

School of Computer Science Engineering and Information Systems

Fall Semester 2023-2024

Continuous Assessment Test – II

Programme Name & Branch: B.Tech

Course Name & code: BITE201L- Data Structures and Algorithms

Class Number (s): VL2023240102599, VL2023240102586, VL2023240102572, VL2023240102939

Faculty Name (s): Dr. Vijayan E, Dr. Agilandeewari L, Dr. Nancy Victor, Dr. Ramesh P S

Exam Duration: 90 Min.

Maximum Marks: 50

Q.No.	Question	Max Marks
1.	Consider the following set of integers: 7, 11, 3, 10, 17, 23, 1, 4, 21, 5 These elements are to be sorted in descending order using the Insertion Sort mechanism. a. Write the partially sorted list after completing three passes. b. How many passes are required to sort this array? Explain. c. Identify the cases where an insertion sort mechanism would be preferred over other sorting techniques	5 2 3
2.	a. Identify the technique that uses the divide-and-conquer strategy to sort a given set of elements. Write the algorithm for the same. b. Use this technique to sort the following set of numbers. Show every step in detail. 1, 6, 3, 2, 7, 5, 8, 4	5 5
3.	a. Convert the following infix expression to its postfix form. $(a+b)*(c*(d+e))$ b. Using the infix and postfix expressions, draw the expression tree. Explain each step in detail. c. Find the post order traversal of the expression tree.	3 4 3



4.	a. Identify whether the following tree is a Binary Search Tree or not. Justify your answer. <pre> graph TD 1((1)) --- 7((7)) 1 --- 9_1((9)) 7 --- 2((2)) 7 --- 6((6)) 6 --- 5_1((5)) 6 --- 11((11)) 9_1 --- 9_2((9)) 9_2 --- 5_2((5)) </pre> b. Insert the following sequence of elements into a Binary Search Tree, starting with an empty tree: 0, 12, 5, 4, 20, 8, 7, 15 and 13 Explain each step in detail. c. Delete the element 12. d. Delete the element 8.	2
5.	a. Identify the situations where a linear search is preferred over binary search and vice versa. b. How does the number of items in a collection affect the performance of a linear search? Explain with an example. c. Write the pseudocode for linear search.	4 3 3

2 7 8

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Root Node
0, 5, 2, 8, 12, 13, 15, 20

