

Code No.: R22AI404PC

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CMR ENGINEERING COLLEGE:: HYDERABAD

UGC AUTONOMOUS

II-B.TECH-II-Semester End Examinations (Regular) -July- 2024

DESIGN AND ANALYSIS OF ALGORITHMS

(Common for CSD, CSC, CSM)

[Time: 3 Hours]

[Max. Marks: 60]

Note: This question paper contains two parts A and B.

Part A is compulsory and carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

PART-A

(10 Marks)

1. a) Define Theta notation. [1M]
- b) Write down the importance of Space complexity. [1M]
- c) Explain the uses of Graph coloring techniques. [1M]
- d) Define back tracking. [1M]
- e) What is the time complexity of all pairs shortest path? [1M]
- f) Give the general method for Dynamic programming. [1M]
- g) Write a short note on single source shortest Path problem. [1M]
- h) Define spanning tree. [1M]
- i) What is NP-Hard Problem with example? [1M]
- j) Compare Deterministic algorithms and non-deterministic algorithms. [1M]

PART-B

(50 Marks)

- 2.a) Describe the performance analysis of an algorithm in detail. [5M]
- b) Briefly explain the merge sort algorithm with a suitable example and derive its time complexity. [5M]

OR

- 3.a) Define time complexity. Describe different notations used to represent time complexities. [5M]
- b) Explain divide and conquer in detail. [5M]

- 4.a) Explain about the union and find algorithms in detail. [5M]
- b) Describe the sum of subsets problem with an example. [5M]

OR

- 5.a) Write an algorithm of n-queen's problem and explain. [5M]
- b) Explain disjoint sets in detail. [5M]

- 6.a) Discuss the dynamic programming approach in detail. [5M]
- b) Explain the Reliability design. [5M]

OR

- 7.a) Explain the traveling salesperson problem by applying the dynamic programming method with an example. [5M]
- b) Solve the following 0/1 Knapsack Problem using dynamic programming
 $n=4, m=30, (w_1, w_2, w_3, w_4) = (10, 15, 6, 9)$ and $(p_1, p_2, p_3, p_4) = (2, 5, 8, 1)$. [5M]

- 8.a) Discuss the Job sequencing with deadlines problem. [5M]
- b) Illustrate Knapsack problem with the Greedy approach. [5M]

OR

- 9.a) Explain the general method of the Greedy method. [5M]
- b) Write and explain Kruskal's algorithm with an example. [5M]

- 10.a) Write an algorithm of FIFO Branch and Bound. [5M]
b) Explain the cook's theorem. [5M]

OR

- 11.a) Explain 0/1 knapsack with respect to the branch and bound problem. [5M]
b) Discuss in detail the classes of NP-hard and NP-complete. Give the relation between them. [5M]
