



R18 Regulation *Subject code: 2P5ED & 2P5FD*
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
 (Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech V Semester Supplementary Examinations, July 2024

DESIGN AND ANALYSIS OF ALGORITHMS
(Common to CSE & IT)

Maximum Marks: 70

Date: 26.07.2024 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 which carries 10M.
 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)	CO	Bloom Tx
1	solve the recurrence relation for its complexity $T(n) = T(n/4) + T(n/2) + cn^2$ $T(1) = c$ $T(0) = 0$		1	L1
2	Write the control Abstraction for Divide and Conquer strategy.		1	L1
3	What is an Optimal Solution?		3	L1
4	Write any two characteristics of Greedy Algorithm.		3	L1
5	State m-coloring decision problem.		2	L1
6	Explain about state space tree.		2	L1
7	Write the general procedure of dynamic programming.		4	L1
8	What is the difference between 0/1 Knapsack and fractional Knapsack		4	L1
9	Define branch & bound strategy. What are the searching techniques that are commonly used in branch & bound method?		5	L1
10	Define NP-Hard problems.		5	L1

Part-B

Answer All the following questions.		(5X10M=50Marks)		
11	Write an algorithm for Binary Search and analyze its time complexity with an example [10]		1	L2
OR				
12	Explain Strassen's Matrix Multiplication with an example and calculate its time complexity. [10]		1	L2
13	Write an algorithm to implement 8-Queens Problem. Analyze the algorithm for its space & time complexity. [10]		2	L2
OR				
14	A) Define Strongly Connected components and explain their properties. B) Explain the general method of Backtracking. [5+5]		2	L2
15	Explain job sequencing with deadlines using greedy method with an example. [10]		3	L2

	OR												
16	<p>A) Write the Kruskal's Algorithm for the Minimum Spanning Tree. Analyze its Time complexity.</p> <p>B) Compute the Minimum Cost Spanning Tree and its cost for the following tree.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">[5+5]</p>	3	L2										
17	<p>State Chained Matrix Multiplication Problem and explain it considering the following matrices. [10]</p> <table style="margin-left: 20px;"> <tr> <td>Matrix</td> <td>size</td> </tr> <tr> <td>A1</td> <td>5X4</td> </tr> <tr> <td>A2</td> <td>4X7</td> </tr> <tr> <td>A3</td> <td>7X6</td> </tr> <tr> <td>A4</td> <td>6X2.</td> </tr> </table>	Matrix	size	A1	5X4	A2	4X7	A3	7X6	A4	6X2.	4	L2
Matrix	size												
A1	5X4												
A2	4X7												
A3	7X6												
A4	6X2.												
	OR												
18	<p>Explain Travelling salesman problem with suitable example using Dynamic programming. [10]</p>	4	L2										
19	<p>A) State 0/1 Knapsack problem and design an algorithm of LC Branch and Bound.</p> <p>B) Find the solution for the 0/1 knapsack instance of $n = 4$, $(p_1, p_2, p_3, p_4) = (10, 10, 12, 18)$, $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ and $M = 15$.</p> <p style="text-align: right;">[5+5]</p>	5	L2										
	OR												
20	<p>A) Explain about NP-Hard and NP-Complete problems. [5]</p> <p>B) State and prove Cook's theory. [5]</p>	5	L2										