VIT
Vellore Institute of Technology

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2025-2026

Programme Name & Branch	**: B.TECH IT**
Course Code and Course Name	**: BITE201L - Data Structures and Algorithms**
Faculty Name(s)	**: Dr. Mythili N, Dr. Nancy Victor, Dr. Tamil Priya B, Dr. Dharmendra Singh Rajput**
Class Number(s)	**: VL2025260103029, VL2025260103025, VL2025260103040,**
Date of Examination	**: 06-Oct-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

  CO 1: Identify user defined data types, linear data structures for solving real world problems.

  CO 2: Analyse and derive time and space complexity for algorithms designed.

  CO 3: Illustrate various techniques for searching, sorting and hashing

  CO 4: Write modular programs on nonlinear data structures and algorithms for solving engineering problems efficiently.

Q. No	Question	M	CO	BL
1	Determine the time complexity of the following code segments.		2	4

	a)
	for(i=0;i<n;i++){
	for(j=0;j<n;j++){
	for(k=0;k<n;k++){
	x=i+j+k;
	}}}
		3		

	b)
	fun()
	{
	int i,j;
	for(i=1;i<=n;i++){
	for(j=1;j<=n;j=j+i){
	printf("DSA");
	}}}
		3		

	c) Write the recurrence relation for the following function and find its time complexity using the Master's method.
	void fun(int n)
	{
	if(n<=1) return;
	fun(n/2);
	fun(n/2);
	}
		4		

VIT
Vellore Institute of Technology

REG.NO.:

SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS
CONTINUOUS ASSESSMENT TEST - II
FALL SEMESTER 2025-2026

SLOT: B1+TB1

2.	A music player stores songs in a list so that after the last song, the first one plays automatically. Identify which type of linked list will be best suited in such a scenario and write the pseudocode for the following tasks: a) Insert songs into the playlist. b) Traverse and display the playlist continuously. c) Delete a given song from the playlist.	10	1	2
3.	a) Consider the following set of integers: 32, 51, 27, 23, 85, 66, 23, 13, 57 The elements are to be sorted using the Bubble Sort mechanism. Write the output list after completing the first pass of the Bubble Sort. Analyze the time complexity of the Bubble Sort technique.	5	3	3
	b) Check whether a given element is present in the sorted list from 3a. Use Binary search for the same and show each step in detail.	5		
4.	Explain why Shell Sort is considered an improved version of Insertion Sort? Also, discuss the importance of gap sequences in shell sort. Show the working of Shell sort on the following input to sort them in ascending order, using the increments {1, 3, 7}. 9, 8, 7, 6, 5, 4, 3, 2, 1	10	3	3
5.	A binary tree has the following traversals: Inorder: [K, F, L, D, M, B, N, A, G, C, H] Postorder: [K, L, F, M, D, N, B, A, H, C, G] a) Construct the binary tree from the given traversals and verify the result by writing its Preorder traversal. b) Re-draw the tree after deleting the node G.	10	4	5