U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 23IS3PCDSC /22IS3PCDSC /19IS3PCDSC **Max Marks: 100**
Course: Data Structures

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			CO	PO	Marks
		UNIT - I			
1	a)	Write C functions to implement insert front, insert rear, delete front, delete rear and display on Singly linked list with header node.	CO2	PO1	**10**
	b)	Write a program to add to polynomials using singly linked list.	CO2	PO1	**10**
		OR			
2	a)	Write C functions to implement insert front, insert rear, delete front, delete rear and display on Singly linked list.	CO2	PO1	**12**
	b)	Differentiate static and dynamic memory allocation with examples.	CO2	PO1	**8**
		UNIT - II			
3	a)	Write C program to evaluate a postfix expression.	CO2	PO1	**8**
	b)	Develop C functions to perform insert front, insert rear, delete front, delete rear and display in a doubly linked list.	CO2	PO2	**12**
		OR			
4	a)	Implement insert front, insert rear, delete front and display operations on circular singly linked list.	CO2	PO1	**8**
	b)	Write C function to convert infix to postfix expression. Illustrate with an example.	CO2	PO2	**12**
		UNIT - III			
5	a)	Write C program to insert, delete and display in a circular queue.	CO3	PO1	**8**
	b)	Write recursive functions for Factorial of a number, Towers of Hanoi and Fibonacci series.	CO3	PO2	**12**
		OR			
6	a)	Write C program to insert, delete and display in a linear queue.	CO3	PO1	**10**

		b)	Elucidate the need for priority queues and dequeues with an example for each.	*CO3*	*PO2*	**10**
			UNIT - IV			
	7	a)	Write C Program to insert and display in a Binary search tree.	*CO3*	*PO1*	**10**
		b)	Describe the advantages of using Threaded binary trees.	*CO4*	*PO1*	**5**
		c)	Construct BST for the given traversal order: Preorder: 10, 5, 3, 7, 20, 15, 25	*CO3*	*PO1*	**5**
			OR			
	8	a)	Write C functions to implement the three tree traversals.	*CO2*	*PO1*	**8**
		b)	Explain the procedure of three cases to delete an element in Binary search tree with illustration. Write C function to search an element in a Binary search tree.	*CO4*	*PO2*	**12**
			UNIT - V			
	9	a)	Write the algorithm to insert an item in Red-Black trees. Illustrate with an example.	*CO3*	*PO2*	**8**
		b)	Describe different rotations performed while inserting in AVL trees with example for each rotation.	*CO4*	*PO1*	**12**
			OR			
	10	a)	Elucidate the procedure to insert an item in Splay trees. Illustrate with an example of any 6 keys.	*CO3*	*PO2*	**10**
		b)	Write C functions to perform insertion with necessary rotations in AVL trees.	*CO4*	*PO2*	**10**

****