



Daffodil International University  
Faculty of Science & Information Technology  
Department of Information Technology & Management  
Final Examination, Fall 2024

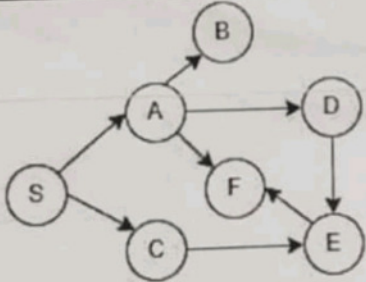
Course Code: ITM 217; Course Title: Data Structure and Algorithms  
Sections & Teachers: MA

Time: 2:00 Hrs

Marks: 40

Answer ALL Questions

*[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

1.	a)	Define graph data structure with a real life example. <b>Explain</b> the properties of tree data structure.	[Marks-5]	CLO-3 Level-2
	b)	What is BST? <b>Write</b> down an algorithm to delete a node from a BST where both children are present.	[Marks-5]	CLO-3 Level-1
2.	a)	Explain different types of linked lists. <b>Differentiate</b> between array and linked list.	[Marks-5]	CLO-3 Level-4
3	a)	 <p>Consider this graph. Represent the graph using both adjacency matrix and adjacency list. Which representation is better in terms of space for this graph? <b>justify</b> your answer.</p>	[Marks-8] 3+3+2	CLO-4 Level-5
	b)	<b>Calculate</b> the discovery time d, finish time f and previous node prev for all the nodes in the given graph using appropriate graph traversal algorithm. Show step by step implementation.	[Marks-7]	CLO-4 Level-3
4.	a)	<b>Array</b> = [12, 7, 19, 4, 22, 15, 3, 10, 6, 18] Consider the array and <b>apply</b> merge sort for ascending order. Illustrate the whole process step by step.	[Marks-5]	CLO-4 Level-3
	b)	<b>B</b> = [12, 10, 7, 5, 2, 1] <b>Apply</b> insertion sort on the given array and demonstrate each step.	[Marks-5]	

Dynamic size  
No configuration  
Easily into list  
L P R