (5)
- 7 a) What are friend functions? With the aid of a suitable program explain how a friend function can access private members of a class? (5)
- b) What are private, public, protected members of a class? (5)
- 8 a) Explain any two types of inheritances. (5)

- b) Write a program to illustrate class declaration, definition and accessing class members? (5)

**PART C**

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

- 9 a) Explain the stability and convergence of numerical methods? (5)  
 b) Explain Aitken interpolation technique? (5)
- 10 a) What is meant by order of a PDE? Give examples of first, second and third order PDE? (5)  
 b) Explain the method of least squares in curve fitting? (5)
- 11 Use Gauss elimination method to solve (10)  
 $4x_1 + x_2 - x_3 = -2$   
 $5x_1 + x_2 + 2x_3 = 4$   
 $6x_1 + x_2 + x_3 = 6$
- 12 Write a C++ program/ algorithm / flow chart for a finite difference method for solving numerical problem? (10)
- 13 Solve the Laplace equation for the square mesh shown below and find the temperature T1, T2, T3 and T4 with the boundary conditions, left T=200K, right T=600K top T=400K and bottom T=800K as below (10)

	T1	T4
	T2	T3

- 14 Find the Lagrange interpolation polynomial which agrees with the following data and calculate f(9). (10)

x	5	7	11	13	17
f(x)	150	392	1452	2366	5202

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