



# St. Francis Institute of Technology (Engg. College)

## Internal Assessment Test-I

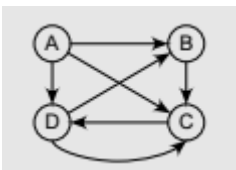
Academic Year: 2023-24

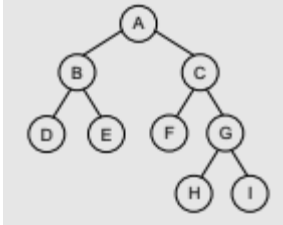
Branch: INFT Division: A & B	Year:SEIT Semester: III
Subject: Data Structure and analysis	Time: 3.00 to 4.00
Date: 14 august 2023	No. of Pages:
Marks: 20 Marks	

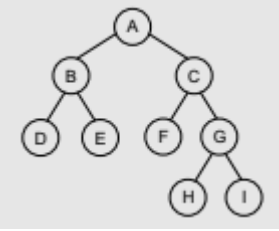
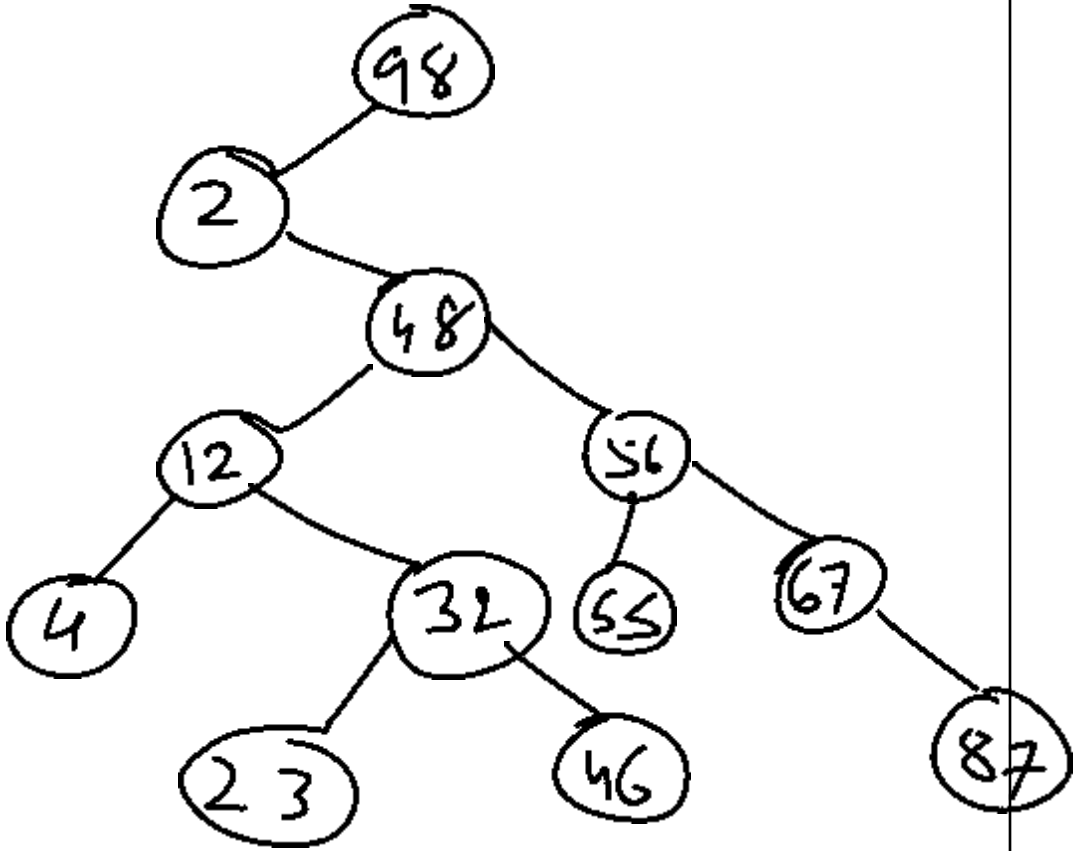
**Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.**

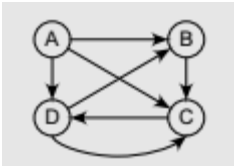
Note the following instructions.

1. All questions are compulsory.
2. Draw neat diagrams wherever necessary.
3. Write everything in ink (no pencil) only.
4. Assume data, if missing, with justification.

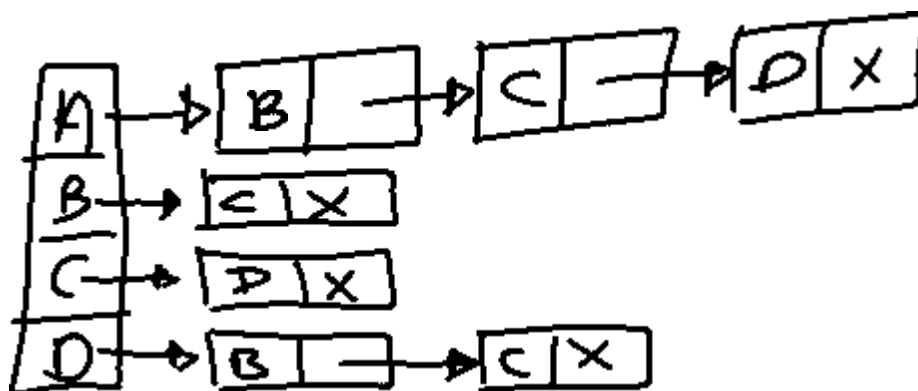
Q.1	Attempt any five.	Marks															
a.	<p>For the given graph, state In-degree, out-degree of each node</p>  <p>Ans:</p> <table border="1"> <thead> <tr> <th></th><th>In-degree</th><th>Out-degree</th></tr> </thead> <tbody> <tr> <td>A</td><td>0</td><td>3</td></tr> <tr> <td>B</td><td>2</td><td>1</td></tr> <tr> <td>C</td><td>3</td><td>1</td></tr> <tr> <td>D</td><td>2</td><td>2</td></tr> </tbody> </table>		In-degree	Out-degree	A	0	3	B	2	1	C	3	1	D	2	2	2M
	In-degree	Out-degree															
A	0	3															
B	2	1															
C	3	1															
D	2	2															

b.	<div></div> <p>For the given tree, find level of all the nodes</p> <table><tr><td>A</td><td>0</td><td>E</td><td>2</td></tr><tr><td>B</td><td>1</td><td>F</td><td>2</td></tr><tr><td>C</td><td>1</td><td>G</td><td>2</td></tr><tr><td>D</td><td>2</td><td>H</td><td>3</td></tr><tr><td></td><td></td><td>I</td><td>3</td></tr></table>	A	0	E	2	B	1	F	2	C	1	G	2	D	2	H	3			I	3	2M
A	0	E	2																			
B	1	F	2																			
C	1	G	2																			
D	2	H	3																			
		I	3																			
c.	<p>State pendant vertex and and sink node in directed graph</p> <p>Pendant vertex is who is also a leaf node with no child. It has only one indegree</p> <p>Sink node: which has positive indegree but zero outdegree</p>	2M																				
d.	<p>Write pseudocode to define a “Node” structure of a tree</p> <pre>struct node {     int info;     struct node *lchild;     struct node *rchild; }</pre>	2M																				
e.	<p>For the tree shown in que 1.b Write Ancestors of F and descendents of C</p> <p>Ancestors of F : A and C</p> <p>Descendents of C: F,G,H,I</p>	2M																				
f.	<p>Define a weighted graph with example</p> <p>A graph with some value on its edges which may represent cost, length or weight between the two connected nodes is called weighted graph</p>	2M																				
Q.2	Attempt any one.																					
.																						

a.	<p>Find the in-order, pre-order, post-order traversal for the given tree.</p>  <p>In-order – D B E A F C H G I  Pre-Order – A B D E C F G H I  Postorder – D E B F H I G C A</p>	5m
b.	<p>Create a binary search tree with the input given below: 98, 2, 48, 12, 56, 32, 4, 67, 23, 87, 23, 55, 46</p>  <p>Show all steps of insertion</p>	5m
Q.3	Attempt any one.	
a.	Create adjacency matrix and adjacency list for the given graph	5m



	A	B	C	D
A	0	1	1	1
B	0	0	1	0
C	0	0	0	1
D	0	1	1	0



b. Write Breadth first search traversal algorithm.

5m

Breadth\_First\_Search( G, A ) // G is the graph and A is the source node

Let q be the queue

q.enqueue( A ) // Inserting source node A to the queue

Mark A node as visited.

While ( q is not empty )

B = q.dequeue( ) // Removing that vertex from the queue, which will be visited by its neighbour

Processing all the neighbors of B

For all neighbors of C of B

If C is not visited, q.enqueue( C ) // Stores C in q to visit its neighbour

Mark C as visited