R18

HALL TICKET NUMBER

PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE
(AUTONOMOUS)
II B.TECH I SEMESTER END REGULAR/SUPPLEMENTARY EXAMINATIONS, JAN - 2023
DATA STRUCTURES
(Common to ECE,CSE,CSIT,IT,CSE(IOTCSBT),AIDS, AIML Branches)

Time: 3 hours   Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)
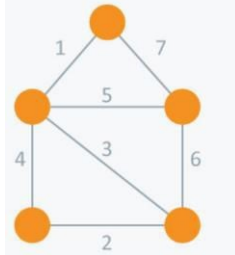
PART-A
Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1	a)	Discuss time and space complexities with an example.	[2M]	1	2
	b)	Define the stack ADT. List the applications of the stack.	[2M]	2	2
	c)	Write pseudo code to reverse the singly linked list.	[2M]	3	3
	d)	Mention the properties of binary search tree. Give an example.	[2M]	4	2
	e)	What are the various rotations on the AVL tree? Explain with an example.	[2M]	5	2

PART-B
Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL
		UNIT-I			
2.	a)	Illustrate the asymptotic notations with suitable examples.	[5M]	1	2
	b)	Write an algorithm to perform binary search. Analyze its time complexity	[5M]	1	2
		OR			
3.	a)	Write a recursive algorithm to find the sum of the first 'n' integers and derive its time complexity.	[5M]	1	2
	b)	Write an algorithm to perform the Fibonacci search. Illustrate.	[5M]	1	2
		UNIT-II			
4.	a)	Write an algorithm to perform selection sort. Analyze its time complexity.	[5M]	2	2
	b)	Arrange the following list of elements in ascending order using insertion sort. 40,10,30,50,20,70,10,90,60,80	[5M]	2	3
		OR			
5.	a)	Write an algorithm for basic operations of the stack.	[5M]	2	2
	b)	Write an algorithm to convert infix expression to postfix expression.	[5M]	2	2
		UNIT-III			
6.		Write the program to implement the basic operations of the simple queue. List the applications of the queue.	[10M]	3	3
		OR			
7.		Illustrate an algorithm to insert a new node at the beginning, at the middle position, and at the end of the doubly linked list.	[10M]	3	2
		UNIT-IV			
8.	a)	Write in-order, pre-order, and post-order traversals for a binary tree with an example.	[5M]	4	3
	b)	Write an algorithm to discuss the searching, and insertion operations of a binary search tree.	[5M]	4	2
		OR			

9.		Insert the following sequence of elements into an AVL tree, starting with an empty tree 10,20,15,25,30,16,18,19 Perform the required rotations.	[10M]	4	3
		UNIT-V			
10.		Write an algorithm to perform the Breadth-First Search technique on the graph. Illustrate with an example.	[10M]	5	2
		OR			
11.		Write the prim's algorithm to find the minimal spanning tree for the given graph. Find the minimal spanning tree for the following graph. 	[10M]	5	3

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