Total No. of Questions – [4]

PRN No.	

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PAPER CODE	U124-364

MAY-2024 (ENDSEM) EXAM

FY.B. TECH (COMPUTER SCIENCE & ENGINEERING- DATA SCIENCE)

(AY 2023-24 SEMESTER - II)

COURSE NAME: FUNDAMENTALS TO DATA STRUCTURE & ALGORITHM **COURSE CODE:** CD12234

(PATTERN 2023)

Time: [90 Min] **[Max. Marks: 40]**

Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **Solve any one sub questions from Question 1 and 2 and solve any three sub questions from Question 3 and 4.**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) Differentiate between linear and non-linear data structures, static and dynamic data structures. Give an example of each type.	[5]	1	Understand
	b) Define time complexity and space complexity in the context of algorithm analysis. Why are these metrics important?	[5]	2	Understand
Q 2	a) Write C++ Program for Addition and Substation of two Matrices?	[5]	2	Understand
	b) Explain two- dimensional array with row and column major implementation. Explain address calculation in both cases with examples?	[5]	2	Understand
Q 3	a) Compare and contrast the Linear Search and Binary Search techniques in terms of their approach and efficiency in finding an element in a sorted array?	[5]	3	Apply
	b) Describe the Bubble Sort algorithm, demonstrate its operation on an unsorted array with step-by-step sorting, and analyze its worst-case time complexity?	[5]	3	Apply
	c) Write C++ Pseudo code Linear Search Algorithms with Examples?	[5]	3	Apply
	d) Compare the time complexities of bubble sort, selection sort, insertion sort, quick sort and merge sort. Provide insights into which sorting technique would be preferable for different types of data and sizes.	[5]	3	Apply
Q 4	a) Describe Single linked list? Write a Pseudo C++ Code to insert and	[5]	4	Apply

	delete node into Single linked list?			
	b) Describe circular linked list? Write a Pseudo C++ Code to represent circular linked list?	[5]	4	Apply
	c) Describe fundamental concept of linked list and illustrate it with an example of a node structure in a linked list.	[5]	4	Apply
	d) Explain Polynomial Representation using linked list with Examples?	[5]	4	Apply