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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**

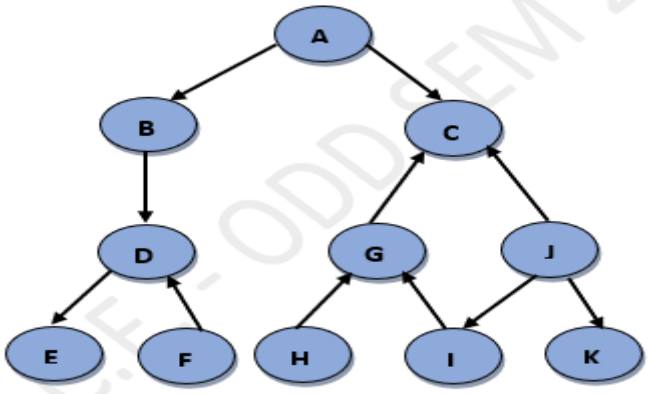
Branch: Computer Science and Engineering **Duration: 3 hrs.**

Course Code: 23CS3PCDST / 22CS3PCDST / 19CS3PCDST **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.

		UNIT - I	CO	PO	Marks
1	a)	Differentiate between data and information. Explain how data structures differ from file organizations.	CO2	PO2	**6**
	b)	Explain the concept of structures in programming languages with an example.	CO1	PO1	**4**
	c)	Convert the following Infix expression to Postfix: **(A + B) * C - (D / E)** Show the stack contents at each step iteration.	CO2	PO2	**10**
		OR			
2	a)	Describe in detail about various classification of Data structures.	CO1	PO1	**6**
	b)	Explain the purpose of pointers in programming languages.	CO1	PO1	**4**
	c)	Write a program to implement a stack using an array. Include push pop and display operations.	CO3	PO3	**10**
		UNIT - II			
3	a)	Write a program to implement Linear queue operations using array.	CO3	PO3	**10**
	b)	Create a Singly linked list and write a program to reverse a Singly linked list.	CO3	PO3	**10**
		OR			
4	a)	Write a program to implement the following operations on Singly linked list considering all possible cases. **i.** Insert at beginning **ii.** Insert at end **iii.** Delete a node whose value is given **iv.** Search for the given value	CO3	PO3	**10**
	b)	Write a program to perform the insert, delete and display operations in a Circular queue.	CO3	PO3	**10**

			UNIT - III			
	5	a)	Compare and contrast Singly linked list, Doubly linked list and Circular linked list.	*CO2*	*PO2*	**8**
		b)	Implement the following operations on a Circular linked list: **i.** Insert at beginning **ii.** Insert at end **iii.** Delete a node whose value is given **iv.** Search for a given value **v.** Display the content of the list	*CO3*	*PO3*	**12**
			OR			
	6	a)	Compare and contrast array and linked list implementations of Stack data structure. Discuss the pros and cons in each method.	*CO2*	*PO2*	**8**
		b)	Write a program to perform polynomial addition using Linked list.	*CO3*	*PO3*	**12**
			UNIT - IV			
	7	a)	Demonstrate the Inorder, Preorder and Postorder traversal mechanisms in binary tree with an example.	*CO1*	*PO1*	**10**
		b)	Develop a program to construct a binary search tree and display the elements.	*CO3*	*PO3*	**10**
			OR			
	8	a)	Differentiate between Breadth First Search and Depth First Search graph traversal techniques. Write an algorithm for the BFS traversal.	*CO2*	*PO2*	**10**
		b)	Apply DFS traversal technique to find traversal for the following graph. Show the steps with the appropriate data structure.  Write a program to implement Depth First search traversal.	*CO3*	*PO3*	**10**
			UNIT - V			
	9	a)	Define hashing technique. Discuss the importance of Hash functions. Discuss how to implement a hash table with an example.	*CO1*	*PO1*	**8**

		b)	Construct a Hash table for the following numbers: **{111, 31, 56, 127, 89, 167, 891, 231, 415, 213, 421, 313}** Show how collision is resolved using Linear Probing and design a program for implementing the same. **Hash Function: H(Key)=Key mod 13**.	*CO1*	*PO1*	**12**
			OR			
	10	a)	Describe the collision in hashing technique. Discuss about the Open addressing method and Separate chaining method with example.	*CO1*	*PO1*	**8**
		b)	Demonstrate the various collision resolution techniques with example.	*CO1*	*PO1*	**12**

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