

Code: 23CS3201, 23IT3201, 23AM3201, 23DS3201

**I B.Tech - II Semester – Supplementary Examinations  
DECEMBER 2024****DATA STRUCTURES  
(Common for CSE, IT, AIML, DS)****Duration: 3 hours****Max. Marks: 70**

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**Note:** 1. This question paper contains two Parts A and B.

2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.

3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.

4. All parts of Question paper must be answered in one place.

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**PART – A**

1. a)	Differentiate linear data structure and non-linear data structure.
b)	Differentiate Big – O and Theta notations.
c)	Give the structure of node in doubly linked list.
d)	In a single linked list if the address of last node is stored in the next field of first node, then what happens?
e)	What is stack under-flow and over-flow? Does this occur in pointer implementation of stack?
f)	List applications of stack.
g)	List the properties of queue.
h)	What are rear and front pointers in the context of queue data structure?
i)	Define a tree.
j)	What is collision in hashing? How it is detected?

## PART – B

					Max. Marks
<b>UNIT-I</b>					
2	a)	Discuss the implementation of linear search and also discuss about complexity of this implementation.			5 M
	b)	Apply Insertion sort on the following elements : 4 , 1 , 6, 2, 5, 10, 3.			5 M
<b>OR</b>					
3	a)	Develop a code for implementation of binary search.			5 M
	b)	Apply bubble sort method on the following elements: 20,10,5,15,35,25,40,1.			5 M
<b>UNIT-II</b>					
4	a)	Consider a single linked list with n nodes where first node is pointed by a pointer called head. Develop a function which returns the position of the node when a node value is given.			5 M
	b)	Discuss about deletion of a node in double linked list.			5 M
<b>OR</b>					
5	a)	Explain the operations insert a node, delete a node, search a node and print linked list with respect to single linked list implementation.			5 M
	b)	Discuss about insertion of a node in Circular linked list.			5 M
<b>UNIT-III</b>					
6	a)	Explain push() and pop() functions of stack data structures with array implementation.			5 M

	b)	Explain how to convert a infix expression to post fix expression.	5 M
<b>OR</b>			
7	a)	In the linked implementation of stack, explain push() and print the elements of stack operations.	5 M
	b)	You are given a stack and a string. Develop a code to reverse the string using stack.	5 M
<b>UNIT-IV</b>			
8	a)	Explain pointer implementation of queue data structure.	5 M
	b)	How do we implement a queue using stack?	5 M
<b>OR</b>			
9	a)	Show the circular implementation of queue, where the front and rear will point if: <ul style="list-style-type: none"> <li>i. There is only one element in the queue.</li> <li>ii. There are 4 elements in the queue.</li> </ul>	5 M
	b)	Discuss about insert and delete an element in the queue using array implementation.	5 M
<b>UNIT-V</b>			
10	a)	Construct binary search tree with the following keys: 10,5,15,2,16,8,3,45,14,1,7,19,12.	5 M
	b)	Assume a table has 10 slots. Using chaining, insert the following elements into the hash table. 65,47,66,18,72,43,3,6,17,10,5,64,84,16,71 and 15 are inserted in the order. Consider Hash function: $h(k) = k \text{ mod } m$ , where $m=10$ .	5 M
<b>OR</b>			

11	a)	Explain different collision resolving techniques with an example.	5 M
	b)	Construct Binary search tree with the following keys: 10,4,15,17,2,6,1,23,9,5,14,16. Apply in-order, pre-order and post-order traversal techniques on constructed Binary search tree. Explain what kind of transformations needs to apply if we want to delete node with key 6.	5 M