BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - IV Computer Science & Engineering : SUMMER : 2025
SUBJECT: DESIGN OF ALGORITHMS

Day : Monday
Date : 02/06/2025

S-25584-2025

Time . 10:00 AM-01:00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Assume suitable data **WHEREVER** necessary.
4) Draw neat labeled diagrams **WHEREVER** necessary.

Q.1 Explain the following types of algorithms with suitable examples. **(10)**

i) Iterative algorithms.

ii) Randomized algorithms.

OR

Q.1 Write a note on: **(10)**

i) Time and Space Trade-Off.

ii) Performance measurement of an algorithm.

Q.2 Explain the Divide and Conquer strategy to solve problems. Write algorithm for Merge Sort. Also explain the running time of the algorithm. Sort using Merge Sort Algorithm: 45, 21, 36, 89, 54, 60, 95. **(10)**

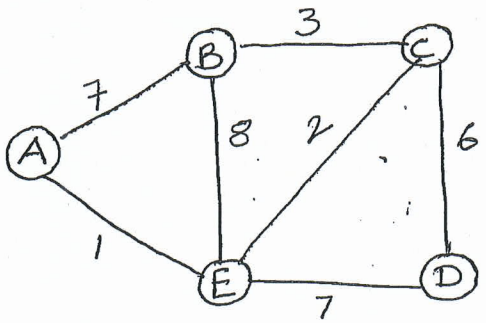
OR

Q.2 Explain the Divide and Conquer strategy to solve problems of Strassen's Algorithm for Matrix Multiplication that works on Divide and Conquer strategy. **(10)**

Q.3 What are Greedy algorithms? Discuss important properties of these algorithms. Explain how they are different from Divide and Conquer & Brute Force techniques. **(10)**

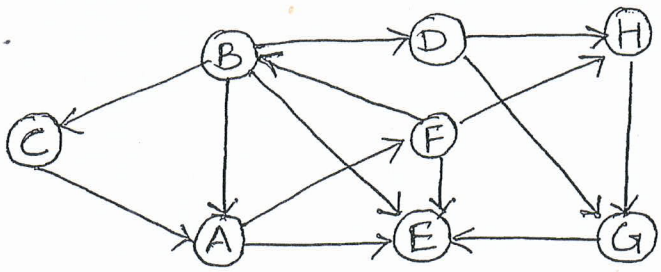
OR

Q.3 Write an algorithm to find the shortest path in a graph from Single Source that uses Greedy Strategy. Also discuss the running time of that algorithm. Find out the shortest path in the given graph. Consider A as the source node. **(10)**



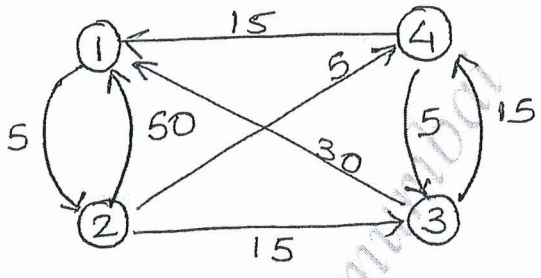
P.T.O

Q.4 Write an algorithm for Depth First Search Graph Traversal. Discuss the running time of that algorithm. Apply on the given graph with starting vertex as C. **(10)**



OR –

Q.4 Write an algorithm to calculate All Pair Shortest Path that uses Dynamic Programming. Also apply on the Graph. **(10)**



Q.5 Explain the terminologies used in Backtracking strategy to solve problems. Explain how to use Backtracking to solve Graph Coloring and Subset Sum problems. **(10)**

OR

Q.5 Explain the use of Branch and Bound strategy to effectively solve 15 Puzzle problem. **(10)**

Q.6 Explain P-Class, NP-Class, NP-Hard and NP-Complete problems. Prove that Clique is NP-Complete. **(10)**

OR

Q.6 Write a note on: **(10)**

i) Online-Paging Problem.

ii) K-Server Problem.

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