

III B. Tech II Semester Supplementary Examinations, February-2022
DESIGN AND ANALYSIS OF ALGORITHMS

(Computer Science and Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**
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PART -A**(14 Marks)**

1. a) Define the term: Time Complexity. [2M]
- b) Write the abstract Divide and Conquer algorithm. [2M]
- c) State the Job-Sequencing with Deadline Problem. [2M]
- d) State the Purge Rule in 0/1 Knapsack problem using Dynamic Programming. [3M]
- e) Draw the state-space tree along with answer nodes for 4-queens problem. [3M]
- f) Define LC-Search. [2M]

PART -B**(56 Marks)**

2. a) Write different pseudo code conventions used to represent an algorithm. [7M]
- b) What do you mean by performance analysis? Give the algorithm for matrix multiplication and find the time complexity using step-count method. [7M]
3. a) Write a recursive algorithm for binary search and also bring out its efficiency. [7M]
- b) Apply Merge Sort to sort the list $a[1,10] = (31,28,17,65,35,42,86,25,45,52)$. [7M]
 Draw the tree of recursive calls of merge sort functions.
4. a) Use the greedy algorithm for sequencing unit time jobs with deadlines and profits to generate the solution when $n = 7$,
 $(p_1, p_2, \dots, p_7) = (3, 5, 20, 18, 1, 6, 30)$,
 and
 $(d_1, d_2, \dots, d_7) = (1, 3, 4, 3, 2, 1, 2)$. [7M]
- b) What is a Spanning tree? Explain Prim's Minimum cost spanning tree algorithm with suitable example. [7M]
5. a) Explain the methodology of Dynamic programming. Mention the applications of Dynamic programming. [7M]
- b) Construct an optimal travelling sales person tour using Dynamic Programming for the given data: [7M]

$$\begin{pmatrix} 0 & 10 & 9 & 3 \\ 5 & 0 & 6 & 2 \\ 9 & 6 & 0 & 7 \\ 7 & 3 & 5 & 0 \end{pmatrix}$$



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SET - 1

6. a) Write control abstraction for backtracking. Explain with an example. [7M]
b) What are the applications of graph coloring? Explain in detail. [7M]
7. a) Distinguish between backtracking and branch – and bound techniques. [7M]
b) Generate FIFO branch and bound solution for the given knapsack problem, [7M]
 $m = 15, n = 3, (P_1, P_2, P_3) = (10, 6, 8)$ and $(w_1, w_2, w_3) = (10, 12, 3)$.

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