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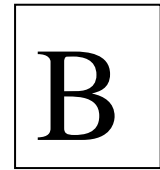
SNS College of Technology, Coimbatore-35.
(Autonomous)

B.E/B.Tech- Internal Assessment Examination -I
Academic Year 2023-24(ODD)

Third Semester

Common to IT, AI&ML and CSE

19ITT201- Data Structures



Time: 1^{1/2} Hours

Maximum Marks: 50

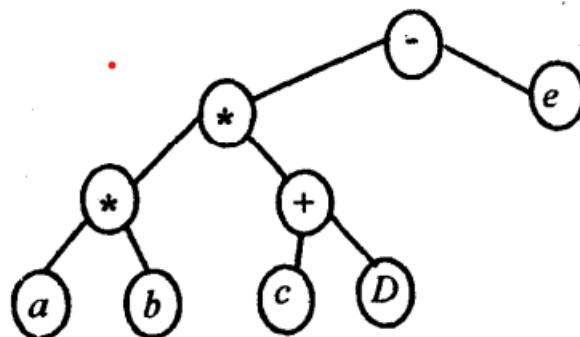
Answer All Questions

PART - A (5 x 2 = 10 Marks)

- | | CO | Blooms |
|--|-----------|---------------|
| 1. Define Data structure. List different types of Data Structures with example. | CO1 | Rem |
| 2. Identify the types of Data Structures suitable for the following scenarios
Scenario 1: Representing the list of Names of 10 students in a class
Scenario 2: Representing the following items: emp_no, emp_name, emp_address, emp_sal, emp_age | CO1 | Und |
| 3. What is balance factor? How does it effectively supports for making height balanced tree? | CO2 | Und |
| 4. When does a binary tree become binary search tree? | CO2 | Und |
| 5. Justify how Stack ADT works effectively for reversing a number. | CO1 | Und |

PART – B (2x13 = 26 Marks & 1x14=14 Marks. Total: 40 marks)

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|--|---|-----|-----|
| 6. (a)(i) Give the Prefix, infix and postfix expression corresponding to the following tree as shown below | 8 | CO1 | App |
|--|---|-----|-----|



- | | | | |
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| (ii) Show that the maximum number of nodes in the binary tree of height h is $2^{(h+1)} - 1$ | 5 | CO1 | App |
|--|---|-----|-----|

(or)

- | | | | |
|--|---|-----|-----|
| (b)(i) Explain how to Insert a node in the 5 th position of a singly linked list and remove a node from the start of a singly linked list | 7 | CO1 | App |
|--|---|-----|-----|

(ii)	Construct an expression tree for the following	6	COI	App
	a b c * + d e f + * +			
7. (a)	Construct a Binary Search Tree (BST) from the post order sequence 8, 12, 10, 16, 25, 20, 15. Insert the values 4, 6, 17, 18 and 19 into the newly constructed Binary Search Tree.	13	CO2	Und
	(or)			
(b)	Explain the need for rotation in an AVL tree and describe single rotation with examples and diagrams as necessary	13	CO2	Und
8. (a)	Consider the following stack of items where stack is allocated N = 8 memory cells. STACK: 2,3,5,8, -, -, -, - (- means empty cell). Describe stack as the following operation takes place.	14	CO1	App
	<ul style="list-style-type: none"> • POP (STACK, ITEM) • POP (STACK, ITEM) • POP (STACK, ITEM) • PUSH (STACK, 43) • PUSH (STACK, 23) • PUSH (STACK, 12) • PUSH (STACK, 11) • POP (STACK, ITEM) 			
	(or)			
(b)	Make a BST for the following sequence of numbers. 45,32,90,34,68,72,15,24,30,66,11,50,10 Traverse the BST created in Pre order, In order and Post order.	14	CO2	App