

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)**

**CLASS: BCA
BRANCH: BCA**

**SEMESTER : II
SESSION : SP/2025**

SUBJECT: CN121 INTRODUCTION TO DATA STRUCTURES

TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates
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		CO	BL
Q.1(a)	Define data structure and classify its types.	[2] 1	1
Q.1(b)	Explain the concepts of time complexity and space complexity with a suitable example	[3] 1	3
Q.2(a)	A 2D array A[6][6] is stored in row-major order with the base address 1000. If each element occupies 2 bytes, find the address of the element A[3][4].	[2] 2	3
Q.2(b)	Define a Stack Data Structure. Write an algorithm for performing the Push and Pop operations in a stack.	[3] 2	3
Q.3(a)	Define a linked list and explain its advantages over arrays.	[2] 1	2
Q.3(b)	Write the steps to insert a node at the end of a singly linked list.	[3] 2	3
Q.4(a)	Differentiate between singly, doubly, and circular linked lists.	[2] 1	2
Q.4(b)	Write an algorithm or code to delete a node from the beginning of a doubly linked list.	[3] 2	3
Q.5(a)	Define a tree data structure. Explain any two types of trees.	[2] 1	2
Q.5(b)	Define a Binary Search Tree. Construct a Binary Search Tree for the following sequence of numbers: 24, 12, 34, 5, 1, 20, 38, 36, 29.	[3] 3	3

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