Seat No. _____

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BE SEMESTER-III (CE/IT/CSE) Examination April - 2025

Subject Name: Data Structures and Algorithms
Subject Code: CT303-N

Date: 25/04/2025 **Time: 10:00 am to 1:00 pm** **Total Marks: 70**

Instructions:

1. Answer each section in separate answer sheet.
2. Use of scientific calculator is permitted.
3. All questions are Compulsory.
4. Indicate clearly, the option you attempt along with its respective question number.
5. Use the last page of main supplementary of rough work.

Section-I

Q-1 **(A)** What is a Data type? Explain primitive and non-primitive data type with example. [5]

(B) What is Stack? List out different stack operations and write algorithms for any two operations. [5]

(C) Convert (A+B)/(C-D)-(E*F) infix expression into postfix using stack. [5]

OR

(C) Explain recursion with suitable example. [5]

Q-2 **(A)** Define queue. Write difference between stack and queue. [5]

(B) Consider the following queue, where queue is a circular queue having 6 memory cells. Front=2 and Rear=4 [5]
Queue: _, A, C, D, _, _
Describe queue as following operation take place:
(i) F is added to the queue (ii) Two letters are deleted (iii) R is added to the queue
(iv) S is added to the queue (v) One letter is deleted.

OR

Q-2 **(A)** Write an algorithm to insert and delete an element in a linear queue. [5]

(B) Explain implementation of queue using Linked List. [5]

Q-3 **(A)** Write algorithm to insert an element at starting and ending in a doubly linked list. [5]

(B) Define following terms: [5]

1. Linear Data structures
2. Binary Search Tree
3. Weighted Graph
4. Degree of graph
5. Height of tree

OR

Q-3 **(A)** Write a short note on threaded binary tree. [5]

(B) Explain BFS and DFS with example. [5]

Section-II

Q-4	(A)	Create a binary search tree for the following data. Also write all traversals of it. 50 ,25 ,75, 22,40,60,80,90,15,30	[5]
	(B)	Define Minimum spanning tree. Explain Krushkal's algorithm with example.	[5]
	(C)	Apply binary search to find 18 from given data. 12, 2, 16, 30, 8, 28, 4, 10, 20, 6, 18	[5]
		OR	
	(C)	Write a short note on AVL Tree.	[5]
Q-5	(A)	Explain insertion and deletion in B-tree with example.	[5]
	(B)	Perform merge sort for given data: 26, 5, 37, 1, 61, 11, 59, 15, 48, 19	[5]
		OR	
Q-5	(A)	Explain adjacency matrix and adjacency list representation of a graph with example.	[5]
	(B)	Perform bubble sort for given data: 26, 5, 37, 1, 61, 11, 59, 15, 48, 19	[5]
Q-6	(A)	What is Collision? Explain any one collision resolution techniques in detail.	[5]
	(B)	Explain File in the terms of fields, records and database.	[5]
		OR	
Q-6	(A)	What is hashing? Explain any two hashing techniques in detail.	[5]
	(B)	Explain Indexed and Relative/Random file organization in detail.	[5]

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