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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Summer 2026
Course Code: CSE 213 , Course Title: Algorithms
Level: 2 Term:1 Batch: 69

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.]

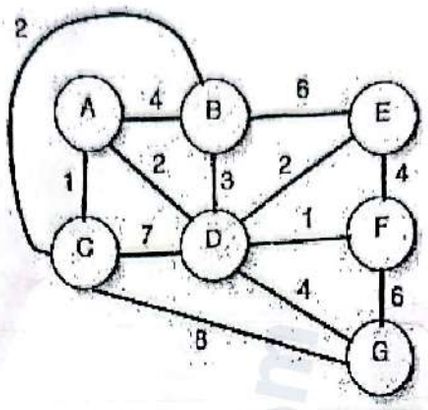
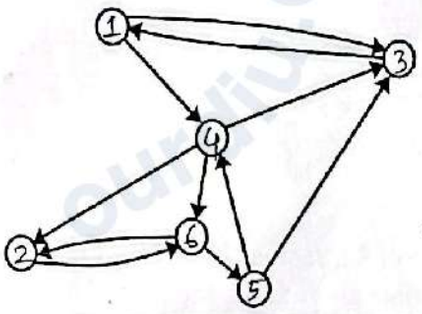
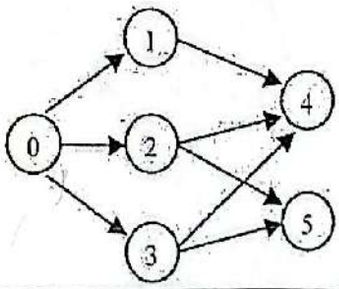
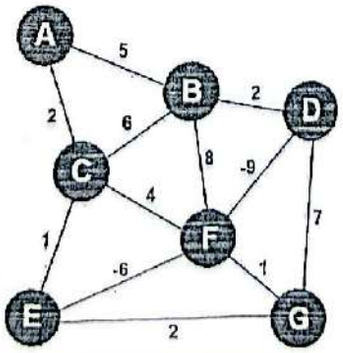
1.	Given the sequence : 4, 4, 6, 4, 1, 3, 2, 2, 1			CO1
	a)	Identify valid longest not decreasing subsequence(LNDS) from the above given sequence	03	
	b)	Briefly explain how it differs from the Longest Decreasing Subsequence (LDS)	02	
2.		Consider the following two strings: • X = ABCBDAB • Y = BDCABA Apply the LCS (Longest Common Subsequence) algorithm to find the LCS of the two strings. Use the appropriate algorithm's pseudocode to show: • The LCS table after each character comparison • The final LCS length • The resulting LCS sequence	05	CO2
3.	a)	Given coin denominations {3, 5, 2, 7}, construct a DP table to find the minimum number of coins required for 9 taka. Show the required coin values.	05	CO3
	b)	During a flood relief operation in Bangladesh, Nabil prepares a backpack to deliver essential supplies to affected families. His backpack can carry a maximum weight of 10 kg. Each available item has a specific weight and value (importance). Nabil can either take an item completely or leave it behind, but he cannot take a fraction of any item.	05	

	Rice Pack	Medicine Box	First Aid Kit	Baby Food Pack
weight(kg)	4	3	4	5
Price(per unit)	300	550	400	700

What is the maximum total value of supplies Nabil can carry? Construct a detailed table using the 0/1 Knapsack Dynamic Programming algorithm and identify the selected items.

	c)	During a trip to the hilly areas of Bangladesh, a group of students wants to connect several villages with minimum-cost roads. The following graph shows	05	

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		the possible roads and their construction costs. Apply Prim's Algorithm to construct the Minimum Spanning Tree (MST), Starting from vertex A. 		CO3
	d)	Construct strongly connected components for the following graph. Show the detailed steps: 	05	
	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	

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