R22 Regulation *Subject code:4E4FE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

DESIGN AND ANALYSIS OF ALGORITHMS

(IT)

Maximum Marks: 60 Date:10.06.2026 Duration: 3 hours

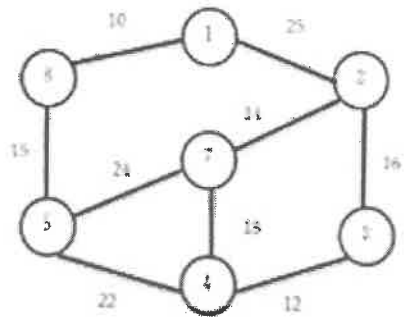
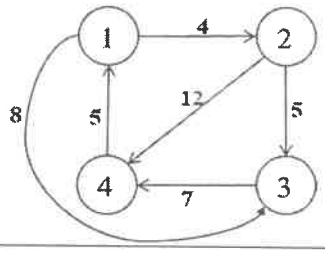
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1. a)	What is space complexity?	1M	1	L1
b)	Name the applications of the divide and conquer method.	1M	1	L1
c)	Write an algorithm for find.	1M	2	L1
d)	Define chromatic number.	1M	2	L1
e)	List the applications of greedy method.	1M	3	L1
f)	Give the control abstraction of greedy method.	1M	3	L1
g)	Define purging rule.	1M	4	L1
h)	State the chained matrix multiplication problem.	1M	4	L1
i)	Distinguish between LCBB and FIFOBB.	1M	5	L1
j)	What is non-deterministic algorithm?	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Discuss Asymptotic notations in detail with suitable examples and graphs. b) Search for key = 25 in the sorted array: A = [10, 15, 20, 25, 30, 35, 40] and derive it time complexity.	5M 5M	1	L3 L2
	OR			
3	a) Explain Strassen's Matrix Multiplication with an example. b) Apply Quick Sort on the array: A = [38, 27, 43, 3, 9, 82, 10].	5M 5M	1	L2 L4
4	a) Illustrate AND/OR graphs with a suitable example. b) State bi-connected components and articulation points with examples.	5M 5M	2	L2 L2
	OR			
5	a) Elaborate n-queen's problem and explain 4-Queens problem, draw the state space tree. b) Solve graph coloring using backtracking with an example.	5M 5M	2	L3 L2

6	a) Consider the Knapsack instance with n=3, m=20, (P1,P2,P3)=(25,24, 15), (W1,W2,W3)=(18,15,10). Find the optimal solution using greedy method? b) Solve the following instance of Job-sequencing with deadlines problem: n=7, profits (p1, p2, p3, … , p7) = (3, 5, 20, 18, 1, 6, 30) and deadlines (d1, d2, d3, … , d7) = (1, 3, 4, 3, 2, 1, 2).	5M 5M	3	L4 L4
	OR			
7	Construct minimum – cost spanning tree for the following figure using Prim's algorithm & Kruskal's algorithm. 	10M	3	L4
8	Compute all pairs shortest paths for the following graph: 	10M	4	L2
	OR			
9	Draw an Optimal Binary Search Tree for n=4 identifiers (a1,a2,a3,a4) = (do, if, read, while), P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1).	10M	4	L4
10	a) State and explain the Cook's theorem. What is the significance of this theorem? b) Explain NP - Hard and NP Complete classes in detail.	5M 5M	5	L2 L2
	OR			
11	Consider the following TSP cost matrix; draw the state space tree by using LCBB. $\begin{bmatrix} \infty & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{bmatrix}$	10M	5	L4