

Course Code: 20MCA203**Course Name: DESIGN & ANALYSIS OF ALGORITHMS**

Max. Marks: 60

Duration: 3 Hours

PART A*Answer all questions, each carries 3 marks.*

Marks

- 1 Define the terms Best Case, Worst Case and Average case complexities? (3)
- 2 Explain Matrix Multiplication using divide and conquer with an example. (3)
- 3 Write the Control Abstraction for Greedy Strategy. (3)
- 4 State and illustrate the Principle of Optimal Substructure. (3)
- 5 Differentiate between Backtracking and Branch and Bound design techniques. (3)
- 6 Explain and Analyse lower bound of the time complexity of Comparison based sorting algorithms? (3)
- 7 Explain the various Complexity classes. (3)
- 8 What is Maximum Bipartite matching problem. (3)
- 9 Explain what is an a) Approximation algorithm b) Randomized algorithm. (3)
- 10 Explain the Schwartz-Zippel Lemma. How is this applied to test the identity of two polynomials. (3)

PART B*Answer any one question from each module. Each question carries 6 marks.***Module I**

- 11 Explain Asymptotic Notations used in Algorithm analysis. (6)

OR

- 12 Explain Merge sort algorithm with an example and analyse the complexities of the algorithm. (6)

Module II

- 13 Write Kruskal's algorithm to compute the minimum cost spanning tree using an example. (6)

OR

- 14** What is Dynamic Programming? Explain Single Source Shortest path algorithm using an example and analyse the time complexity. (6)

Module III

- 15** Explain the 8-puzzle problem and illustrate how it can be solved using Branch and Bound. (6)

OR

- 16** What is Backtracking algorithm design strategy. Explain the N-Queen's problem and its solution. (6)

Module IV

- 17** Show that the Vertex Cover problem is NP-Complete. (6)

OR

- 18** Describe the Ford Fulkerson's procedure to compute the Max-Flow using a sample Flow Network. (6)

Module V

- 19** What is an Approximation Algorithm? Explain the 2-approximation algorithm for Vertex Cover and justify its approximation ratio. (6)

OR

- 20** Describe and Evaluate Randomised Quick sort. (6)
