Computer Science and Engineering

Winter Semester 2022-2023

Continuous Assessment Test – 1

Programme Name &Branch : Btech(CSE) & Computer Science and Engineering

SLOT : B2+TB2

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

Class Number (s): VL2022230504123

Faculty Name (s): Sanjiban Sekhar Roy

Exam Duration: 90 Min.

Maximum Marks: 50

Answer ALL questions(5X10=50 Marks)

Q.No.	Question	Max Marks	CO	BL
1.	a) Suppose on a single machine four jobs with profit values (100, 10, 15 and 27) and their respective deadline unit values (2, 1, 2, 1) are given. Calculate the different feasible solutions using greedy methd to complete the jobs with optimal solution.	(Marks 5)	CO2	BL
	b) Show the proof of correctness of the following algorithm.	(Marks 5)		
	INSERTION-SORT(A) 1 for $j = 2$ to $A.length$ 2 $key = A[j]$ 3 // Insert $A[j]$ into the sorted sequence $A[1..j-1]$. 4 $i = j-1$ 5 while $i > 0$ and $A[i] > key$ 6 $A[i+1] = A[i]$ 7 $i = i-1$ 8 $A[i+1] = key$			
2.	a)Multiply 1234 x 2326 using Karatsuba multiplication using divide and conquer strategy. Show all valid and invalid recursive calls(Showing recursion tree is a must).	(Marks10)	CO2	BL3

| 3. | A file contains the following characters with the frequencies as shown. If Huffman Coding(greedy) is used for data compression, determine the following: | (Marks 10) | CO1 | |

A file contains the following characters with the frequencies as shown. If Huffman Coding(greedy) is used for data compression, determine the following:

1. Huffman Code for each character
2. Average code length
3. Length of Huffman encoded message (in bits)

Characters	Frequencies
a	10
e	15
i	12
o	3
u	4
s	13
t	1

| 4. | Given two sequences
X = A B C B A D B
&
Y = B D C B A A
Find the longest common subsequence between X & Y, using dynamic programming. Show all steps in c table and b table. | (Marks 10) | CO1 | BL2 |

| 5. | Given the set of positive numbers {7,11,13,24} ,find if there is a subset for a given sum m=31 using backtracking technique. Discuss the significance of bounding function in the context of the above subset sum problem through the full state space tree and highlight the recursive calls on the tree. | (Marks 10) | CO2 | BL1 |