



R17 Regulation

Subject code: 1P5FA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Year I Semester Supplementary Examinations, January 2023

DESIGN AND ANALYSIS OF ALGORITHMS

(Information Technology)

Maximum Marks: 70

06-01-2023

Duration: 3 hours

Part-A

Answer all of the following questions

(10X2M = 20 Marks)

- 1 Define Space Complexity.
- 2 Mention the criteria to be satisfied by an algorithm.
- 3 What is an articulation point in a graph? Give one example.
- 4 What is a bi-connected component?
- 5 State knapsack 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.

(5X10M = 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 $n = 3$, $m = 20$, $(p_1, p_2, p_3) = (25, 24, 15)$ and $(w_1, w_2, w_3) = (18, 15, 10)$.
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. [10]

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 of 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 State and prove Cook's theorem. [10]