BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH (COGNIZANT) **SEMESTER : I**
BRANCH: CS **SESSION : MO/2022**

SUBJECT: CS531 DATA STRUCTURE AND ALGORITHMS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Prove that height of a binary Tree is lgn.	[5]	1	3
Q.1(b)	Solve the recurrence $T(n)=2T(n/3) + n^2$	[5]	1	3
Q.2(a)	Write an algorithm for conversion of infix to postfix expression and explain with an example.	[5]	2	3
Q.2(b)	Given a linked list with even and odd numbers, write an algorithm for making changes to the list in such a way that all even numbers appear at the beginning.	[5]	2	4
Q.3(a)	Write an algorithm to find the k^{th} smallest element in a Binary Search Tree.	[5]	3	3
Q.3(b)	Write an algorithm for the post order traversal of a Binary Tree and analyze it's time complexity.	[5]	3	3
Q.4(a)	Write an algorithm for finding the MST and analyze it's time complexity.	[5]	4	4
Q.4(b)	Discuss hashing and methods of collision handling with examples.	[5]	4	3
Q.5(a)	Write an algorithm for finding a shortest path from any node of a directed graph and analyze it's time complexity.	[5]	5	3
Q.5(b)	Write an algorithm for Quicksort and analyze it's time complexity. Explain with an example.	[5]	5	4

::::::16/03/2023::::::M