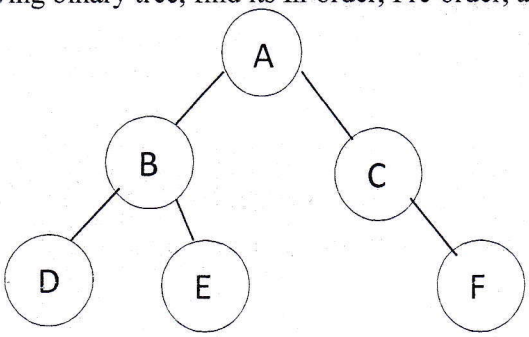
K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai) Carry-On

July-Aug 2025
(B. Tech / M. Tech.) Program: Artificial Intelligence and Data Science Scheme I/II/IIB/III:**III**
~~Regular~~/Supplementary Examination: SY Semester: III
Course Code: AIC302 and Course Name: Data Structure and Algorithms
Date of Exam: 11/8/2025 Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any **two** questions out of three: (05 marks each)	10		
a)	Classification of Data Structure with its suitable example.		CO1	U
b)	Write algorithm of push and pop operations in a stack.		CO2	U
c)	Explain topological sorting with suitable example.		CO3	U
Q 2	Solve any **two** questions out of three: (05 marks each)	10		
a)	Draw the Binary Search Tree (BST) formed by inserting the following values in the given sequence: 35, 12, 45, 23, 78, 9, 45, 65, 92, 15.		CO4	Ap
b)	Given the following binary tree, find its In-order, Pre-order, and Post-order traversals. 		CO5	Ap
c)	Select a suitable data structure to manage undo and redo operations in a text editor. Justify your choice and describe how it handles the sequence of actions.		CO6	An
Q.3	Solve any **two** questions out of three. (10 marks each)	20		

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a)	Explain how a stack can be used to convert an infix expression to postfix. Apply the algorithm to convert (A + B) * (C - D) into postfix form.		CO2	Ap
b)	Write the algorithm to delete a node at the beginning, end, and at a specified position in a doubly linked list.		CO2	U
c)	What is a collision? What are the methods to resolve collisions? Explain Linear probing with an example.		CO5	U
Q.4	Solve any **two** questions out of three. (10 marks each)	20		
a)	What is an AVL tree? Construct an AVL tree for the elements 30, 20, 40, 10, 25, 50, 5 and show the tree after each rotation.		CO4	Ap
b)	Sort the following array using **Heap Sort** algorithm. 1. Show all intermediate steps including: 2. Construction of the Max Heap 3. Step-by-step extraction and heapify process Final sorted array **Given Array:** [20, 5, 15, 22, 9, 3, 1]		CO5	Ap
c)	Explain the Ordered (Sorted) Linear Search algorithm.		CO4	U

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