MAY 2025

P/ID 17609/ PCA3G/PIT3G/ PCATD

Time : Three hours Maximum : 80 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. Why analysis of algorithms is important?
2. Define: Big Oh notation.
3. What is the time and space complexity of Merge sort?
4. Give the general strategy of Divide and Conquer Method.
5. State the general principle of greedy algorithm.
6. What are the advantages of dynamic programming method over divide and conquer method?
7. Define the term Graph.
8. Define the principle of optimality.
9. What is N-Queens Problem?
10. State Hamiltonian Circuit problem.

11. Define NP-Complete Problem.

12. How to find lower bound by problem reduction?

PART B — (5 × 6 = 30 marks)

Answer any FIVE questions.

13. Discuss on primality testing.

14. With an example, analyze quick sort algorithm for best, average and worst cases. In which case it performs similar to selection sort?

15. Compare BFS and DFS algorithms with an example graph and specify their time complexities.

16. Write and explain Bellman Ford algorithm. Will your algorithm detect all negative cycles in a graph? Justify your answer.

17. Describe in detail about graph coloring using back tracking technique.

18. Write an algorithm for subset sum and explain with an example.

19. Explain briefly about comparison trees.

PART C — (3 × 10 = 30 marks)

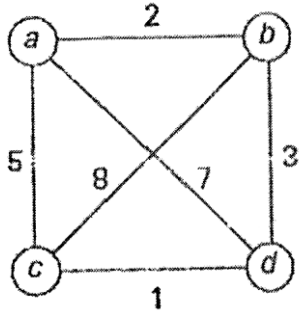
Answer any THREE questions.

20. Explain the mathematical analysis of recursive and non-recursive algorithms.

21. Discuss Strassen's matrix multiplication problem using divide and conquer technique.

22. Discuss and derive an equation for solving the 0/1 Knapsack problem using dynamic programming method. Design an algorithm and analyze it.

23. Apply Branch and Bound algorithm to solve the following Travelling Salesman problem:



24. Explain the strategy to prove that a problem is NP-hard.

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