R22 Regulation *Subject code:* **4E4FE**

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2024

DESIGN AND ANALYSIS OF ALGORITHMS

(IT)

Maximum Marks: 60 Date:05.12.2024 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	CO	Bloom Tx
All the following questions carry equal marks (10X1M=10 Marks)			
1.a)	List out the characteristics of an algorithm.	CO1	L1
b)	Compare Merge and Quick Sort algorithms.	CO1	L1
c)	Define Disjoint Sets.	CO2	L1
d)	Define Chromatic number.	CO2	L1
e)	Write about principle of optimality in shortest path problem.	CO3	L1
f)	What is job sequencing with deadlines.	CO3	L1
g)	What is reliability design in dynamic programming?	CO4	L1
h)	Explain optimal binary search tree.	CO4	L1
i)	Define : i) LC – Search ii) FIFO – BB.	CO5	L1
j)	Write about non-deterministic algorithms.	CO5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
2	a) Illustrate Merge sort algorithm and discuss its time complexity. [5M] b) Explain asymptotic notations. [5M]	CO1	L2
	OR		
3	a) Explain Strassen's matrix multiplication and its time complexity. [5M] b) Explain the big oh notation used in algorithm analysis. [5M]	CO1	L2
4	a) Write a recursive backtracking algorithm for sum of subsets problem. [5M] b) Discuss the Union operation in Disjoint Sets. [5M]	CO2	L2
	OR		
5	a) Describe an algorithm to solve 8-queen problem and Show the state space tree. [5M] b) Explain the Graph – coloring problem. And draw the state space tree for m= 3 colors n=4 vertices graph. [5M]	CO2	L2

6	Derive time complexity of job sequencing with deadlines. Obtain the optimal solution when n=5, (p1, p2,…)=(20,15,10,5,1) and (d1,d2,…)=(2,2,1,3,3). [10M]	CO3	L3
	OR		
7	a) Explain Prim's algorithm for minimal spanning tree with an example. [5M] b) Apply greedy algorithm to generate single-source shortest path with an example graph. [5M]	CO3	L2
8	Describe the Travelling sales person problem and discuss how to solve it using dynamic programming. [10M]	CO4	L2
	OR		
9	Explain the chained matrix multiplication with suitable example. [10M]	CO4	L2
10	a) Difference between NP-hard and NP-complete problems. [5M] b) Explain non-deterministic algorithm with an example. [5M]	CO5	L2
	OR		
11	a) Write and explain the Cooks theorem. [5M] b) List out the differences between FIFO and LC branch and bound solutions. [5M]	CO5	L2