REG.NO.:

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - II
WINTER SEMESTER 2024-2025

SLOT: B1+TB1

Programme Name & Branch	: M.Tech Integrated & DS, CS
Course Code and Course Name	: CSI2002 – Data Structures and Algorithm Analysis
Faculty Name(s)	: Dr. S. Murali, Dr. Anindita Kundu, Dr. Lijo V.P, Dr. N. S. Nithya
Class Number(s)	: VL2024250501912, VL2024250501917, VL2024250501920 VL2024250501915
Date of Examination	: 17.03.2025
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 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
  CO2. Select the suitable data structures for storage and management of different types of data.
  CO4: Analyse algorithms asymptotically and compute the performance analysis of algorithms with the same functionality.

Q. No	Question	M	CO	BL
1.	a) Give the conditions for finding the last node in singly linked list and circular linked list. [4 Marks] b) Write an algorithm for inserting an element in a singly linked ordered list. [6 Marks]	10	CO2	BL2
2.	a) Compare and contrast linear queue and circular queue based on efficient use of storage, and error conditions. [3 Marks] b) Draw the circular queue of size 4. Illustrate the working for the following commands (in the given order) over that circular queue with a neat diagram. Also give the values of the variables FRONT and REAR on execution of each command; [7 Marks] ENQUEUE (10); ENQUEUE (15); ENQUEUE (20); DEQUEUE; ENQUEUE (30); ENQUEUE (35); ENQUEUE (45);	10	CO2	BL3

Command	Circular queue	Front	Rear
Initially Queue is empty	Expected to draw the appropriate circular queue here	-1	-1

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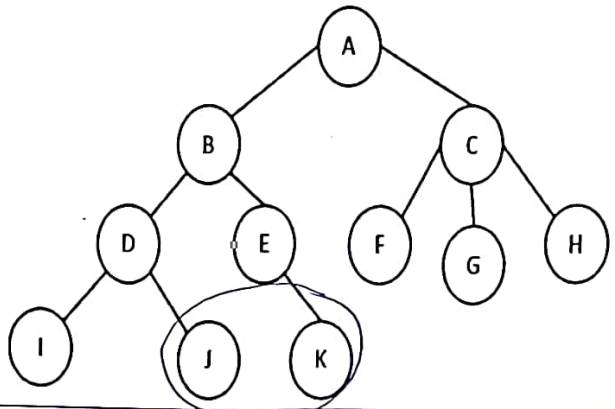
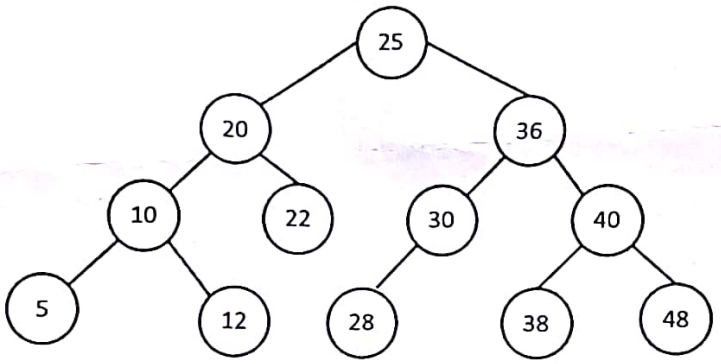
3.	a) A + B * C / D – E. Draw the expression Tree for the given expression and perform post order traversal. [5 Marks] b) Convert the given tree to an equivalent binary tree, give each and every step of the conversion. [5 Marks] 	10	CO2	BL3
4.	Perform deletion of nodes 25, 30, and 12, one after the other and Insertion of nodes 15, 35, and 24 on the given Binary Search Tree. Show each and every step. 	10	CO2	BL3
5.	a) In the sorting algorithms each phase fixes an element in its proper position in the array. Find previous and next phase array status for the following sorting algorithms with the given input 1, 3, 2, 6, 4, 7, 8, 5. [6 Marks]	10	CO4	BL4

Type of Sorting	Current Phase	Previous Phase	Next Phase
Bubble Sort	1 2 3 4 6 5 7 8		
Insertion Sort	1 2 3 4 6 7 8 5		
Selection Sort	1 2 3 4 6 7 8 5		

b) Show the complexity of Merge sort based on this example.
Set: 10, 31, 22, 16, 14, 71, 83, 45. [4 Marks]