R18 Regulation *Subject code:* 2P5ED

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Supplementary Examinations, January 2023

DESIGN AND ANALYSIS OF ALGORITHMS

(CSE)

Maximum Marks: 70 18/01/2023 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 Write an algorithm to solve GCD problem.
2 Write the Control Abstraction for Greedy Approach.
3 Define Backtracking.
4 Write the algorithms for Collapsing Find and Weighted Union.
5 What is an optimization Problem?
6 Define Spanning tree
7 Define principle of optimality
8 What is Traveling salesman problem
9 Define Tractable and intractable problems.
10 State NP-Complete Problem.

Part-B

Answer All the following questions. (10M X 5=50Marks)

11 a) Use Back Substitution Method to show the time complexity taken for the above Recurrence Relation

$$T(n) = \begin{cases} 1 & n=0 \\ 2T(n-1)+1 & n>0 \end{cases}$$

b) Write a Short note on Properties of Asymptotic Notations. [5+5]

OR

12 a) Write an algorithm to implement merge sort technique.
b) Explain in detail quick sorting method. Provide a complete analysis of Quick sort. [5+5]

13 Explain in detail Sum of Subsets Problem with a suitable example. [10]

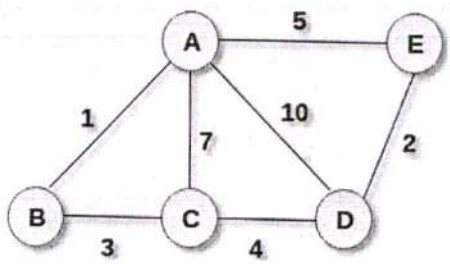
OR

14 Write an algorithm to implement 8-Queens Problem. Analyze the algorithm for its space & time complexity. [10]

15 Explain the concept of job sequencing with deadlines by Greedy technique. With Example. [10]

OR

16 Write the Kruskal's Algorithm for the Minimum Spanning Tree. Analyze its Time complexity. Compute the Minimum Cost Spanning Tre and it's cost for the following tree.



[10]

17 a) State Chained Matrix Multiplication Problem and explain it considering the following matrices

Matrix	size
A1	5X4
A2	4X7
A3	7X6
A4	6X2.

b) Device an algorithm for the above problem [6+4]

OR

18 Explain Travelling salesman problem. Give and analyze the algorithm with suitable example. [10]

19 Explain 0/1 Knapsack Problem using branch and bound technique. [10]

OR

20 a) Explain Cook's Theorem.
b) Write a short notes on FIFO Branch and Bound. [5+5]