



VIT
Vellore Institute of Technology
(Instituted to be University under section 3 of UGE Act 1956)

REG.NO.:

SLOT: F1+TF1

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

Programme Name & Branch : B.Tech (All Branches)
Course Code and Course Name : BCSE 202L, Data Structures and Algorithms
Faculty Name(s) : Prof. Adrija Bhattacharya, Prof. Arpita Ghosh
Class Number(s) : VL2025260502578, VL2025260502581
Date of Examination : 01-02-2026
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 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcomes (Type the CO statements covered in this question paper. Use the CO number as per the syllabus copy)
 1. Understand the fundamental analysis and time complexity for a given problem.
 2. Articulate linear, non-linear data structures and legal operations permitted on them.
 3. Identify and apply suitable algorithms for searching and sorting.

Q. No	Question	Module	Marks	CO	BL
1.	Calculate the time complexity of the given functions. Describe the best case and worst case for each of the functions. (i) void ABC(int arr[], int n) { for (int i = 0; i < n-1; i++) { for (int j = 0; j < n-i-1; j++) { if (arr[j] > arr[j+1]) { int temp = arr[j]; arr[j] = arr[j+1]; arr[j+1] = temp;}}} } (ii) int PPP(int arr[], int low, int high, int key) { while (low <= high) { int mid = low + (high - low) / 2; if (arr[mid] == key) return mid; if (arr[mid] < key) low = mid + 1;	1	5+5=10	1	BL 5



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	<pre> else high = mid - 1; } return -1; } </pre>				
2.	a) Prove $3n^2 + 2n + 1 = O(n^2)$ b) Analyse the following pairs of functions and find the which one is better and identify the underlying constraints. i) $A(n) = 5n \log n$ vs $B(n) = 25n$ ii) $A(n) = 2^n$ vs. $B(n) = n^4$	1	4+6	1	BL4
3.	a) Consider the expression $A*B/(C*(D+E)-F)$, with $A=48$, $B=2$, $C=3$, $D=5$, $E=4$, $F=21$, then i) Convert to postfix. ii) Evaluate using stack for both the cases show step-by-step stack operations b) Write a pseudocode to delete first occurrence of value X from singly linked list. Handle all possible cases.	2	5	2	BL2
4.	a) For a circular queue with size 4 perform- i) Insert 5 elements: 10,20,30,40,50 (show overflow handling). ii) Delete 2 elements. iii) Insert 60. iv) Display queue contents with positions. b) Write pseudocode to reverse array contents in-place using two pointers.	2	5	2	BL4
5.	i) Write pseudocode to find the minimum in the rotated array 4, 5, 6, 7, 0, 1, 2. Illustrate how the strategy works for this array. ii) Describe the time complexity of Binary Search by solving appropriate recurrence relation using any method.	3	6+4=10	3	BL3
