BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-III INFORMATION TECHNOLOGY : WINTER: 2025
SUBJECT: DATA STRUCTURES

Day : Thursday
Date : 11/12/2025

W-29247-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

NB :
1. Assume suitable data, if necessary.
2. Draw neat labelled diagrams WHEREVER necessary.
3. Figures to the right indicate FULL marks for the question.
4. All questions are COMPULSORY.

Q. 1	Design a pseudocode for an algorithm that merges two sorted arrays into a single sorted array. Discuss its time and space complexity and its advantages over other merging approaches.	(10)
	OR	
Q. 1	Explain the difference between a data structure and an abstract data type (ADT). Provide examples of common data structures and their corresponding ADTs.	(10)
Q. 2	Explain the concept of a priority queue. How does it differ from a regular queue? Discuss the two common types of priority queues (min-heap and max-heap) and their applications	(10)
	OR	
Q. 2	What is a multi-stack? Discuss how multiple stacks can be implemented within a single array. Provide pseudocode for the push and pop operations in a multi-stack implementation.	(10)
Q. 3	What is a generalized linked list? How does it differ from a regular linked list, and what are its applications?	(10)
	OR	
Q. 3	Describe the different types of linked lists. Discuss the advantages and use cases for singly linked lists, doubly linked lists, and circular linked lists.	(10)
Q. 4	Define BST. Explain different cases to delete an element from BST. Also enlist the application of BST.	(10)
	OR	
Q. 4	What is AVL tree? Enlist applications of AVL tree.	(10)
Q. 5	Write algorithm of depth first search traversal with suitable example.	(10)
	OR	
Q. 5	Describe realization of graphs using adjacency matrix and adjacency list with suitable example.	(10)
Q. 6	Explain sequential, indexed and random file organization in detail.	(10)
	OR	
Q. 6	Write a C program to search a list using indexed sequential search. What are the advantages of using indexed sequential search over sequential search?	(10)

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