Name:.....
Roll No:.....

MAR ATHANASIUS COLLEGE OF ENGINEERING (AUTONOMOUS),
KOTHAMANGALAM - 686666
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

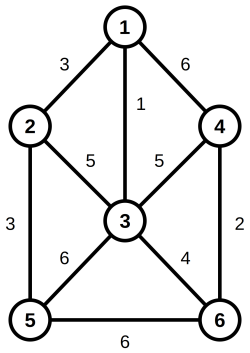
B.TECH SECOND SERIES EXAMINATION, OCTOBER 2026 (S5 CS, DS(AB) & AIML)
B24CS3T04 ALGORITHM ANALYSIS AND DESIGN

Max. Marks: 40 Duration: 1.5 Hours

PART A

Answer all questions. Each question carries 3 marks.

1. **Solve** using Prims's method to find minimum cost spanning tree for the following graph. Write the complexity of the algorithm. (CO 3)



2. **Explain** the control abstraction of Divide and Conquer strategy with an example. (CO 3)
3. **Differntiate** between Dijikstra algorithm and Floyd Warshall Algorithm. Write the time complexities of both. (CO 4)
4. State and **explain** the essential properties/characteristics that a problem must exhibit for it to be efficiently solved using dynamic programming (CO 4)

VISION

To mould competent computing professionals, innovators, and leaders guided by ethical values and committed to technological advancement and sustainable societal development.

MISSION

- Provide quality education through strong theoretical foundations, experiential learning, and exposure to emerging computing technologies.
- Cultivate critical thinking, research aptitude, and innovation through problem-based learning, industry interaction, and research initiatives.
- Foster ethical values, leadership, social responsibility, and an aspiration for lifelong learning through professional practices, teamwork, and mentoring.

PART B

Answer all questions. Each question carries 14 marks.

5. (a) Consider an instance of fractional knapsack problem with 7 objects and capacity 15Kg. The profit and weight vectors corresponding to the 7 objects respectively are (5,10,15,7,8,9,4) and (1,3,5,4,1,3,2). **Compute** an optimal solution to this instance of fractional knapsack problem. What will be the profit earned corresponding to this solution? (CO 3)(7 marks)

   (b) **Explain** Strassen's algorithm for matrix multiplication. Write the equations and derive the complexity (CO 3)(7 marks)

6. (a) **Explain** backtracking technique. Discuss how n-queens problem can be solved using backtracking. (CO 4)(6 marks)

   (b) Given the chain of 4 matrices A1, A2, A3, A4 with sequence of dimensions 5x6, 6x4, 4x2, 2x3, using Matrix chain multiplication, find the optimal parenthesization of the given problem and the minimum number of multiplications required. (CO 4)(8 marks)