DECEMBER 2022 **P/ID 17609/PCA3G/ PIT3G/PCATD**

Time : Three hours   Maximum : 80 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1.   Define the term algorithm.

2.   Write an algorithm to find the sum of first n integers.

3.   What is Masters' theorem?

4.   Mention the drawbacks of greedy method.

5.   Specify the meaning of transitive closure in a graph.

6.   Compare BFS and DFS.

7.   Give explicit and implicit constraints for 8-queens problem.

8.   What is Hamiltonian cycle?

9.   Distinguish between Backtracking and Branch and Bound methods.

10. What is biconnected component in a graph?

11. Say true or false.

    "Big O is used to represent upper bound and
    Big   is used to represent lower bound"

12. What is adversary argument? Explain.
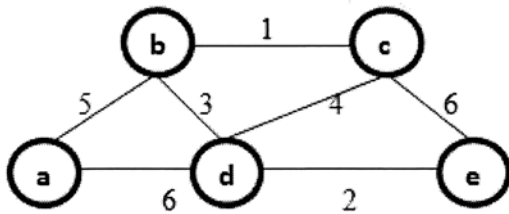
PART B — (5 × 6 = 30 marks)

Answer any FIVE questions.

13. What is prime number? Write an algorithm for primality checking.

14. Compare selection sort, quick sort and merge sort.

15. Apply quick sort algorithm to sort the list 45, 23, 42, 55, 8, 56, 14, 78, 33, 21 in ascending order.

16. Discuss the algorithm used in optimal storage on tape.

17. What is connected component of a graph? Explain.

18. Explain LIFO and FIFO branch and bound method.

19. Explain NP complete and NP hard problem with an example.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Describe the concept of divide and conquer method.

21. State and explain tree vertex splitting problem using greedy technique.

22. Write Dijkstra's algorithm. Find SSS using Dijkstra's algorithm from a to e for the following undirected, weight graph.

23. Apply the backtracking method to solve sum of subset problem S = {1, 3, 4, 5} and sum(D) = 11 with the help of state space tree.

24. Draw a comparison tree for three-element insertion sort or selection sort and Find the number of key comparisons in the worst case.

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