



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

B.Tech V Semester Supplementary Examinations, June/July 2023
DESIGN AND ANALYSIS OF ALGORITHMS
(CSE)

Maximum Marks: 70

Date:01.07.2023 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 Define Space Complexity.
- 2 Write an algorithm to solve Towers of Hanoi Problem.
- 3 Write the Control Abstraction for Greedy Approach.
- 4 What is an AND/OR graph.
- 5 Construct all the possible spanning trees for a graph with 4 nodes?
- 6 Define Feasible Solution.
- 7 State the Principle of Optimality.
- 8 Differentiate between tractable and intractable problems.
- 9 What are the differences between backtracking and branch & bound algorithm design Techniques?
- 10 Define branch & bound strategy.

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 Write an algorithm for Binary Search and analyze its time complexity with an example [10]
OR
- 12 Explain Strassen's Matrix Multiplication with an example and calculate its time complexity. [10]
- 13 A) Explain how backtracking is used for n-queens problem. Show the State space tree.
B) What is biconnected graph? [7+3]
OR
- 14 A) Explain the Find algorithm with collapsing rule
B) What is spanning tree. Explain with example [5+5]
- 15 Explain the concept of job sequencing with deadlines by Greedy technique. With Example. [10]
OR
- 16 Define and explain Prim's Algorithm, give pseudo-code and trace it with a suitable example [10]
- 17 Construct an optimal binary search tree for the given set.
Keys = {10,20,30,40} Pi={3,3,1,1} Qi = {2,3,1,1,1} [10]
OR

- 18 Write the Bellman and Ford Algorithm to compute shortest paths. And trace it with a suitable example. [10]
- 19 Give and explain the relationship between P, NP, NP Complete and NP Hard. [10]
OR
- 20 State travelling salesperson problem. Apply Branch and Bound algorithm to solve the TSP instantiated by the following cost matrix. [10]

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