

Code No: 156AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B. Tech III Year II Semester Examinations, February - 2023****ALGORITHM DESIGN AND ANALYSIS****(Information Technology)****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

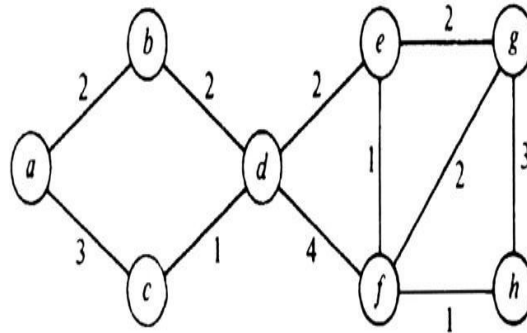
PART – A**(25 Marks)**

- 1.a) Define Little oh notation. [2]
- b) Write the application area of divide and conquer strategy. [3]
- c) What is collapsing find? [2]
- d) Define Chromatic number. Give one example. [3]
- e) What is the beauty of dynamic programming? [2]
- f) How many possible binary trees with n nodes, where n=3, draw them. [3]
- g) Define spanning tree. [2]
- h) List the application area of Greedy approach. [3]
- i) What is E-node? Give an example. [2]
- j) Compare and contrast deterministic algorithms and non-deterministic algorithms. [3]

PART – B**(50 Marks)**

- 2.a) Write an Iterative algorithm for binary search. What is its best case analysis? [5+5]
 - b) Write any five rules to define an algorithm. [5+5]
- OR**
- 3.a) What is an algorithms? List the properties of an algorithm. [5+5]
 - b) Write the worst case analysis of quick sort with suitable example. [5+5]
- 4.a) Write the union and find algorithms. [5+5]
 - b) Explain the 4-Queens problem. [5+5]
- OR**
- 5.a) Compare and contrast divide and conquer approach with dynamic programming. [5+5]
 - b) Explain the sum of subset problem. [5+5]
- 6.a) Consider n=4 & (q1,q2,q3,q4)=(do, if, int, while) the values for p's & q's are given as p(1:4)=(3,3,1,1) & q(0:4)=(2,3,1,1,1). Construct the Optimal Binary Search tree. [5+5]
 - b) Define backtracking. List the advantages of it. [5+5]
- OR**
- 7.a) Write the general method for dynamic programming. [5+5]
 - b) Find an Optimal Solution to the knapsack instance n=7, m=15, (P1,P2.....P7)=(10,5,15,7, 6, 18,3) and (W1,W2.....W7)=(2,3,5,7,1,4,1). [5+5]

8.a) Find the minimum cost spanning tree for the following graph using kruskals algorithm.



b) What is the need of Greedy approach? [7+3]

OR

9.a) Consider the following jobs, deadlines and profits. Use the scheduling with deadline algorithm to maximize the total profit.

Job	deadline	profit
1	2	40
2	4	15
3	3	60
4	2	20
5	3	10
6	1	45
7	1	55

b) Explain Single source shortest path problem with an illustrative example. [5+5]

10.a) Define Cook's theorem and prove it.

b) Define NP-Hard problem. Explain it's time complexity. [5+5]

OR

11.a) Explain P, NP and NP-Complete classes with suitable examples.

b) Explain the strategy to prove that a problem is NP-Hard. [5+5]

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