



## 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	Max Marks	CO	BL										
1.	a) Demonstrate the iteration method to compute the asymptotic complexity for the following recurrence. $T(n) = 4T\left(\frac{n}{3}\right) + n^2$	10	CO1	BL5										
	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. (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	CO2	BL3										
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. <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>-2</td><td>-3</td><td>1</td><td>4</td><td>-1</td><td>3</td><td>5</td><td>-4</td><td>6</td><td>1</td> </tr> </table>	-2	-3	1	4	-1	3	5	-4	6	1	10	CO2	BL4
-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	CO2	BL5										
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	CO2	BL4										