

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

~~Jan - Feb~~ - ~~Nov - Dec~~ 2026

(B. Tech) Program: Computer Engineering Scheme III

*Supplementary* Examination: SY Semester: III

Course Code: CEC302 and Course Name: Data Structure

Date of Exam: ~~31/11/25~~ 31/01/26

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 <b>two</b> questions out of three: (05 marks each)	10		
a)	Explain any 5 basic operations performed on data structures.		CO1	U
b)	Convert an infix expression to postfix using stack (A+B) * (C-D/E) *(F+G)		CO2	AP
c)	Write an algorithm for addition of two polynomials using singly linked list (3M). Illustrate with an example. 2(M)		CO3	U
Q 2	Solve any <b>two</b> questions out of three: (05 marks each)	10		
a)	Given the binary search tree below, perform inorder (1M), preorder (2M), and postorder (2M) traversals <div style="text-align: center;"> <pre> graph TD     A((A)) --&gt; B((B))     A --&gt; C((C))     B --&gt; D((D))     C --&gt; E((E))     C --&gt; F((F))     E --&gt; G((G))     F --&gt; H((H))     F --&gt; I((I))             </pre> </div>		CO4	AP
b)	Consider the following directed graph. Perform BFS and DFS starting from vertex 0 and show the traversal order with queue/stack contents at each step. <div style="text-align: center;"> <pre> graph LR     0((0)) --&gt; 1((1))     0 --&gt; 2((2))     1 --&gt; 3((3))     2 --&gt; 1     2 --&gt; 4((4))     3 --&gt; 1     4 --&gt; 3             </pre> </div>	CO5	AP	

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c)	Explain linear search and binary search (2M) and compare them on: time complexity, type of input, and applications.(3M)		CO6	U
Q.3	Solve any <b>two</b> questions out of three. (10 marks each)	20		
a)	Explain a <b>circular queue</b> ? How is it different from a linear queue? (4M) Write algorithms for: (i) INSERT element in a linear queue (3M) (ii) DELETE element from a linear queue (3M)		CO2	U
b)	Write algorithm: a) To delete the first node from a Singly Linked List. (5M) b) To insert a node after a given node in a Singly Linked List.(5M)		CO3	U
c)	Construct a Binary Search Tree using the sequence: 48, 25, 72, 18, 30, 60, 85, 62 Show step by step construction. (6M). Delete 72 from the BST and draw the tree after deletion. (4M)		CO4	AP
Q.4	Solve any <b>two</b> questions out of three. (10 marks each)	20		
a)	Construct a Huffman Tree and write the final Huffman codes for the following characters and their frequencies: A:5 B:9 C:12 D:13 E:16 F:45		CO4	AP
b)	Given an infix expression, check whether the parenthesis are balanced or not ((A+B)*{(C+D)/[E-F]}+(G*(H+I))). Solve using stack data structure.		CO2	AP
c)	Write algorithms to perform Push and Pop operations on Linked Stack.		CO3	U

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