

Assignment on Design and Analysis of Algorithm
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1 Answer following questions: (each question 2 marks)

- a Write down the basic properties of an Algorithm.
- b Define Time and Space complexity of an algorithm.
- c Define three traversal algorithms in a binary tree.
- d Prove that $3n^2+5n+6 = \Omega(n^2)$
- e State the general principle of greedy algorithm.
- f What do you mean by Recursion?
- g Define Tower of Hanoi problem.
- h What are BFS and DFS?
- I What is the time complexity of Merge sort algorithm.
- J What is called divide and conquer strategy?
- K Write down time complexity of Binary search technique.
- L What is minimum spanning tree?
- M Define shortest path problem.
- N Define N-queen problem.
- O Define Knapsack problem.
- P What is Backtracking?
- Q Define Dynamic programming technique.

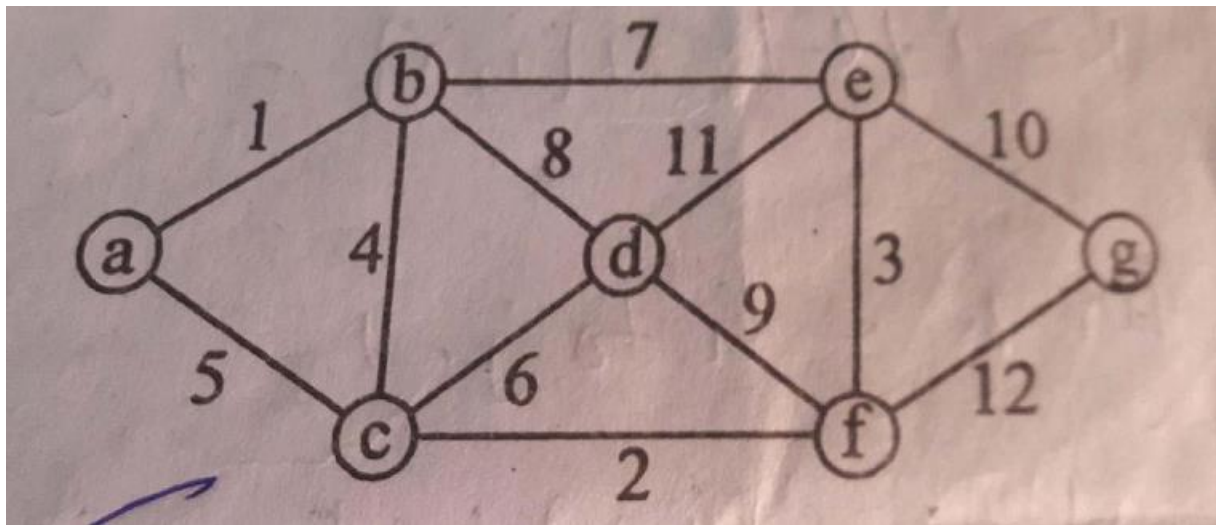
2 Answer following questions: (each question 5 marks)

- A Discuss Merge sort algorithm.
- B Calculate the time complexity of Merge sort algorithm.
- C Write down Tower of Hanoi algorithm.
- D Derive time complexity of Tower of Hanoi algorithm.
- E Briefly explain the concept of Big 'oh' notation, omega notation and theta notation.
- F Illustrate Quick sort algorithm for the following set of numbers: 265, 12 45, 89, 35, 33,74, 32, 65.
- G Briefly discuss, N-queens problem and write its algorithm.
- H Write down BFS and DFS algorithms.

- I Discuss Binary search technique.
- J Briefly, describe Selection sort technique.
- K Write down Kruskal's algorithm for finding minimum weight spanning tree.
- L Write down differences between Dynamic programming and Greedy techniques.

3 Answer following questions: (each question 10 marks)

- A Write down Prim's algorithm to find a minimum cost spanning tree (MCST) of a weighted graph. Find the MCST for the following graph using Prim's algorithm. Consider 'a' as the starting vertex.



- B Write down Matrix chain multiplication algorithm using Dynamic programming technique.