DECEMBER 2021 **P/ID 17609/PCA3G/ PIT3G/PCATD**

Time : Three hours Maximum : 80 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. Define Big O notation.

2. Write a recursive algorithm to find factorial of a number.

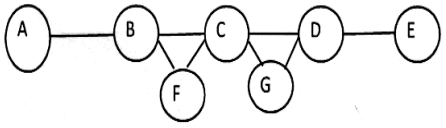
3. Distinguish between merge sort and quick sort.

4. Specify the meaning of feasible solution and optimal solution.

5. Give the meaning of principle of optimality.

6. What is 0/1 knapsack problem?

7. Identify articulation point (if any) in the following graph.



8. Assume ATM machine is loaded with {5, 10, 20, 50, 100, 200, 500, l000} valued currency notes, what is the minimum number of currency notes needed to supply the amount 3250? (Use Greedy method)

9. What is backtracking?

10. Find subsets and sum of {4, 2,3, 6}.

11. Compare BFS and DFS.

12. Give the purpose of lower bound in algorithm analysis.

PART B — (5 × 6 = 30 marks)

Answer any FIVE questions.

13. Define

(a) Time Efficiency

(b) Space Efficiency

14. Write an algorithm for the finding maximum of n numbers in an array. Give its time and space complexity.

15. Describe the working of divide and conquer method.

16. Explain knapsack problem using greedy method.

17. Define multistage graph. Explain.

18. What is n-queen problem? Generate the state space tree for n = 4.

19. Discuss the concepts of P, NP, NP complete and NP hard problems.

PART C — (3 × 10 = 30 marks)

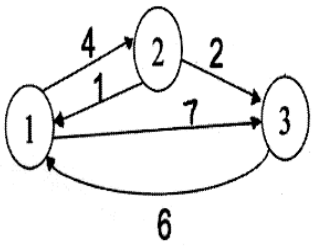
Answer any THREE questions.

20. Write merge sort algorithm. Explain.

21. Explain Strassens's matrix multiplication algorithm. Write its advantages.

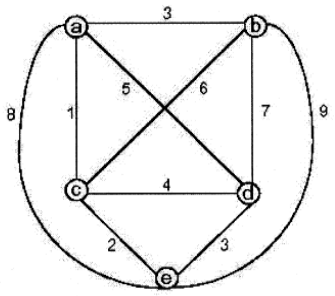
22. (a) Write Floyd's algorithm. (5)

(b) Apply Floyd's algorithm on following graph. (5)



23. What is TSP problem?

Solve the following TSP problem using branch and bound method.



24. Write note on

(a) Comparison tree. (5)

(b) Problem reduction. (5)