R18 Regulation *Subject code:2P5FD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, May 2025

DESIGN AND ANALYSIS OF ALGORITHMS

(IT)

Maximum Marks: 70 Date: 24.06.2025 Duration: 3 hours

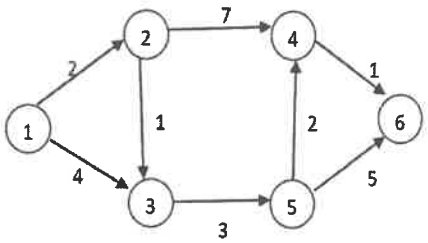
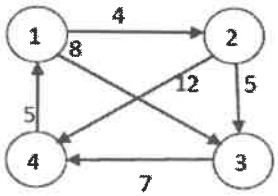
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	What is an algorithm?	2M	1	L1
2	Write the control abstraction for divide – conquer.	2M	1	L1
3	Write an algorithm of simple union.	2M	2	L1
4	What is Hamilton cycle?	2M	2	L1
5	What is greedy method.	2M	3	L1
6	Define feasible solution.	2M	3	L1
7	Define optimal substructure.	2M	4	L1
8	What is optimal binary search tree?	2M	4	L1
9	What is class P and NP?	2M	5	L1
10	What is LC branch & bound method?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Write an algorithm for Binary search using recursive method and sort the following elements? Find the recurrence relation using back substitutional method.	10M	1	L2
	OR			
12	Write an algorithm for strassen's matrix multiplication and multiply the matrix using strassen's matrix multiplication: $A=\begin{bmatrix}1 & 3\\7 & 5\end{bmatrix}$ $B=\begin{bmatrix}6 & 7\\3 & 8\end{bmatrix}$	10M	1	L2
13	What is Graph colouring? Write an algorithm and explain with an example.	10M	2	L2
	OR			
14	Explain 4 queens problem with state space tree.	10M	2	L2
15	Using Dijkstra's algorithms find the shortest path from vertex 1 vertex 6 for the following graph.	10M	3	L2

				
	OR			
16	Discuss about fractional knapsack problem. Consider the following instance of knapsack problem. n=7, m=15. Profits (P1,P2,P3,P4,P5,P6,P7)=(10,5,15,7,6,18,3) and Weights(W1,W2,W3,W4,W5,W6,W7)=(2,3,5,7,1,4,1). Obtain the optimal solution using greedy approach.	10M	3	L2
17	Describe Floyd's algorithm for all pairs shortest path problem. Apply the same to the following weight matrix and discuss its time efficiency. 	10M	4	L2
	OR			
18	Explain the methodology of Dynamic programming. List the applications of dynamic programming.	10M	4	L2
19	a) Give the 0/1 Knapsack LCBB algorithm b) Differentiate between deterministic and non deterministic algorithm	5M 5M	5	L2
	OR			
20	a) Explain the satisfiability problem. b) Difference between deterministic and non-deterministic algorithm.	5M 5M	5	L2