Regulation R18 *Subject code: 2P5FD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech V Semester Supplementary Examinations, January 2023

Design and Analysis of Algorithms

(INFORMATION TECHNOLOGY)

Maximum Marks: 70 18-01-2023 Duration: 3 hours

Note: **1. Question paper contains two parts A and B.**
2. Answer all questions in Part A, Each question carries 1 mark.
3. Answer 5 questions in Part B out of 10 questions. Each question carries 12 marks.

Part-A

Answer all the following questions (10x2M=20 Marks)

1 Arrange the following functions in increasing order.

n, logn, n^2, n^3, nlogn, 2^n

2 What are algorithm design techniques?

3 Write an algorithm of simple union.

4 What is weighted union?

5 What is greedy method?

6 Define feasible solution.

7 What is dynamic programming?

8 Define optimal substructure?

9 State the methodology of Branch and Bound.

10 What is NP-Hard Problem?

Part-B

Answer all the questions. **(5X10M=50Marks)**

11 Write an algorithm for Binary search using recursive method and sort the following elements? Find the recurrence relation using back substitutional method. [10]

3,6,8,12,14,17,25,29,31,36,42,47,53,55,62.

OR

12 Find the recurrence relation and tree for the following: [10]

a) $T(n) = \begin{cases} 1, & n = 0 \\ 2T(n-1) + 1, & n > 0 \end{cases}$

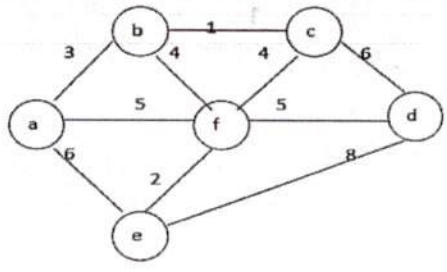
b) $T(n) = \begin{cases} 1, & n = 0 \\ T(n-1) + n, & n > 0 \end{cases}$

13 Explain graph traversal methods with an example? [10]

OR

14 Explain 8 queens problem with suitable example. [10]

15 Explain kruskal's with an algorithm and Compute a minimum cost spanning tree for the graph using kruskal's algorithm. [10]



OR

16 Discuss about fractional knapsack problem. Consider the following instance of knapsack problem n=7, m=15, profits $(p_1,p_2,p_3,p_4,p_5,p_6,p_7)$=(10,5,15,7,6,18,3) and weights $(w_1,w_2,w_3,w_4,w_5,w_6,w_7)$=(2,3,5,7,1,4,1). Obtain the optimal solution using greedy approach. [10]

17 Explain how matrix-chain multiplication problem can be solved using dynamic programming with suitable example. [10]

OR

18 Solve the below travelling sales person problem by using dynamic programming methodology.

$$A = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \begin{bmatrix} 0 & 10 & 15 & 20 \\ 5 & 0 & 9 & 10 \\ 6 & 13 & 0 & 12 \\ 8 & 8 & 9 & 0 \end{bmatrix} \end{array}$$

[10]

19 a. Explain the satisfiability problem. [5]
b. Explain cooks theorem. [5]

OR

20 Draw the portion of state space tree generated by LCBB for the 0/1 knapsack instance n=5 (p1,p2,…p5)=(10,15,6,8,4), (w1,w2,w3….w5)=(4,6,3,4,2) and m=12. And also find an optimal solution of the same. [10]