Final Assessment Test – June 2023

VIT

Vellore Institute of Technology

Course: **BCSE202L** - **Data Structures and Algorithms**

Class NBR(s): **5837/5840/5842/5847/5849/5851/5855/ 6304/6331**

Slot: **A1+TA1**

Time: **Three Hours**

Max. Marks:

KEEPING MOBILE PHONE/SMART WATCH, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACT

Answer ALL Questions

(10 X 10 = 100 Marks)

1. a) Find the asymptotic complexity for the function T(n) by using Recursive **[5]** Tree Method, where $T(n) = 2T\left(\frac{n}{4}\right) + \sqrt{n}$

    b) Compute the time complexity of the program by showing all the steps **[5]** involved.

```
void function(int n) {
        int i, j, k , count =0;
        for(i=n/2; i<=n; i++)
                for(j=1; j + n/2<=n; j= j+1)
                        for(k=1; k<=n; k= k * 2)
                                count++;

}
```

2. a) Reversing elements of a stack using push and pop operations only. Write a **[4]** Pseudocode for find its time and space complexity.

    b) Suppose there are two singly linked lists both of which intersect at some **[6]** point as shown in the picture below. The head (or start) pointers of both the lists are known, but the intersecting node is not known. List1 may have n nodes before it reaches the intersection point, and List2 may have m nodes before it reaches the intersection point where m and n may be m = n, m < n or m > n. Give a Procedure for finding the intersection node. Give its time and space complexity. (Note: In the below image the? node is the intersection node).

3.