III B. Tech II Semester Supplementary Examinations, April - 2021
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**
~~~~~~

PART –A   (14 Marks)

1. a) What is Psuedo code?   [2M]
    b) Write control abstraction of Divide – and – Conquer.   [2M]
    c) State the Greedy Knapsack problem.   [2M]
    d) Distinguish between Dynamic Programming and Greedy method.   [3M]
    e) Write the control abstraction of iterative Backtracking method.   [3M]
    f) Define Bounding Function?   [2M]

PART –B   (56 Marks)

2. a) Give the Big–O notation definition and briefly discuss with suitable example.   [7M]
    b) Explain the method of determining the complexity of procedure by the step count   [7M]
       approach. Illustrate with an example.

3. a) Write Divide – And – Conquer recursive Quick sort algorithm and analyze the algorithm   [7M]
       for average time complexity.
    b) Discuss the time complexity of Binary search algorithm for best and worst case.   [7M]

4. a) State the Greedy Knapsack. Find an optimal solution to the Knapsack instance n=3,   [7M]
       m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10).
    b) State the Job – Sequencing with deadlines problem. Find an optimal sequence to the n=5   [7M]
       Jobs where profits (P1, P2, P3, P4, P5) = (20, 15, 10, 5, 1) and deadlines (d1, d2, d3, d4,
       d5) =(2, 2, 1, 3, 3).

5. a) What is All – Pair Shortest Path problem (APSP)? Discuss the Floyd's APSP algorithm   [7M]
       and discuss the analysis of this algorithm.
    b) What is principle's of optimality? Explain how travelling sales person problem uses the   [7M]
       dynamic programming technique with example?

6. a) Write an algorithm for N – queen's problem. Give time and space complexity for 8–   [7M]
       queen's problem.
    b) Give the statement of sum –of subsets problem. Find all sum of subsets for n=4, (w1, w2,   [7M]
       w3, w4) = (11, 13, 24, 7) and M=31. Draw the portion of the state space tree using fixed –
       tuple sized approach.

7. a) What is LC – Search? Discuss LC – Search algorithm.   [7M]
    b) Explain Travelling sales person problem LCBB procedure with the following instance and   [7M]
       draw the portion of the state space tree and find an optimal tour.

$$\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$$

*****