# VARDHAMAN COLLEGE OF ENGINEERING
## (AUTONOMOUS)

II B. Tech II Semester Regular Examinations, July – 2024
(Regulations: VCE-R22)

## DESIGN AND ANALYSIS OF ALGORITHMS
(Common to Computer Science and Engineering,
Computer Science and Engineering (AIML), Information Technology &
Artificial Intelligence and Machine Learning)

Date: 16 July, 2024 FN          Time: 3 hours          Max Marks: 60

### Answer All Questions

### PART – A

| | | | | | |
|---|---|---|---|---|---|
| 1. | a) | Distinguish the best-case, average-case, and worst-case efficiency of an algorithm. | CO1 | L2 | 1M |
| | b) | Write down the control abstraction for the divide and conquer strategy. | CO1 | L2 | 1M |
| | c) | Mention the Properties of Greedy method. | CO2 | L1 | 1M |
| | d) | Time Complexity of job sequencing with deadlines. | CO2 | L1 | 1M |
| | e) | List the difference between an optimal solution and a feasible solution. | CO3 | L1 | 1M |
| | f) | What is the knapsack problem? | CO3 | L1 | 1M |
| | g) | Define State Space Tree. | CO4 | L1 | 1M |
| | h) | Define E node and live node. | CO4 | L1 | 1M |
| | i) | When can a path be terminated in a branch and bound algorithm? | CO5 | L2 | 1M |
| | j) | Define P and NP problems. | CO5 | L1 | 1M |

### PART – B

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|---|---|---|---|---|---|
| 2. | a) | Illustrate briefly on Big oh Notation, Omega Notation and Theta Notations. Depict the same graphically and explain. | CO1 | L3 | 5M |
| | b) | Write the algorithm for merge sort and Trace 76, 23, 45, 13, 98, 52, 84 and 18. | CO1 | L2 | 5M |

(OR)

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|---|---|---|---|---|---|
| | c) | Apply Strassen's algorithm for matrix multiplication to multiply the matrices with an example and justify how the Strassen's algorithm is better. | CO1 | L3 | 5M |
| | d) | Apply quick sort technique and arrange the records with the following index values in the ascending order. 2, 3, 8, 5, 4, 7, 6, 9, 1. Explain with algorithm and analyze time complexity. | CO1 | L3 | 5M |

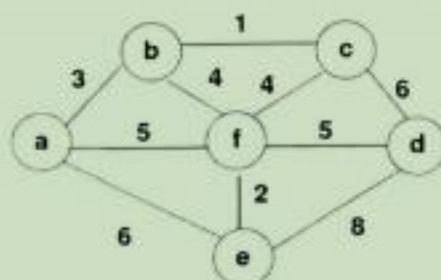| | | | | | |
|---|---|---|---|---|---|
| 3. | a) | Write the Dijkstra's Algorithm. | CO2 | L3 | 5M |
| | b) | Apply prims algorithm to find Minimum spanning Tree. | CO2 | L3 | 5M |



Fig.1

(OR)

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|---|---|---|---|---|---|
| | c) | Solve the following instance of Knapsack problem by Greedy Method. W=15, n=6. <br> (p1, p2 ,p3, p4, p5, p6) = (40, 35, 18, 4, 10, 2) <br> (w1, w2, w3, w4, w5, w6) = (5, 7, 2, 4, 5, 1) | CO2 | L3 | 5M |
| | d) | Write the Kruskal's algorithm for finding minimum Spanning tree. | CO2 | L3 | 5M |