



R22 Regulation

Subject code:4E4EB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2025

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE, CSE(AI&ML) & CSE(DS))

Maximum Marks: 60

Date:18.12.2025

Duration: 3 hours

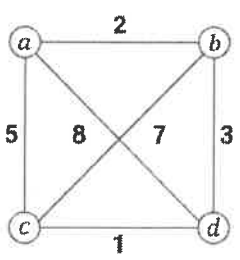
- Note: 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	How to measure a time complexity of an algorithm?	1M	CO1	BL1
b)	Give the general idea of Divide & Conquer algorithms	1M	CO1	BL1
c)	What is the bounding function in backtracking?	1M	CO2	BL1
d)	What is a bi-connected component in a graph?	1M	CO2	BL1
e)	Define Minimum Cost Spanning tree.	1M	CO3	BL1
f)	Define greedy technique.	1M	CO3	BL1
g)	Give the principle difference between dynamic programming and divide and Conquer techniques.	1M	CO4	BL2
h)	What is the time complexity of Floyd-Warshall algorithm?	1M	CO4	BL2
i)	What is FIFO search in branch and bound?	1M	CO5	BL1
j)	Why is TSP considered a difficult problem to solve exactly?	1M	CO5	BL2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	Discuss Quick Sort Algorithm and Explain it with example. Derive Worst case and Average Case Complexity.	10M	CO1	BL3
OR				
3	Apply strassen's algorithm to compute. $\begin{bmatrix} 1 & 2 & 1 & 1 \\ 0 & 3 & 2 & 4 \\ 0 & 1 & 1 & 1 \\ 5 & 0 & 1 & 0 \end{bmatrix} * \begin{bmatrix} 2 & 1 & 0 & 2 \\ 1 & 2 & 1 & 1 \\ 0 & 3 & 2 & 1 \\ 4 & 0 & 0 & 4 \end{bmatrix}$	10M	CO1	BL3
4	Write backtracking algorithm for i) The n-queens problem ii) The subset-Sum problem.	10M	CO2	BL2
OR				
5	a) Explain the Graph-Coloring problem and draw the state space tree for m= 3 colors and n=4 vertices graph. b) Discuss the time and space complexity.	7M 3M	CO2	BL3

6	Discuss the Dijkstra's single source shortest path algorithm with an example and derive its time complexity.	10M	CO3	BL3
OR				
7	Solve the following instance of knapsack problem using greedy method. n=7(objects), m=15, profits are (P1,P2,P3,P4,P5,P6,P7)=(10,5,15,7,6,18,3) and its corresponding weights are (W1,W2,W3,W4,W5,W6,W7) = (2,3,5,7,1,4,1).	10M	CO3	BL3
8	a) Find the all-pairs shortest path solution for the graph represented by below adjacency matrix. $\begin{bmatrix} \infty & 6 & 5 & 4 \\ 3 & \infty & 2 & 6 \\ 12 & 6 & \infty & 7 \\ 8 & 11 & 10 & \infty \end{bmatrix}$	8M	CO4	BL3
	b) Define merging and purging rules in 0/1 knapsack problem.	2M		
OR				
9	Explain optimal binary search tree algorithm with example and analyze its efficiency.	10M	CO4	BL3
10	a) Give a comparison between different branch-and-bound approaches. b) Discuss 0/1 Knapsack problem with respect to branch and bound method.	5M 5M	CO5	BL3
OR				
11	Apply Branch and Bound algorithm to solve the travelling salesman problem for 	10M	CO5	BL3