

III B. Tech I Semester Supplementary Examinations, July – 2023
DESIGN AND ANALYSIS OF ALGORITHMS
 (Common to CSE, IT)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
 All Questions Carry Equal Marks

UNIT-I

1. a) Differentiate performance measurement and performance estimation of algorithms. [7M]
 b) Write the pseudo code for expressing algorithms. [7M]
 (OR)
2. a) What are the Asymptotic notations? And give its properties. [7M]
 b) What are the features of an efficient algorithm? Explain with an example. [7M]

UNIT-II

3. a) Write about quick sort method with example. [7M]
 b) Explain in detail merge sort. Illustrate the algorithm with a numeric example. Provide complete analysis of the same. [7M]
 (OR)
4. a) Derive the Best, Worst and Average time complexities of Merge sorting technique. [7M]
 b) Write about single source shortest path problem. [7M]

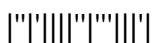
UNIT-III

5. Apply dynamic programming to obtain optimal binary search tree for the identifier set(a1, a2, a3, a4)=(cin, for, int, while) with (p1, p2, p3, p4)=(1, 4, 2, 1),(q0, q1, q2, q3, q4)=(4, 2, 4, 1, 1) and also write algorithm for its construction. [14M]
 (OR)
6. a) How to insert more number of jobs in feasible solution set $J=\{ \}$ to maximize the profit using greedy method? Explain algorithm. [7M]
 b) Write about 0/1 knapsack problem. [7M]

UNIT-IV

7. a) Explain the algorithm for general iterative backtracking method and discuss various factors that define the efficiency of backtracking. [7M]
 b) Explain how backtracking is used for solving n- queens problem. Show the state space tree. [7M]

(OR)



8. a) Construct an optimal travelling sales person tour using Dynamic Programming for the given data: [7M]

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

- b) Write the backtracking algorithm for the sum of subsets problem using the state space tree corresponding to $m=35, w=(20,18,15,12,10,7,5)$. [7M]

UNIT-V

9. Write short note on the following: [14M]

- Vertex cover
- Independent set
- Set cover
- Steiner tree

(OR)

10. a) Explain about NP-complete problem with example. [7M]
b) Explain FIFO Branch and Bound solution. [7M]

