



SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2025-2026

Programme Name & Branch : M.Tech (Integrated) CSE & Spl.
Course Code and Course Name : IACSI101 - Data Structures and Algorithms
Faculty Name(s) : Dr. KARTHIK K, Dr. AYYASAMY S, Dr. SAYAN SIKDER
Class Number(s) : VL2025260501861, 1860, 1947
Date of Examination : 20-03-2026
Exam Duration : 90 minutes
Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyze, 5 - Evaluate, 6 - Create)
- Course Outcomes
CO3 - Analyze the various searching, sorting and hashing algorithms.
CO4 - Implement all operations in basic and advanced tree structures.
CO5 - Experiment the graph algorithms for impactful real-world problem-solving.

Q. No	Question	Module	Marks	CO	BL
1.	a) An array $A = \{38, 27, 43, 3, 9, 82, 10\}$ is to be sorted using Merge Sort. Illustrate the entire process using a recursion tree that represents the splitting and the merging process. b) The merge function merges two sorted arrays into one sorted array, should it be also considered as a sorting algorithm. Justify with an example.	3	5+5	CO1	3
2.	Using the hash function $h(k) = k \bmod 13$, insert the keys 12, 24, 36, 49, 59, 72 and 84 into a hash table. Resolve the collisions that occur using both linear probing and double hashing methods. Compare the performance of these two methods while searching for an element in the hash table and determine which method is more effective.	3	10	CO1	3
3.	a) Construct the Binary tree from given Traversals. Inorder Traversal: $\{4, 2, 1, 7, 5, 8, 3, 6\}$ Postorder Traversal: $\{4, 2, 7, 8, 5, 6, 3, 1\}$ b) Build an expression tree for the following infix expression: $(a+b)-c/d-(e*f)/g*h$	4	5+5	CO2	3
4.	Assume you are given an array of integers representing the ages of people in a group: $[25, 32, 40, 19, 60, 55, 22]$. You need to sort this array in ascending order using heap sort with a min heap.	4	10	CO2	3



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	Additionally, after sorting the array, two new people join the group with ages 35 and 18. You need to insert these two new ages into the sorted array while maintaining the sorted order. How would you perform heap sort on the given array using a min heap? Explain and illustrate. How would you insert the two new ages into the sorted array while maintaining the sorted order? Explain and illustrate.				
5.	Discuss and demonstrate how Dijkstra's algorithm can be applied to the following scenario: Imagine you are a delivery driver in a city with 9 locations. The locations are connected by roads with different travel times. You need to deliver a package from location 'a' to location 'h' as quick as possible. Estimate the total time required to deliver the package. The travel times between locations are shown in the graph below: <pre>graph TD a((a)) --- 4 b((b)) a --- 2 c((c)) b --- 10 d((d)) c --- 3 e((e)) d --- 4 e e --- 5 g((g)) f((f)) --- 11 d f --- 2 g g --- 4 h((h)) f --- 8 h</pre>	5	10	CO3	3
