R18 Regulation *Subject code:* 2P5ED

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Regular Examinations, February 2021

Design and Analysis of Algorithms

(Computer Science and Engineering)

Maximum Marks: 70 Date: 24.02.2021 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 a short note on Algorithm Design and Analysis of Process.
2 Differentiate Time Efficiency and Space Efficiency.
3 Discuss the principle of backtracking.
4 Define the minimum spanning tree problem.
5 Illustrate the general principle of greedy algorithm.
6 Define Big 'Oh'notation.
7 Write short notes on Chained matrix multiplication.
8 What are the parameters considered for a reliable design?
9 Define NP complete problem.
10 State Cook's theorem.

Part-B

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

11 Write an algorithm for Quick sort and write its time complexity with example list are5,3,1,9,8,2,4,7 (10M)

OR

12 With an example, implement Strassen's matrix algorithm and explain it in detail. (10M)

13 Write an Algorithm to find Hamiltonian cycle in a graph and explain with suitable example. (10M)

OR

14 Explain in detail about 8-queens problem. Explain how it can be solved using backtracking. (10M)

15 Summarize Knapsack problem in detail using Greedy method. (10M)

OR

16 How can the total profit be maximized if only one job can be completed at a time?(10M)

17 Explain in detail about Traveling sales person problem with a clear example. (10M)

OR

18 Consider 4 elements a1< a2< a3< a4 with q0=0.25, q1=3/16, q2=q3=q4=1/16, P1=1/4, P2=1/8, P3=P4=1/16. Construct the optimal binary search tree as a minimum cost tree. (10M)

19 (a) Identify an example for the best case input for the branch and bound algorithm for the assignment problem. (6M)

(b) Describe NP-hard and NP-completeness. (4M)

OR

20 Analyze the following instance of the knapsack by branch and bound algorithm.(10M)

Item	Weight	Values
1	10	$100
2	7	$63
3	8	$56
4	4	$12