VIT
Vellore Institute of Technology

School of Computer Science and Engineering

Winter Semester 2023-2024

Continuous Assessment Test – 1

Programme Name &Branch: B.Tech (BCB/BCE/BCI/BCT/BDS/BKT) **Slot : A2+TA2**

Course Name & code: BCSE204L – Design and Analysis of Algorithms

Class Number (s): ALL

Faculty Name (s): ALL

Exam Duration: 90 Min. **Max. Marks: 50**

General instruction(s): **ANSWER ALL THE QUESTIONS**

Q.No.	Question
1.	a) Demonstrate the iteration method to compute the asymptotic complexity for the following recurrence. $T(n) = 4T\left(\frac{n}{3}\right) + n^2$ **(5-Marks)**
	b) Use master's method to compute the asymptotic complexity for the following recurrences. In each case, identify the case of master method that it uses to compute the asymptotic complexity. **(5-Marks)** (a) $T(n) = 16T\left(\frac{n}{4}\right) + n^2$ (b) $T(n) = 3T\left(\frac{n}{3}\right) + n^{1/2}$
2.	Discuss how the greedy approach is used to solve optimization problems. Construct the frequency table of characters in "Hi! How are you?" in a non-decreasing order of frequency. Use Huffman code to find the code word for each character. **(10-Marks)**
3.	Define maximum sub-array sum problem. Find the series of contiguous elements that results in the maximum sub-array sum for the array given below. **(10-Marks)**

-2	-3	1	4	-1	3	5	-4	6	1

4.	Longest common subsequence (LCS) problem is the problem of finding the longest subsequence common to all sequences in a set of sequences .Consider the sequences "ACCGGTCGAGT" and "GTCGTTCGG". Find the length of the longest common subsequence using dynamic programming approach with the pseudocode for the same. **(10-Marks)**
5.	Given a set of non-negative integers S = {3, 34, 4, 12, 5, 2} and a sum 30, determine the subsets of S, whose sum is equal to 30 using backtracking. **(10-Marks)**