Reg No.:_____ Name:_____

0520MCA203122102

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester MCA (Two Years) Degree (S, FE) Examination May 2024

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 time and space complexity of an algorithm	(3)
2	Explain control abstraction for divide and conquer strategy.	(3)
3	Compare divide and conquer and dynamic Programming algorithm designing strategies.	(3)
4	Discuss control abstraction of Greedy strategy.	(3)
5	How does Backtracking differ from Branch and Bound?	(3)
6	Illustrate & Explain about the significance of decision tree method in lower bounds.	(3)
7	Discuss the classes of problems P and NP.	(3)
8	Define the term Flow Network and illustrate with an example.	(3)
9	What do you mean by approximation ratio of an Approximation algorithm?	(3)
10	What is meant by a Randomized Algorithm?	(3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11	Explain various asymptotic notations in algorithms.	(6)

OR

12	Discuss the Quicksort algorithm, sort the following list of numbers using quicksort algorithm 23, 62 ,27,10,15	(6)

Module II

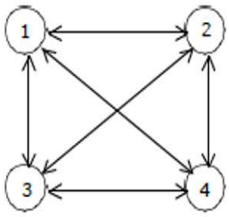
13 Solve the following Fractional Knapsack problem (6)

Example: Knapsack Capacity W = 30 and

Item	A	B	C	D
Value	50	140	60	60
Size	5	20	10	12

OR

14 Solve travelling sales persons problem. Given below (6)



The cost adjacency matrix = $\begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix}$

Module III

15 Discuss how to apply Backtracking to solve sum of subset problem with suitable example (6)

OR

16 Discuss 8 puzzle problem in branch and bound (6)

Module IV

17 Prove that Clique problem is NP complete problem (6)

OR

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

Module V

19 Explain the 2-approximation algorithm for Vertex Cover and justify its approximation ratio. (6)

OR

20 Describe Randomized Quick sort. (6)

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