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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Final Examination, Spring 2026

Course Code: CSE 213 , Course Title: Algorithms

Level: 2 Term:1 Batch: 68

Time: 02:00 Hrs **Marks: 40**

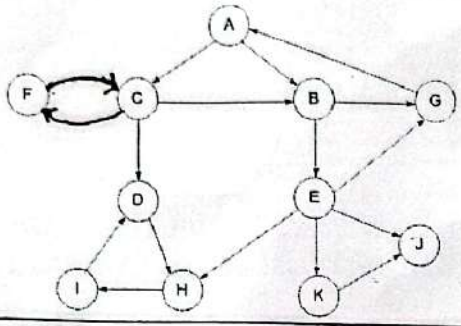
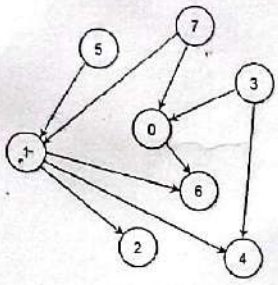
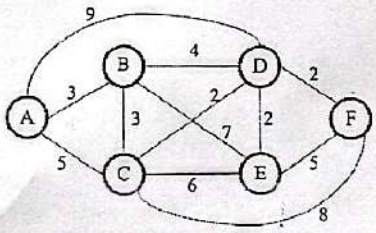
Answer ALL Questions

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

1.	Explain the concept of the Longest Decreasing Subsequence (LDS). Given the sequence : 9, 4, 7, 6, 1, 3, 2, 5, 1			**CO1**
	a)	Identify valid longest decreasing subsequence from the above given sequence	03	
	b)	Briefly explain how it differs from the Longest Increasing Subsequence (LIS)	02	
2.	*a)*	Consider the following operations on a set of elements {1,2,3,4,5,6}: • Union(1,2) • Union(2,3) • Union(4,5) • Find(3) • Union(3,5) • Find(5) Apply an appropriate algorithm's pseudocode to visualize the following operations: • The parent array after each union • The result of each Find operation	05	**CO2**
3.	*a)*	For the given two strings below construct the DP Table to find the LCS length. Also show the LCS string. "ABCBDABBBD" & "BDCABABDBB"	05	**CO3**
	b)	Given coin denominations {2, 3, 5, 7}, construct a DP table to find the minimum no of coins required for 9 tk. Show the required coin values.	05	
	c)	While traveling through the hills of Bangladesh, Arif found a few valuable items. His backpack had limited capacity, so he had to choose wisely. He could either take an item completely or leave it—no splitting allowed. To maximize the total value, Arif carefully selected the best combination of items without exceeding the weight limit. If his backpack can hold 9 kg, what will be his maximum profit? Construct a detailed table.	05	

	Golden Statue	Ancient Book	Rare Spices	Silver Coins
weight(kg)	2	3	4	5
Price(per unit)	300	550	550	700

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	d)	Construct strongly connected components for the following graph. Show the detailed steps: 	05	CO3
	e)	Construct Topological Sorting order for the following graph. Show detailed steps. 	05	
	f)	Construct the shortest path for the following figure where the starting vertex is 'A'. Show detailed steps: 	05	