Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester MCA (Two Year) Regular and Supplementary Examination December 2022

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   (3)
   sorting algorithms?

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   (3)
   polynomials.

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 (6)
      algorithm.

Module II

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

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)

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