

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R&S), MAY 2019

Course Code: CE306

**Course Name: COMPUTER PROGRAMMING AND COMPUTATIONAL
 TECHNIQUES**

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

- | | | Marks |
|---|--|-------|
| 1 | a) Write short notes on usage of Preprocessor directives in C++ | (4) |
| | b) What are manipulators in C++. Explain with suitable examples. | (4) |
| | c) Write a program to accept the height of a person in centimetres and convert and display the height in feet and inches | (7) |
| 2 | a) Explain in detail the use of <i>break</i> and <i>continue</i> statements in C++ with suitable examples. | (7) |
| | b) Write a program to read a 2D array of size m x n and prepare a 1 D array that will store all the elements of the 2D array as if they were stored in the row major form. | (8) |
| | Sample: if the 2 D array is $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$ the 1 D array having the elements of 2D array in row major form is [1 2 3 4 5 6 7 8 9] | |
| 3 | a) Explain any four string handling functions. | (8) |
| | b) Write a program to check whether a given character is a vowel, using switch statement. | (7) |

PART B

Answer any two full questions, each carries 15 marks.

- | | | |
|---|---|------|
| 4 | a) Explain the call by value and call by reference methods of function invoking. | (5) |
| | b) Write a program using functions to find the largest and smallest number in a 2D array. Note: The function should accept the 2D array from the main function and return the maximum and minimum number. | (10) |
| 5 | a) Write and explain the general form of a structure definition, declaration & initialisation with proper examples. | (7) |

- b) Write a program (using structure) to read the details of m students in a class including Roll no., name and marks of 3 subjects and print average mark of each student. (8)
- 6 a) Explain the various file input and output streams commonly used in C++? (7)
- b) Bring out the difference between procedure oriented programming and object oriented programming (8)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Using method of successive approximations find a real root of the equation $x - \sin x - \frac{1}{2} = 0$. For iteration the trial value of root may be taken as 1.0. (10)
- b) Develop a program to fit a straight line to a given set of coordinates. (10)
- 8 a) The following table gives the results of the measurements of resistance felt by a running train, where V the velocity of travel in km/hr and R is the resistance in kN. (10)

V	20	40	60	80	100	120
R	5.5	9.1	14.9	22.8	33.3	46

Develop a 2nd degree polynomial (parabola) relationship connecting R and V using the method of least squares.

- b) Write a program to perform numerical integration using Trapezoidal rule when the function is tabulated as data points. (10)
- 9 a) Solve the following simultaneous system of equations using Gauss elimination method. $3x_1 - 0.1x_2 - 0.2x_3 = 7.85$; (10)
- $$0.1x_1 + 7x_2 - 0.3x_3 = -19.3; \quad 0.3x_1 - 0.2x_2 + 10x_3 = 71.4.$$
- b) Demonstrate the finite difference method of numerical solution of partial differential equations for the case of a Laplace equation given by $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} = 0$ (10)
