

(FOR THE CANDIDATES ADMITTED

25PCS103

DURING THE ACADEMIC YEAR 2025 ONLY)

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : NOVEMBER-2025

MSC COMPUTR SCIENCE-SF

MAXIMUM MARKS: 75

SEMESTER-I

TIME : 3 HOURS

DESIGN AND ANALYSIS OF COMPUTER ALGORITHMS
SECTION – A (10 × 1 = 10 MARKS)

Answer Following questions:-

1. The maximum number of nodes at level L in a Binary Tree is _____.
a) 2^L b) 2^{L-1} c) L-1 d) $2L+1$
2. What is the time complexity of Merge Sort?
a) $O(n)$ b) $O(n \log n)$ c) $O(1)$ d) $O(n^2)$
3. Storing the results of sub-problems to avoid redundant calculations is called _____.
a) Tabulation b) Memoization c) Brute force d) Recursion
4. Which one of the following problem cannot be solved using Backtracking method?
a) N-queen problem b) Knapsack Problem
c) Hamiltonian Problem d) Travelling Salesman Problem
5. The focus of Vedic Mathematics is _____.
a) Written Calculations b) Mental Calculations
c) Theoretical Mathematics d) Algebra

Answer the following in ONE or TWO Sentences

6. What are the key aspects of Performance Analysis?
7. List the applications of Spanning Tree.
8. What is meant by Dynamic Programming?
9. Comment on Chromatic number in graph.
10. What is Vedic Mathematics?

SECTION – B (5 × 5 = 25 MARKS)

Answer Either (a) OR (b) in each of the following questions.

(K3)

11. a) List out the applications of Binary Tree.

(OR)

- b) Compare BFS and DFS techniques used in Graph.

12. a) Describe the Divide and Conquer technique with example.

(OR)

- b) How does Huffman coding use the Greedy method for data compression?

13. a) Why is memoization important in Dynamic Programming?

(OR)

b) How does Dynamic programming solve the Fibonacci sequence problem efficiently?

14. a) What is meant by Backtracking? List the Key concepts in Backtracking.

(OR)

b) Write short notes on Graph coloring and its use.

15. a) List the benefits and common techniques used in Vedic Mathematics.

(OR)

b) Perform the arithmetic 98×97 using Vedic Mathematics technique.

SECTION – C

(5 × 8 = 40 MARKS)

ANSWER EITHER (A) OR (B) IN EACH OF THE FOLLOWING QUESTIONS.(K4/K5)

16. a) Describe the differences between in-order, pre-order, and post-order traversal.

(OR)

b) What are the elementary data structures? Compare any two with suitable example.

17. a) Demonstrate the Quick Sort algorithm with example.

(OR)

b) Explain the different variants of Knapsack problem.

18. a) Demonstrate the multi-stage graph for finding the path with minimum cost from source S to T using any example graph. **(OR)**

b) Consider the Travelling Salesman problem with 4 cities and the following distance matrix. Find the shortest tour among the possible tour.

	A	B	C	D
A	0	10	15	20
B	10	0	35	25
C	15	35	0	30
D	20	25	30	0

19. a) Consider the following table of items with weight and value. Find the Optimal Solution for the Knapsack with a capacity of 50 units.

Item	Weight	Value
Orange	10	60
Apple	20	100
Mango	30	120

(OR)

b) Describe the steps of FIFO Branch and Bound technique with example.

20. a) Explain the history and origin of Vedic Mathematics.

(OR)

b) Describe the Urdhva Tiryagbhyam Sutra for multiplication with example.