Sub Code: BCST303 **ROLL NO……..……..**

III SEMESTER EXAMINATION, 2023 – 24

II[nd] year B.Tech. – Computer Science & Engineering

DATA STRUCTURE

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) Define algorithm and its characteristics and also define best case, average case and worst case for analyzing the complexity of a program. b) Give brief description about the priority queues. write an algorithm to implement priority queue c) List the various asymptotic notations? Explain Big Oh notations along with suitable diagram d) Apply suitable data structure to covert infix to postfix expression: K + L – M*N + (O^P) * W/U/V * T + Q e) Given A=[10,30,40,80,200,700,927,1000,1410,1578] Here N=10 , Value = 6 Find the Time Complexity in terms of (a) Linear Search Algorithm (b) Binary Search Algorithm f) What is stack? Why it is known as LIFO? Write algorithm of PUSH and POP operation on stack	5x4=20
Q 2.	Answer any four parts of the following. a) The order of nodes of a binary tree in inorder and postorder traversal are as follows: In order : B, I, D, A, C, G, E, H, F. Post order: I, D, B, G, C, H, F, E, A. (i) Draw the corresponding binary tree. (ii) Write the pre order traversal of the same tree. b) Write a program in c language to sort the sequence 13, 11, 74,37,85,39,22,56,25 using Insertion sort c) Write an algorithm for Quick sort. Use Quick sort algorithm to sort the following elements: 2, 8, 7, 1, 3, 5, 6, 4 d) Discuss doubly linked list. Write an algorithm to insert a node after a given node in singly linked list. e) What is circular Queue? Write a C code to insert an element in circular queue? f) What is queue? Why it is known as FIFO? Write an algorithm to delete_last and delete _random an element from a simple queue.	5x4=20
Q 3.	Answer any two parts of the following. a) Define an AVL tree. Obtain an AVL tree by inserting one integer at a time in the following sequence. 150, 155, 160, 115, 110, 140, 120, 145, 130, 147, 170, 180. Show all the steps. b) (i) What is Graph? Explain matrix and linked list representation of a graph. Also give the application of Graph (ii) Differentiate depth-first search and breadth-first search traversal of a graph with	10x2= 20

	suitable examples. c) Construct a B-Tree of order 5 with the following sequence of integer. 10,90,20,80,30,70,40,60,50,35,55,15,25,5,75,85,95,45,100,22,12	
Q 4.	Answer any two parts of the following. a) Explain ADT and Concrete data structure with examples? b) Write short notes on (i) Minimum Spanning Tree (ii) Hashing c) What is Bubble Sort? How it is different from Selection Sort? Explain how the following list can be sorted using the bubble sort algorithm: 13,7,9,32,76,96,100,22,88,6,17	10x2= 20
Q 5.	Answer any two parts of the following. a) What do you mean by min heap? Create a min heap for the following data: 10,30,16,12,25,30,14,2,7 After creation of min heap, perform one delete operation and represent final min heap b) Write an algorithm to reverse a single linked list c) Create a Binary Search Tree for the following data and do in-order, Pre-order and Post-order traversal of the tree. 50, 60, 25, 40, 30, 70, 35, 10, 55, 65, 5	10x2= 20

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