Final Assessment Test – June 2023

VIT® Vellore Institute of Technology

Course: BCSE202L - Data Structures and Algorithms

Slot: B1+TB1

Class NBR(s): 7614

Max. Marks: 100

Time: Three Hours

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

Answer ALL Questions

(10 X 10 = 100 Marks)

1. a) Define the necessity of Asymptotic notation in the study of an algorithm. Describe commonly used Asymptotic notations and give their significance. [8]

   b) Analyse the time complexity of the following code snippet. [2]

```
#include<stdio.h>
int power(int x,  int y)
{
    if (y == 0)
     return 1;
      else if (y%2 == 0)
       return power(x, y/2)*power(x, y/2);
        else
         return x*power(x, y/2)*power(x, y/2);
    }
    int main()
    {
    int x = 2;  int y = 3;
    printf("%d", power(x, y));
      return 0;
    }
```

2. Prove that the average case time complexity of Quick sort algorithm is T(n) = O(nlogn).

3. Inscribe infix to postfix conversion algorithm and apply the same to convert the given infix expression to a postfix expression. Show the stack trace for the given Infix expression.

   ((a + b) * c – (d – e))/ (f + g)

4. Write an algorithm for inserting elements at all possible positions in a Doubly Linked List. Substantiate your answer using an example.