(Please write your Enrolment No. immediately) Enrolment No. 147

MID TERM EXAMINATION

B.TECH PROGRAMMES (UNDER AEGIS OF USICT)

Third semester, November 2023

Paper Code CIC – 209 **Subject: Data Structures**
Time: 1 ½ Hrs. **Max. Marks: 30**

Note: Attempt Q. No. 1 which is compulsory and any two more questions from remaining.

Q. No.	Question 1	Max. Marks	CO(s)
1(a)	What is data structure. Discuss different operations performed on it.	2	CO1
1(b)	Consider a two dimensional array A[5:14][10:20]. Find the total number of elements in an array A. Suppose Base Address (A) = 200 and there are w=4 words per memory cell. Determine the address of A [10] [10] using row major order.	2	CO2
1(c)	Explain the different Asymptotic notations.	2	CO1
1(d)	Explain sparse matrix and its representation.	2	CO2
1(e)	Construct a max heap using the following data elements 10, 20, 5, 30. Show heap after insertion of each element.	2	CO3
	Question 2		
2(a)	Convert the following expression into reverse polish notation using stacks: (A *B / (C ^ D)) + (E / F)	5	CO2
2(b)	What is B-Tree? What are the properties of the B-Tree. Construct a 3-way B-Tree for the following elements: 10,15,20,30,5,8,40.	5	CO2
	Question 3		
3(a)	What is DEQUE? Explain different types of DEQUE? Write an algorithm for insertion at the front end in the DEQUE.	5	CO2
3(b)	Create a BST for the following data in sequence: 4,6,9,13,18 What kind of BST is created? Is there any kind of problem with such kind of BST? If yes, give solution for it.	5	CO2
	Question 4		
4(a)	Write an algorithm/ function to delete an element from the end of the linear linked list.	5	CO2
4(b)	The post-order and in-order traversal of a binary tree are given below. Construct corresponding binary tree. Show all steps to construct a tree. Write its equivalent pre-order traversal. Write a recursive function/algorithm for pre-order traversal. Post-order: D,F,E,B,G,L,J,K,H,C,A In-order: D,B,F,E,A,G,C,L,J,H,K	5	CO2