R20 Regulation *Subject code: 3P4FE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular/Supplementary Examinations, September 2023

DESIGN AND ANALYSIS OF ALGORITHMS
(INFORMATION TECHNOLOGY)

Maximum Marks: 70 Date:24.09.2023 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 which carries 10M.
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 Explain the concept of Big oh notation.
2 In what way a time complexity differs from space complexity.
3 What is a set? List the operations that can be performed on it.
4 What is Hamiltonian Cycles?
5 Write Control Abstraction of Greedy method.
6 Write any two characteristics of Greedy Algorithm.
7 Give the statement of Reliability design problem.
8 What you mean by dynamic programming?
9 State the methodology of Branch and Bound.
10 Define NP hard problem.

Part-B

Answer All the following questions. (5X10M=50Marks)

11 Consider the following recurrence $T(n)=8T(n/2)+ n$, Obtain asymptotic bound using substitution method. [10]

OR

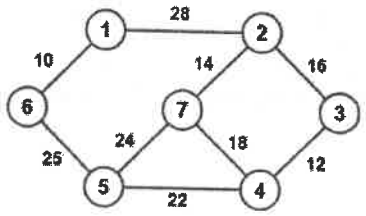
12 A. Distinguish between Merge sort and quick sort. [5]
B. Explain Binary search algorithm with suitable examples. [5]

13 Explain the AND/OR graph problem with an example. [10]

OR

14 A. Given a set of non-negative integers {10, 7, 5, 18, 12, 20, 15}, and a value sum 35, determine if there is a subset of the given set with sum equal to given sum. [5]
B. Give the solution to the 4-queens problem using backtracking. [5]

15 Write down Prim's Algorithm for finding the Minimum Spanning Tree of a connected graph. Execute your algorithm on the given graph. [10]



OR

16 A. Explain the Knapsack problem with an example. [5]
B. Write a greedy algorithm for sequencing unit time jobs with deadlines and profits. [5]

17 Explain how Matrix – chain Multiplication problem can be solved using dynamic programming with suitable example. [10]

OR

18 A. Explain the traveling sales person problem with suitable example. [5]
B. Analyze its time complexity clearly. [5]

19 A. Prove, If any NP-complete problem belongs to class P, then is P = NP? [5]
B. Write a non deterministic algorithm of sorting the list of elements. [5]

OR

20 Explain the FIFO BB 0/1 Knapsack problem procedure with the knapsack instance for n=4, m=15,(p1,p2,p3,p4)=(10,10,12,18), (w1,w2,w3,w4) =(2, 4, 6, 9). Draw the portion of the state space tree and find optimal solution. [10]