K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-I Winter2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:I
Class:PG-I	Program:MCA
Branch Code:M.C.A.	Pattern:2024
Name of Course:Data Structures and Algorithms	Course Code:2409502
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 1 page.
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 columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1 a)	Apply the concept of Abstract Data Types (ADTs) to design and represent an array as an ADT. Show how basic operations (insertion, traversal) can be implemented using this representation.	(7)	CO5
Question No. 2			
2 a)	Use examples to demonstrate the working of Big (o), Theta (θ), and Omega (**Ω**) notations in evaluating algorithm efficiency.	(8)	CO5
	OR		
2 b)	Discuss the transpose of a sparse matrix using array representation. Give a brief explanation of the process.	(8)	CO5
Question No. 3			
3 a)	Implement the structure of a singly linked list and illustrate how nodes are connected with the help of a neat diagram.	(7)	CO1
Question No. 4			
4 a)	Illustrate with the help of a neat diagram how a doubly linked list works. Explain the process of forward and backward traversal in the list.	(8)	CO1
	OR		
4 b)	Create a circular linked list. Explain how it differs from a normal singly linked list in terms of structure, traversal, advantages, and applications.	(8)	CO1

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