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

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

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:III
Class:SY	Program:B.Tech
Branch Code:ADS	Pattern:2023
Name of Course:Data Structures	Course Code:2311203
Max. Marks:60	Duration:2.30 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 columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Explain classification of data structures	(6)	CO1
Question No. 2			
2a)	Construct a 2 D Array in Row-Major and Column -Major order. Compute address of A[3][4] for a 4*5 integer matrix whose base address is 2000 and size of each element is 4 bytes	(6)	CO2
Question No. 3			
3a)	Apply and explain the concept of a linked list. Represent a linked list as an Abstract Data Type (ADT) with suitable operations.	(8)	CO3
	OR		
3b)	Build an algorithm to insert a node at the beginning, middle, and end of a singly linked list.	(8)	CO3
3c)	Build an algorithm to concatenate two linked lists.	(8)	CO3
	OR		
3d)	Apply the concept of Generalized Linked Lists (GLL) by constructing a GLL representation for a given expression such as (A, (B, C), D). Show the node structure, tag representation, and pointer links used in the GLL.	(8)	CO3
Question No. 4			
4a)	Apply the Stack ADT to push and pop elements for the dataset {10, 20, 30, 40}. Construct the stack using array representation and show the content after each operation.	(8)	CO4
	OR		
4b)	Solve and Convert the infix expression (A + B) * (C - D) to postfix and apply postfix evaluation assuming A=2, B=3, C=7, D=4.	(8)	CO4
4c)	Apply circular queue operations on array of size 5 to insert 4 elements, delete 2, then insert 2 more. Show front & rear pointers after each step.	(8)	CO4
	OR		

4d)	Apply the Josephus elimination process to determine the survivor when n = 10, k = 3. Show elimination order.	(8)	CO4

Question No. 5

5a)	Apply the multiplication hash method (A = 0.618) to insert keys:12, 25, 39, 44(Table size = 10). Show fractional extraction.	(8)	CO5

OR

5b)	Apply folding hash method to hash numbers: 123456, 987654, 111222, 456789. Table size 100.	(8)	CO5
5c)	Apply the properties of a good hash function to design a suitable hash function for storing 50 students' roll(4digits) numbers.Justify your choice and explain each property.	(8)	CO5

OR

5d)	**Apply the concept of hashing and explain its basic operation with a real time example.**	(8)	CO5

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