R20 Regulation *Subject code: 3P4ED*

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: 70 Date: 23.12.2025 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	Define algorithm.	2M	1	L1
2	What is the worstcase complexity in Quick Sort? Why?	2M	1	L1
3	What is an Hamiltonion Cycle. Give two Examples.	2M	2	L1
4	What is an AND/OR graph.	2M	2	L1
5	Construct all the possible spanning trees for a graph with 4 nodes?	2M	3	L1
6	Write about state space tree.	2M	3	L1
7	Write the general procedure of dynamic programming.	2M	4	L1
8	What is the difference between 0/1 Knapsack and ordinary Knapsack	2M	4	L1
9	Define branch & bound strategy.	2M	5	L1
10	Define NP-Hard problems.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Sort the elements 310,285,179,652,351,423,861,254,450,520 using merge sort algorithm and draw the tree of calls of merge sort.	10M	1	L2
	OR			
12	a) How the performance can be analyzed? Explain with the example. b) Give the algorithm for transpose of a matrix m x n and find the time complexity ofthe algorithm using step count method.	5M 5M	1	L2
13	What is weighting rule for Union(i,j)? How it improves the performance of union operation?	10M	2	L2
	OR			
14	a) Explain the Find algorithm with collapsing rule. b) What is spanning tree. Explain with example.	5M 5M	2	L2
15	Explain the concept of job sequencing with deadlines by Greedy technique. With Example.	10M	3	L2
	OR			

16	Explain Kruskal's Algorithm, device and algorithm for it and trace the algorithm with suitable example	10M	3	L2
17	State Chained Matrix Multiplication Problem and explain it considering the the following matrices Matrix size A1 5X4 A2 4X7 A3 7X6 A4 6X2.	10M	4	L2
	OR			
18	Explain Travelling salesman problem. Give an algorithm and explain the algorithm with suitable example.	10M	4	L2
19	a) State 0/1 Knapsack problem and design an algorithm of LC Branch and Bound. b) Find the solution for the 0/1 knapsack instance of n = 4, (p1,p2,p3,p4) = (10,10,12,18), (w1,w2,w3,w4) = 2,4,6,9) and M = 15.	5M 5M	5	L2
	OR			
20	State and prove 3-satisfiablity problem is NP-Complete.	10M	5	L2