



**MID TERM EXAMINATIONS – July 2024**

Programme	: B.Tech.	Semester	: Fall Semester 2024-2025
Course Title	: Data Structures and Algorithms / CSE2002	Slot	: A24+B24+E23+F21+F22
Time	: 1 ½ hours	Max. Marks	: 50

**Answer all the Questions**

Q.No.	Sub. Sec.	Question Description	Marks
1	(a)	What is an Abstract Data Type (ADT)? Illustrate the essential operations of each Abstract Data Types.	10
2	(a)	Describe the different approaches used for analysing efficiency of algorithms. Write codes for calculating the summation of N natural numbers using two different approaches. Compute and compare the efficiency of both the approaches.	10
3	(a)	Describe the insertion sort algorithm step by step with suitable diagram to sort the array A=[35, 50,15,25,80,20,90,45].	10
4	(a)	“A binary search algorithm finds an item in a sorted array in $O(\log(n))$ time”. Justify the statement with proper example.	10
5	(a)	Write a program to I. Create a doubly linked list. II. Insert a node in a particular position in the doubly linked list. III. Delete a node from the beginning of the doubly linked list.	10
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