

Code No.: AI405PC

R20

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II-B.TECH-II-Semester End Examinations (Regular) - June- 2022
DESIGN ANALYSIS OF ALGORITHMS
(CSM)

[Time: 3 Hours]

[Max. Marks: 70]

- Note:** 1. Answer any FIVE questions. Each question carries 14 marks.
2. All questions carry equal marks.
3. Illustrate your answers with NEAT sketches wherever necessary.

5X14=70

1. a) Explain Briefly about Strassen's matrix multiplication. [7M]
b) Write an Algorithm for Merge sort with an example. [7M]
2. a) Explain Briefly about 8 Queens Problem. [7M]
b) Explain Graph Coloring with an example. [7M]
3. a) Construct OPTIMAL BINARY SEARCH TREE Let $n = 4$, and $(a_1, a_2, a_3, a_4) = (\text{do, if, need, while})$, Let $P(1: 4) = (3, 3, 1, 1)$ and $Q(0: 4) = (2, 3, 1, 1, 1)$ using Dynamic Programming. [7M]
b) Consider the 0/1 Knapsack instance $n = 3$, $(w_1, w_2, w_3) = (18, 15, 10)$, $(P_1, P_2, P_3) = (25, 24, 15)$ and $M = 20$ using Dynamic Programming. [7M]
4. a) Write an Algorithm for Prim's with an example. [7M]
b) Consider the following instance of the knapsack problem: $n = 3$, $m = 20$, $(p_1, p_2, p_3) = (25, 24, 15)$ and $(w_1, w_2, w_3) = (18, 15, 10)$ using Greedy Method. [7M]
5. a) Consider the instance: $M = 15$, $n = 4$, $(P_1, P_2, P_3, P_4) = (10, 10, 12, 18)$ and $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$. 0/1 knapsack problem using Least Cost Branch and Bound Technique. [7M]
b) Explain Briefly about Cook's Theorem with an example. [7M]
6. a) Write an Algorithm for Quick sort with an example. [7M]
b) Explain Briefly about Omega, Theta, Big Oh and Little Oh notations with examples. [7M]
7. a) Write an Algorithm for Sum of Subsets with an example. [7M]
b) Explain Reliability Design with an example. [7M]
8. a) Solve the Job Sequencing with Deadlines Problem using Greedy Method. Given $n=4$ with profits $(p_1, p_2, p_3, p_4) = (4, 2, 1, 3)$ and deadlines $(d_1, d_2, d_3, d_4) = (1, 2, 1, 3)$. [7M]
b) Explain Disjoint Set, Union and Find Algorithms. [7M]
