

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

Subject Code: AIC303

Subject Name: DATA STRUCTURE

Date: 01/12/23

Nov – Dec 2023

(B.Tech Program)

Examination: SY Semester: III **Scheme - IIB**

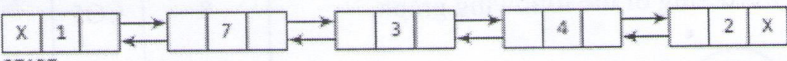
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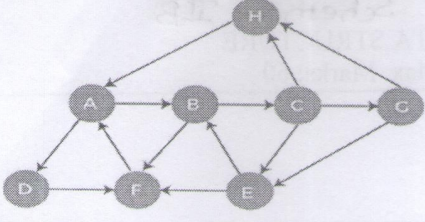
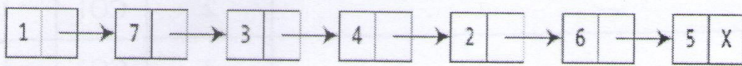
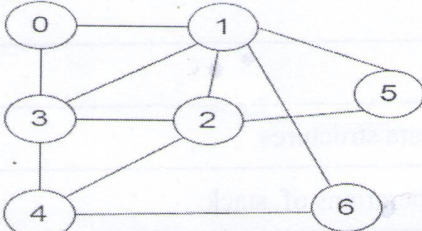
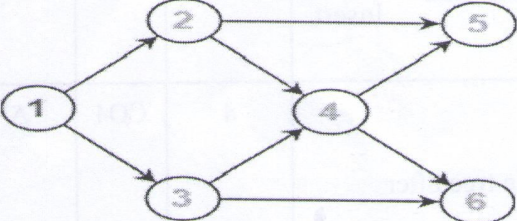
Max. Marks: 60

Duration: 2.5 Hours

Instructions:

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

		Max. Marks	CO	BT level
<b>Q 1</b>	<b>Solve any six questions out of eight:</b>	<b>12</b>		
i)	Explain Linear Data structure	2	CO1	U
ii)	Explain Stack as Abstract Data Types	2	CO2	U
iii)	What is a circular queue?	2	CO2	U
iv)	Explain singly linked list with a neat diagram	2	CO3	U
v)	Draw a binary search tree for the following numbers 10,5,49,78,23,65,21,7,3	2	CO4	U
vi)	Explain the tree terminologies for a binary tree	2	CO4	U
vii)	Explain the adjacency list and Adjacency matrix representation of graph	2	CO5	U
viii)	Explain binary search	2	CO6	U
<b>Q.2</b>	<b>Solve any four questions out of six.</b>	<b>16</b>		
i)	Explain the operations performed on Data structures	4	CO1	U
ii)	Write an algorithm for Push and Pop operations of stack	4	CO2	U
iii)	Consider doubly linked list  5 at the end of the list	4	CO3	A
iv)	Construct Binary search tree for the following output. 23,14,26,30,9,4,1,45,34,13,56,12 Also perform deletion of following elements and redraw the tree after performing deletion. 12,45	4	CO4	A
v)	Given a hash table of 100 locations, calculate the hash value using folding method for keys 5678, 321, and 34567	4	CO6	A

vi)	<p>Give the Depth-first traversal for the following graph, starting from vertex H. Show all the steps.</p>  <p style="text-align: center;">Adjacency Lists</p> <pre> A : B, D B : C, F C : E, G, H G : E, H E : B, F F : A D : F H : A                     </pre>	4	CO5	A
<b>Q.3 Solve any two questions out of three.</b>		<b>16</b>		
i)	Convert it into postfix expression $(A+B)/(C-D)-(E*F)$	8	CO2	A
ii)	<p>Consider a Singly linked list shown below</p>  <p>START</p> <p>Insert a new node with value 9 at the end of the list Insert a new node with value 10 at the end of the list Show step wise insertion</p>	8	CO3	A
iii)	Construct AVL tree for the following elements 20,24,30,15,18,32,40.	8	CO4	A
<b>Q.4 Solve any two questions out of three.</b>		<b>16</b>		
i)	<p>Consider the graph given below. Find out its depth-first traversal scheme. Show step wise execution</p> 	8	CO4	Ap
ii)	<p>Find out at least 2 possible topology ordering of the following graph.</p> 	8	CO5	A
iii)	Consider a hash table with size = 10. Using Linear probing, insert the keys 34, 75,100,50,30,25 and 65 into the table.	8	CO6	A

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