



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-II Summer 2025	
Exam Seat No.:	
Academic Year: 2024-2025	Semester: IV
Class: SY	Program: B.Tech
Branch Code: COM/CSD	Pattern: 2023
Name of Course: Data Structures	Course Code: 2301212
Max. Marks: 30	Duration: 1.15 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last column indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1 a) Explain the process of selecting a pivot in the Quick Sort algorithm and describe how the array [8, 4, 9, 1, 6, 3, 7] would be partitioned after choosing the first element as the pivot. Solve the example step by step, showing all the passes (4) CO1

- 1 b) Consider the following pseudo code: (3) CO1

for i = 0 to n:

for j = 0 to n:

for k = 0 to n:

print("Hello");

Determine the time complexity of the above nested loop using frequency count. Explain the steps you used to arrive at your answer.

Question No. 2

- 2 a) Explain the following terms with suitable examples. (4) CO1

1) Static and dynamic data structures

2) Linear and non-linear data structure

- 2 b) Given an array arr = [5, 8, 3, 12, 7], explain how you will delete element 8. Explain which steps you would follow to insert an element. Write pseudo algorithm or C/C++ code (4) CO1

Group OR

- 2 c) Solve using shell sort [8, 4, 9, 1, 6, 3, 7, 12, 5] and show passes. Explain the term Gap of shell sort (4) CO1

- 2 d) Explain Time and Space complexity of an algorithm and why it is important?. (4) CO1

Question No. 3

- 3 a) Write an pseudo algorithm or C/C++ code for fast transpose of Sparse Matrix (4) CO2
- 3 b) Explain how to represent a single variable polynomial in C/C++. Show with example (3) CO2

Question No. 4

- 4 a) Write an pseudo algorithm or C/C++ code for polynomial addition (4) CO2
- 4 b) What is sparse matrix and how to represent sparse matrix in C/C++ and show example (4) CO2

Group OR

- 4 c) Explain array as an ADT (4) CO2
- 4 d) Explain how strings are represented in C. Write a C/C++ code that takes a string input from the user and counts the number of words, digits in the sentence (4) CO2

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