

UNIT-1 PYQ Analysis

CS402 ADA (2022–2025 PYQ Analysis)

RGPV Unit-Wise Frequency Analysis

Unit	Topic	2022	2023	2024	2025	Total Appearances	Probability
Unit-1	Merge Sort	✓	✓	✓	✓	4	🔥 Very High
Unit-1	Quick Sort	✗	✓	✓	✓	3	🔥 Very High
Unit-1	Strassen Matrix Multiplication	✗	✓	✓	✓	3	🔥 Very High
Unit-1	Recurrence Relation	✓	✓	✓	✓	4	🔥 Very High
Unit-1	Asymptotic Notations	✓	✗	✓	✗	2	★ High
Unit-1	Heap Sort	✓	★	✗	✗	2	★ High

Unit-1	Divide & Conquer	✓	★	✗	✗	2	★ High
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(Algorithms, Asymptotic Notations, Heap, Heap Sort, Divide & Conquer, Binary Search, Merge Sort, Quick Sort, Strassen)


🔥 Most Repeated

Topic	Years
Merge Sort	2022, 2023, 2024, 2025
Quick Sort	2023, 2024, 2025
Strassen Matrix Multiplication	2023, 2024, 2025
Asymptotic Notations	2022, 2023, 2024
Recurrence Relations	2023, 2024, 2025
Heap Sort	2022, 2023
Divide & Conquer	2022, 2023

PYQs

Merge Sort

- Design Merge Sort Algorithm and discuss best/average/worst case.
- Sort given numbers using Merge Sort.
- What is Merge Sort?

 Asked almost every year.

Quick Sort

- Explain Quick Sort.
- Trace Quick Sort.
- Analyze Quick Sort.

 High probability.

Strassen

- Explain Strassen Matrix Multiplication.
- Derive Time Complexity.
- Compare with Classical Matrix Multiplication.

🔥 Very frequently repeated.

Asymptotic Notations

- Define Big O.
- Explain Theta Notation.
- Represent recurrence solution using Theta.

🔥 Short note favourite.

Recurrence Relations

- Solve recurrence using Substitution Method.

Repeated:

- Nov 2023
 - June 2024
 - June 2025
-

UNIT-2 PYQ Analysis

(Greedy Method)

Topics:

- Huffman Coding
 - Job Sequencing
 - MST
 - Prim's
 - Kruskal
 - Dijkstra
 - Optimal Merge Pattern
-

Huffman Coding

Asked:

2022

2024

2025

Questions:

- Construct Huffman Tree.

- Generate Huffman Codes.
 - Applications of Huffman Coding.
 - Decode text using Huffman Tree.
-

Job Sequencing

Asked:

2022

2023

2024

Questions:

- Solve Job Sequencing using Greedy.
 - Find Optimal Sequence.
-

MST

Asked:

2023

2024

Questions:

- Define Spanning Tree.
 - Construct MST using Prim's.
-

★ Dijkstra

Asked:

2022

2025

Questions:

- Single Source Shortest Path.
 - Apply Dijkstra on Graph.
-

UNIT-3 PYQ Analysis

(Dynamic Programming)

Topics:

- 0/1 Knapsack
 - Multistage Graph
 - Floyd Warshall
 - Reliability Design
-

0/1 Knapsack

Asked:

2022

2023

2024

2025

Questions:

- Solve using DP Table.
- Find Optimal Solution.

MOST REPEATED NUMERICAL.

Floyd Warshall

Asked:

2022

2024

2025

Questions:

- Explain Floyd Warshall.
 - Solve shortest path matrix.
-

★ Multistage Graph

Asked:

2022

2024

Questions:

- Find minimum path cost.
 - Construct multistage graph.
-

★ Reliability Design

Asked:

2023

2025

Questions:

- Explain Reliability Design using DP.
-

UNIT-4 PYQ Analysis

(Backtracking & Branch and Bound)

8 Queen

Asked:

2022

2023

2024

Questions:

- Solve 8 Queen using Backtracking.
-

Graph Coloring

Asked:

2022

2024

Questions:

- Explain m-Coloring.
 - Draw State Space Tree.
-

Hamiltonian Cycle

Asked:

2022

2025

Questions:

- Explain Hamiltonian Cycle.
 - State Space Tree.
-

TSP

Asked:

2023

2024

2025

Questions:

- Solve TSP using Branch and Bound.
-

LC Branch & Bound

Asked:

2023

Questions:

- Explain LC Search.
 - Explain FIFO Branch & Bound.
-

Lower Bound Theory

Asked:

2022

2023

Questions:

- Explain Lower Bound Theory.
 - Comparison Tree.
-

UNIT-5 PYQ Analysis

(BST, AVL, B-Tree, DFS, BFS, NP)

AVL Tree

Asked:

2023

2024

2025

Questions:

- Height Balanced Tree.
 - Balance Factor.
 - AVL Rotations.
-

B-Tree

Asked:

2022

2025

Questions:

- Construct B-Tree.
 - Explain B-Tree.
-

BST

Asked:

2025

Questions:

- Delete element from BST.
 - Construct BST.
-

DFS & BFS

Asked:

2022

2023

2025

Questions:

- Difference BFS vs DFS.
 - DFS Traversal.
 - BFS Traversal.
-

Tree Traversals

Asked:

2022

2025

Questions:

- Preorder
 - Inorder
 - Postorder
-

★ 2-3 Tree

Asked:

2023

2024

Questions:

- Explain 2-3 Tree.
 - Advantages over BST.
-

★ NP Completeness

Asked:

2022

2023

Questions:

- Explain NP Complete Problems.
 - P vs NP vs NP Hard.
-

FINAL TOP 20 MOST REPEATED ADA QUESTIONS

 Merge Sort

 Quick Sort

 Strassen Matrix Multiplication

 Recurrence Relations

 Huffman Coding

 Job Sequencing

 Dijkstra

 Prim's MST

- 🔥 0/1 Knapsack
- 🔥 Floyd Warshall
- 🔥 Multistage Graph
- 🔥 Reliability Design
- 🔥 8 Queen
- 🔥 Graph Coloring
- 🔥 Hamiltonian Cycle
- 🔥 TSP
- 🔥 AVL Tree
- 🔥 B-Tree
- 🔥 BFS vs DFS
- 🔥 NP Completeness

If exam is tomorrow

First Priority (70% Paper Coverage)

1. Merge Sort
2. Quick Sort
3. Huffman Coding
4. Job Sequencing
5. 0/1 Knapsack
6. Floyd Warshall
7. 8 Queen
8. TSP
9. AVL Tree
10. BFS & DFS

These alone cover the largest chunk of repeated ADA PYQs from 2022–2025.