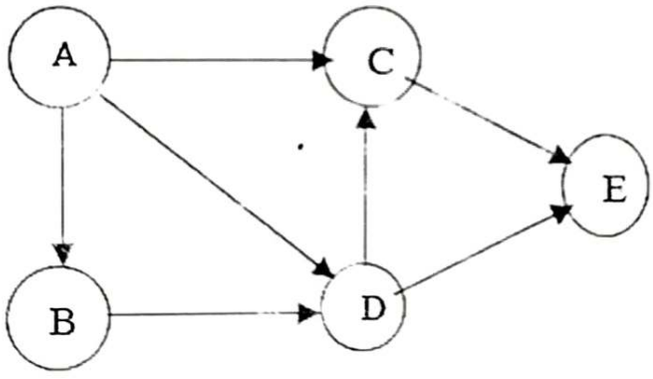
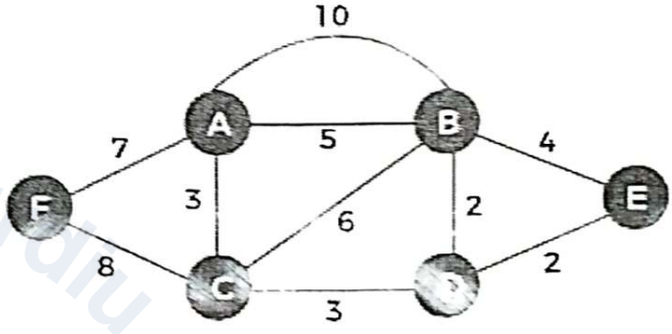
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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Final Examination, Fall -2024
Course Code: CSE213, Course Title: Algorithms
Level: 2 Term: 1 Batch: 65
Time: 2.0 Hours **Marks: 40**

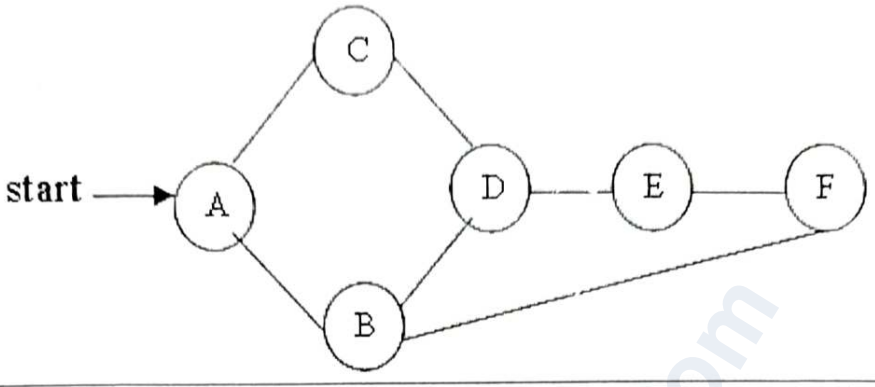
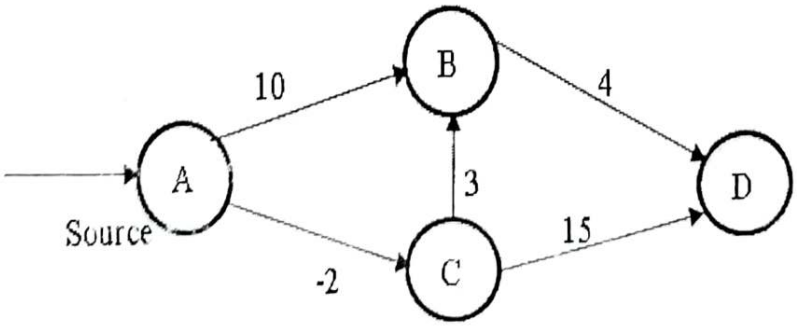
Answer ALL Questions

[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) You are given a sequence of numbers. Apply an appropriate technique to find the length of the Longest Increasing Subsequence (LIS) for the given elements. Elements: [0, 9, 2, 5,3,7,11, 8, 10, 13,6]	**[5]**	**[CO2]**
	b) A directed graph is given below. Apply Topological Ordering approach on the given graph and find the order of the vertices for the graph (Show all the necessary steps). 	**[5]**	
2.	a) Hasan is given an undirected graph. Prepare a minimum spanning tree from the graph where the proposed algorithm works through the edges of the given graph. 	**[5]**	**[CO2]**

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	b) You are given an undirected graph below. Show the visited sequence to find node **F** in the graph. Choose the appropriate technique where the **STACK** data structure is applied. Starting Node: **A**  	**[5]**	
3.	a) You are given 4 products, each with a weight and a value. You also have a bag that can carry up to 6 units of weight. Your goal is to obtain the maximum value of the items you can place in the bag without exceeding the weight limit. Also you are not allowed to choose a partial weight of the products. Apply an appropriate approach to make a maximum profit. Product No. | Weight | Value 1 | 2 | 20 2 | 3 | 15 3 | 4 | 24 4 | 5 | 30	**[8]**	**[CO3]**
	b) Determine the appropriate algorithm for 3. (a) and analyze its time complexity.	**[2]**	
4.	a) Steve Mark loves to visit places. He decided to visit some places by applying the cost-minimizing formula. The following graph represents four places by indicating four nodes. There are some distances in km from one node to another. Estimate the shortest path from the source to the remaining nodes by applying a suitable algorithm.  	**[8]**	**[CO3]**
	b) Analyze the performance of the Bellman-Ford algorithm in the presence of negative cycles.	**[2]**	

The End