R18 Regulation *Subject code:2P5ED*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, April 2026

DESIGN AND ANALYSIS OF ALGORITHMS

(CSE)

Maximum Marks: 70 Date: 22.04.2026 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	Write about Space and Time Complexities.	2M	1	L1
2	Mention the criteria to be satisfied by an algorithm.	2M	1	L1
3	What is an articulation point in a graph?	2M	2	L1
4	What is a Bi-connected component?	2M	2	L1
5	State knapsack problem.	2M	3	L1
6	Define minimum spanning tree.	2M	3	L1
7	Define principle of optimality.	2M	4	L1
8	What is Traveling salesman problem?	2M	4	L1
9	Define Tractable and intractable problems.	2M	5	L1
10	Write about NP-Complete Problem.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	If matrices A = $\begin{bmatrix} 9 & 4 & 6 & 7 \\ 7 & 8 & 1 & 4 \\ 4 & 3 & 2 & 6 \\ 5 & 3 & 0 & 2 \end{bmatrix}$ B= $\begin{bmatrix} 7 & 6 & 2 & 1 \\ 3 & 9 & 0 & 3 \\ 4 & 3 & 2 & 6 \\ 5 & 3 & 0 & 2 \end{bmatrix}$ Implement Strassen's matrix multiplication.	10M	1	L2
	OR			
12	A) Explain various asymptotic notations used in algorithm design in detail. B) Discuss the working strategy of merge sort and illustrate the process of merge sort algorithm for the given data: 43, 32, 22, 78, 63, 57, 91 and 13.	5M 5M	1	L2

13	What is Graph coloring? Write an algorithm and explain with an example.	10M	2	L2
	OR			
14	Write an algorithm to implement 8-Queens Problem. Analyze the algorithm for its space & time complexity.	10M	2	L2
15	Explain the concept of job sequencing with deadlines by Greedy technique. With Example.	10M	3	L2
	OR			
16	A) Find the feasible and optimal solutions for the following knapsack problem. Let n = 3, m = 20, (p1, p2, p3) = (25, 24, 15) and (w1, w2, w3) = (18, 15, 10). B) Write and explain the steps for finding the minimum spanning tree by using prim's algorithm.	5M 5M	3	L2
17	Explain Travelling salesman problem. Give an algorithm and explain the algorithm with suitable example.	10M	4	L2
	OR			
18	Design a reliable three state system with three device types D1, D2 and D3. The costs are \$30,\$15 and \$20 respectively. The cost of system is to no more than \$105. The reliability if each device type is 0.9, 0.8 and 0.5 respectively.	10M	4	L2
19	Explain 0/1 Knapsack Problem using branch and bound technique.	10M	5	L2
	OR			
20	A) Explain Cook's Theorem. B) Write a short notes on FIFO Branch and Bound.	5M 5M	5	L2