VR20 Reg. No: | | | | | | | | | | |

VELAGAPUDI RAMAKRISHNA

SIDDHARTHA ENGINEERING COLLEGE

(AUTONOMOUS)

II/IV B.Tech. DEGREE EXAMINATION, NOVEMBER-2024

Third Semester

INFORMATION TECHNOLOGY

20IT3303 DATA STRUCTURES

Time: 3 hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part - B

Answer to any single question or its part shall be written at one place only

PART-A

10 x 1 = 10M

1.	a.	Define ADT (Abstract Data Type).	**(CO1 K1)**
	b.	What are the applications of stack?	**(CO1 K2)**
	c.	Define double ended queue.	**(CO2 K2)**
	d.	Mention the demerits of linked list.	**(CO2 K2)**
	e.	Define sibling?	**(CO3 K2)**
	f.	What is AVL Tree?	**(CO3 K2)**
	g.	Define B+ Tree.	**(CO4 K2)**
	h.	What are the Limitations of Hashing?	**(CO4 K2)**
	i.	What is divide-and-conquer strategy?	**(CO1 K2)**
	j.	List the nonlinear data structures.	**(CO1 K1)**

PART-B

4 x 15 = 60M

UNIT-I

2. a. Write an algorithm to implement merge sort with suitable example. **(CO1 K2) 7M**

   b. Explain the procedure to evaluate postfix expression. Evaluate the following Postfix expression 7 3 4 + - 2 4 5 / + * 6 / 7 + **(CO1 K3) 8M**

(or)

3. a. Write an algorithm to implement selection sort with suitable example. **(CO1 K2) 7M**

   b. Write the algorithm for converting infix expression to postfix (polish) expression? **(CO1 K3) 8M**

UNIT-II

4. a. Explain the array implementation of queue ADT in detail? **(CO2 K3) 7M**

   b. What is a Circular Linked List? Write an algorithm for insertion and searching an element into a circular linked list. **(CO2 K3) 8M**

(or)

5. a. What is Queue? Explain its operation and implement it using array. **(CO2 K3) 7M**

   b. Write an algorithm for Push and Pop operations on Stack using Linked list. **(CO2 K3) 8M**

UNIT-III

6. a. Construct the binary tree of the following data 25, 30, 10, 9, 62, 5, 18, 43, 53. **(CO3 K3) 7M**

   b. Write an algorithm of single rotation and double rotation of an AVL tree. **(CO3 K3) 8M**

(or)

7. a. What is a Binary Tree? Explain Binary Tree Traversals. **(CO3 K3) 7M**

   b. Write an algorithm to delete an element from the binary search tree. **(CO3 K3) 8M**

UNIT-IV

8. a. Explain about B trees with suitable algorithm. **(CO4 K2) 7M**

   b. Construct the Max heap of the following elements {80, 10, 40, 20, 90, 30, 50, 70, 60,100} **(CO4 K2) 8M**

(or)

9. a. Implement an algorithm to insert and delete the element in B+ tree. **(CO4 K2) 7M**

   b. What are the advantages and disadvantages of various collision resolution strategies? **(CO4 K2) 8M**

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