R17 Regulation *Subject code:* 1P5EC

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

B.Tech III Year I Semester Supplementary Examinations, July 2022

DESIGN AND ANALYSIS OF ALGORITHMS

(CSE)

Maximum Marks: 70 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 Define Space and Time Complexities?
2 Mention the criteria to be satisfied by an algorithm.
3 What is an articulation point in a graph? Give two examples.
4 What is a bi-connected component?
5 State knapsack problem. What is the essential difference between KNAPSACK and 0/1 KANPSACK Problem.
6 Define minimum spanning tree
7 Define principle of optimality
8 What is traveling salesman problem
9 Define tractable and intractable problems.
10 Explain NP-Complete Problem.

Part-B

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

11 If matrices A =

9	4	6	7
7	8	1	4
4	3	2	6
5	3	0	2

B =

7	6	2	1
3	9	0	3
4	3	2	6
5	3	0	2

Implement Strassen's matrix multiplication on A and B. [10]

OR

12 A) Explain various asymptotic notations used in algorithm design in detail.
B) Discuss the working strategy of merge sort and illustrate the process of merge sort algorithm for the given data: 43, 32, 22, 78, 63, 57, 91 and 13 [5+5]

13 What is graph coloring? Write an algorithm for it and explain with an 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 A) Find the feasible and optimal solutions for the following knapsack problem.
Let n = 3, m = 20, (p1, p2, p3) = (25, 24, 15) and (w1, w2, w3) = (18, 15, 10).
B) Write and explain the steps for finding the minimum spanning tree by using prim's algorithm. [5 + 5]

17 Explain Travelling salesman problem. Give an algorithm and explain the algorithm with suitable example. [5 + 5]

OR

18 A) Define Reliability Design Problem
B) Design a reliable three state system with three device types D1, D2 and D3. The costs are $30,$15 and $20 respectively. The cost of system is to no more than $105. The reliability if each device type is 0.9, 0.8 and 0.5 respectively. [3+7]

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

OR

20 Explain Cook's Theorem [10]