

U.S.N.

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

Autonomous Institute Affiliated to VTU

## April 2024 Semester End Main Examinations

**Programme: B.E.**

**Branch: Information Science and Engineering**

**Course Code: 23IS3PCDSC**

**Course: Data Structures**

**Semester: III**

**Duration: 3 hrs.**

**Max Marks: 100**

**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.			UNIT - I	CO	PO	Marks
	1	a)	Define Data Structure. With a neat diagram explain the classification of Data Structures.	CO1	PO1	08
		b)	Write a code snippet to illustrate searching for a particular node in the given singly linked list.	CO1	PO1	06
		c)	Consider a student linked list with USN as the key field to depict the following operations. - insert_Front() - insert_End()	CO1	PO2	06
			OR			
	2	a)	Define dynamic memory allocation. With an example outline the representation of dynamic array creation.	CO1	PO1	08
		b)	A college database has details of employees with employeeID as the info field. Write a code snippet to illustrate how to delete a specific node using singly linked list.	CO1	PO2	06
		c)	A departmental store has various items where customers can purchase items. Use ItemID to illustrate - deleteFront() - display()	CO1	PO2	06
			UNIT - II			
	3	a)	Write a code snippet to illustrate how to insert a node at the last and deleting a node from front using doubly linked list. The doubly linked list has names of group of friends "A", "B", "C", "D", "E".	CO2	PO1	06
		b)	Implement a 'C' function to convert infix expression to its equivalent postfix expression.	CO2	PO1	05
		c)	Evaluate postfix expression for E= 123+*321-+*. Show suitable stack traces.	CO2	PO2	05
		d)	Write a C function to show how push and pop operation will be done for a stack of plates piled up in a college food court.	CO2	PO2	04

		<b>UNIT - III</b>			
4	a)	Write a C program to generate the Fibonacci Series using recursion.	CO2	PO1	<b>05</b>
	b)	Write a code snippet to demonstrate how insertion and deletion of elements can be done for a set of people standing to withdraw an amount at an Automated Teller Machine queue.	CO2	PO2	<b>08</b>
	c)	Write a C code to simulate the working of circular queue using an array to show insert, delete and display operations.	CO2	PO2	<b>07</b>
		<b>UNIT - IV</b>			
5	a)	i) Define a binary tree with a tree depiction to mark Root, Internal Node, External Node, height, level and depth. ii) Illustrate a complete binary tree with a suitable example.	CO2	PO1	<b>10</b>
	b)	Write a program to demonstrate the working of Binary Search Tree Traversals.	CO2	PO1	<b>10</b>
		<b>OR</b>			
6	a)	What is Threaded Binary Tree? How it is different from BST?	CO2	PO1	<b>04</b>
	b)	Construct a Binary Tree when the following Traversals are given: (i) Preorder: A B D I J C E K L M N P Inorder: I J D B C E A L N P M K  (ii) Inorder: P N R V Q M S U T O Postorder: P V R Q N U T S O M	CO2	PO2	<b>08</b>
	c)	Write a function Create_BinaryTree() in a C program.	CO2	PO2	<b>08</b>
		<b>UNIT - V</b>			
7	a)	What is AVL tree? Highlight the balance factor properties and rotations for an AVL tree.	CO3	PO1	<b>10</b>
	b)	What is Red Black tree? List and explain the properties of Red Black tree.	CO3	PO1	<b>10</b>

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