

III B. TECH II SEMESTER REGULAR EXAMINATIONS APRIL - 2023
DESIGN AND ANALYSIS OF ALGORITHMS
(COMMON TO CSE, INF & CSM BRANCHES)

Time: 3 hours

Max. Marks: 70

Note: Answer **ONE** question from each unit (**5 × 14 = 70 Marks**)

~~~~~

UNIT-I

1. a) Explain recursive binary search algorithm with suitable example. [7M]
- b) What is space complexity? Illustrate with an example for fixed and variable part in space complexity. [7M]

(OR)

2. a) Explain the time complexity of quick sort in an average case. [6M]
- b) Describe various asymptotic notations used to represent complexity of algorithms with examples. [8M]

UNIT-II

3. a) Explain the Single source shortest path problem with an example. [7M]
- b) What is optimal merge pattern? Apply optimal merge pattern for ten files whose record lengths are 28, 32, 12, 5, 84, 53, 91, 35, 3, and 11. [7M]

(OR)

4. a) Find an optimal solution to the Knapsack instance  $n=3$ ,  $m=20$ ,  $(P_1, P_2, P_3) = (25, 24, 15)$  and  $(W_1, W_2, W_3) = (18, 15, 10)$ . [8M]
- b) Write an algorithm for Greedy knapsack. [6M]

UNIT-III

5. a) Differentiate between greedy method and dynamic programming. [7M]
- b) Define string editing problem. Explain with an example. [7M]

(OR)

6. a) Explain how solution will be provided for all pairs shortest path problem using dynamic programming. [14M]

UNIT-IV

7. a) Give the solution to the 8-queens problem using backtracking. Draw the state space tree. [7M]

- b) Find the Hamiltonian cycles in the following instance of graph problem. Provide state space tree. [7M]

(OR)

8. a) Give the statement of sum -of subsets problem. Find all sum of subsets for  $n=4$ ,  $(w_1, w_2, w_3, w_4) = (11, 13, 24, 7)$  and  $M=31$ . Draw the portion of the state space tree [7M]
- b) Explain Graph coloring algorithm with example. [7M]

UNIT-V

9. a) Write short notes NP-hard and NP-complete problems. [10M]
- b) Discuss about cook's theorem. [4M]

(OR)

10. a) Describe about Control Abstractions for LC-search. [7M]
- b) State the concept of branch and bound method and mention its applications. [7M]

\*\*\* \* \*