R17 Regulation *Subject code: 1P5EC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Year I Semester Supplementary Examinations, July 2024

DESIGN AND ANALYSIS OF ALGORITHMS

(CSE)

Maximum Marks: 70 Date:24.07.2024 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)

1	Define Space and Time Complexities?
2	Write an algorithm to solve Towers of Hanoi Problem.
3	Write the Control Abstraction for Greedy Approach.
4	Define Backtracking and mention the areas where it can be applied.
5	State knapsack problem. What is the essential difference between KNAPSACK and 0/1 KANPSACK Problem.
6	Define minimum spanning tree
7	Define principle of optimality
8	What is traveling salesman problem
9	Define tractable and intractable problems.
10	Explain NP-Complete Problem.

Part-B

Answer All the following questions. (10M X 5=50Marks)

11	A) Explain recursive binary search algorithm with time complexity analysis. B) Write an algorithm to implement Quick sort technique. Mention the complexity of algorithm. [5+5]
	OR
12	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. [10]
13	A) What is weighting rule for Union(i,j)? How it improves the performance of union operation? B) What is biconnected graph? [6+4]
	OR
14	Write an algorithm to implement 8-Queens Problem. Analyze the algorithm for its space & time complexity. [10]

15	Explain the concept of job sequencing with deadlines by Greedy technique. With Example. [10]
	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. [5 + 5]
17	Construct an optimal binary search tree for the given set of identifiers. Let n=4, (a1,a2,a3,a4) = (do, if, int, while), p(1:4) = (3,3,1,1) and q(0:4) = (2,3,1,1,1) [10]
	OR
18	Write the Bellman and Ford Algorithm to compute Shortest paths. And trace it with a suitable example. [10]
19	A) Write short notes on non-deterministic algorithms. B) Explain the classes of NP- H & NP-C. [5 + 5]
	OR
20	State and prove 3-satisfiablity problem is NP-Complete. [10]