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Daffodil International University

Faculty of Science & Information Technology

Final Examination, Fall 2022

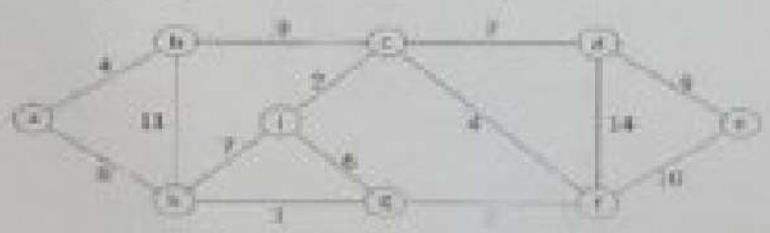
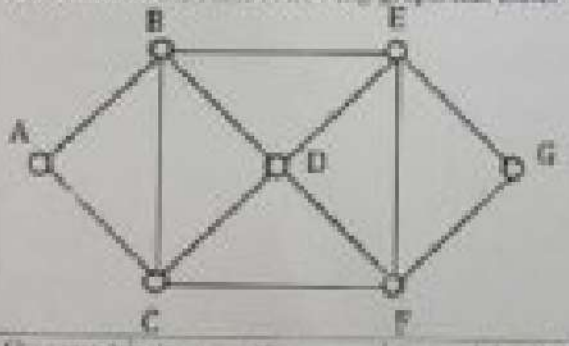
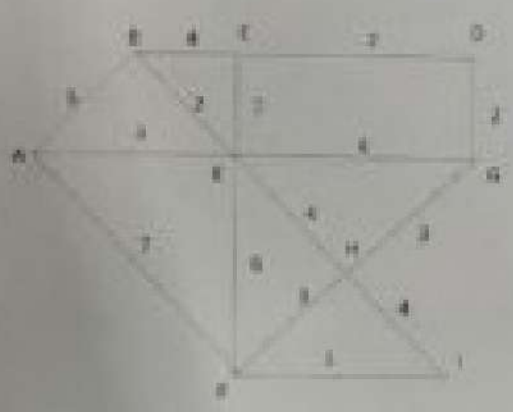
Course Code: CSE131: Course Title: Discrete Mathematics

Sections & Teachers: All

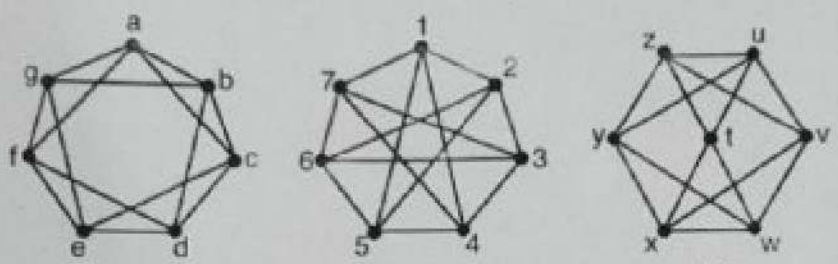
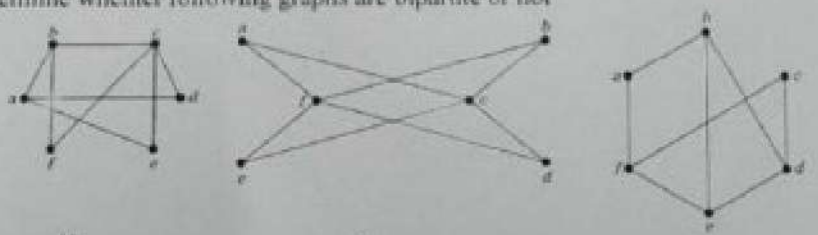
Time: 2:00 Hrs **Marks: 40**

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)	Discover the shortest path using **Dijkstra's algorithm**. Explain the step by step solution on your own. 	5	CO3
	b)	Determinate whether following graph has Euler Circuit or not? 	5	
2.	a)	On your trip to a country, you plan to visit all the important world heritage sites but are short on time. To make your itinerary work, you decide to use an algorithm to determine your visiting plan. Consider the nodes of the following graph as the world heritage sites and the edges indicate the distance between two adjacent sites. 	5	CO3

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		Simplify the graph as your requirement using the Kruskal algorithm showing all steps sequentially.		
	b)	Show which pairs of following graphs are isomorphic, if two pairs are not isomorphic explain why.  G H K	5	
3.	a)	Let A be the adjacency matrix of a weighted graph, G, with the columns and rows labeled, in order, by the vertices of the set V = {v0, v1, v2, v3, v4, v5} so the first row of the matrix represents the adjacencies of vertex v0, the second row those of vertex v1, etc. Note that there are some non-zero diagonals which means that there are some edges of the form (v, v). Also, an entry with weight 0 means there is no edge. $A = \begin{bmatrix} 0 & 1 & 3 & 0 & 0 & 2 \\ 1 & 1 & 0 & 4 & 5 & 0 \\ 3 & 0 & 0 & 5 & 4 & 0 \\ 0 & 4 & 5 & 2 & 0 & 6 \\ 0 & 5 & 4 & 0 & 0 & 2 \\ 0 & 0 & 0 & 6 & 2 & 3 \end{bmatrix}$ (i) Find the adjacency lists for the graph, such that the edges in each list are ordered by increasing weight. (ii) Construct the equivalent graph from the given adjacency matrix representation.	3+2	CO3
	b)	Determine whether following graphs are bipartite or not  H G J	5	
4.	a)	Let R be the relation on a set {a, b, c, d, e} containing the ordered pairs (b,c), (b,e) (c,e),(d,a),(e,b) and (e,c). Find the transitive closure of R	5	CO2
	b)	(b) Let R be the relation on a set {4, 5, 6, 7} containing the ordered pairs (4, 5), (5, 5), (5, 6), (6, 4), (6, 6) and (7, 4). Discover the symmetric and reflexive closures of R.	5	