M.Tech(CSE) 1st Semester Examination -2019
Subject: Design and Analysis of Algorithms(DAA)

Time: 3 Hours ***Marks: 70***

Answer all questions.
The figure in the right hand margin indicates marks.

1. RECURRENCE
    a. Master Method
        i. Give the Master theorem
        ii. Solve the recurrence
            1. $T(n) = 2T(n/8) + (n)^{⅓}$
            2. $T(n) = T(n/3) + T(n/4) + 5n$

        OR

    b. Solve the recurrence using substitution method
        i. $T(n)=4T(n/2)+n^2$ T (n)
2. SORTING
    a. Mergesort
        i. Give the algorithm for Merge Sort
        ii. Give the worst case running time along with the required analysis.

        OR

    b. Quicksort
        i. Give the algorithm for Quick Sort
        ii. Give the worst case running time along with the required analysis.
3. DYNAMIC PROGRAMMING
    a. Define the longest common subsequence problem. Solve the problem with dynamic programming. Give algorithm along with the time complexity and an example.

    OR

    b. Give 2 hallmarks of dynamic programming. Prove the two hallmarks in the longest subsequence problem.
4. GREEDY ALGORITHMS
    a. Definite the Minimum Spanning Tree Problem. Give the Prim's algorithm to solve it along with the time complexity. Give an example.

    OR

    b. Definite the Single Source Shortest Path problem. Give the Dijkstra's algorithm to solve it along with the time complexity. Give an example.
5. ALL PAIRS SHORTEST PATHS
    a. Define the all pairs shortest paths problem. Give the Floyd-Warshall algorithm with an example and time complexity.

    OR

    b. Define the all pairs shortest paths problem. Give the Johnson's algorithm with an example and time complexity.