



Daffodil International University
Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Summer 2025

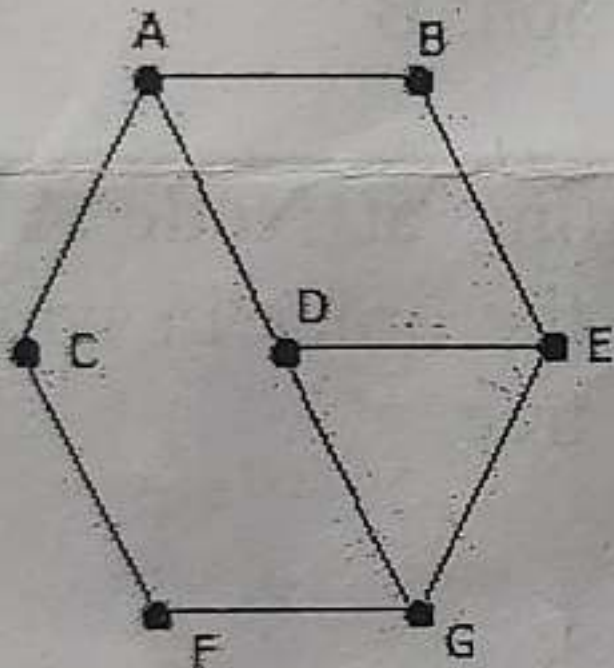
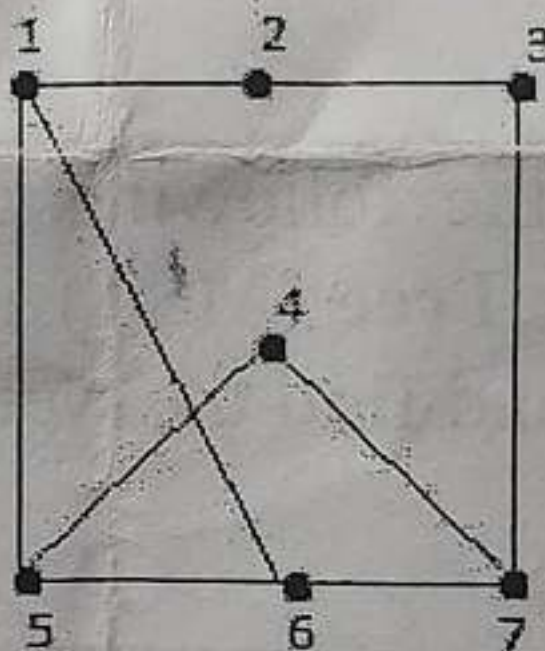
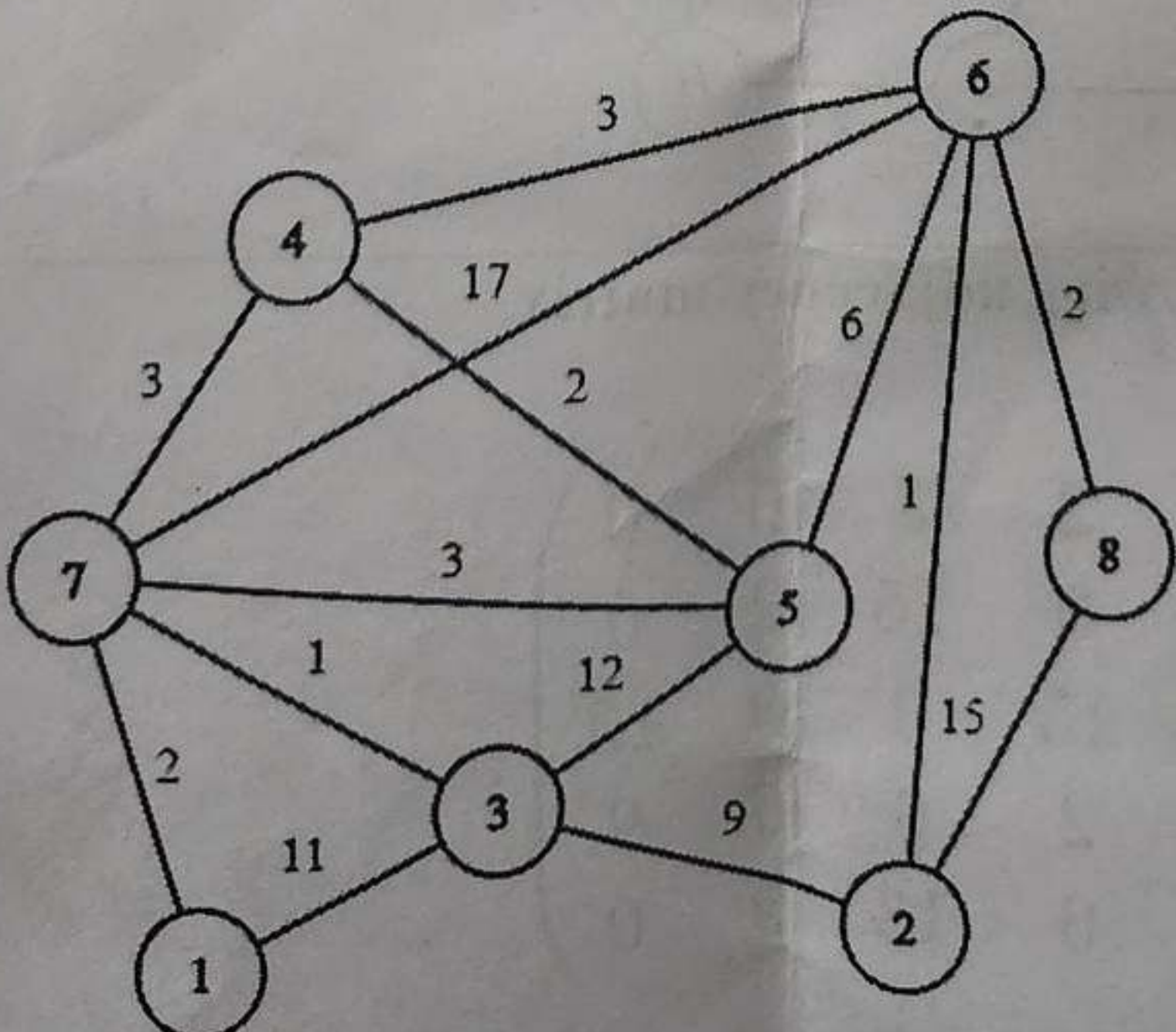
Course Code: CSE212, Course Title: Discrete Mathematics

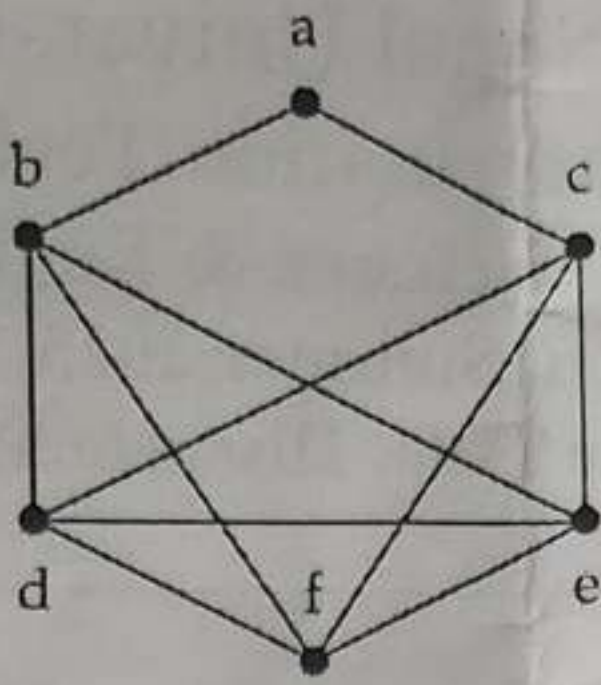
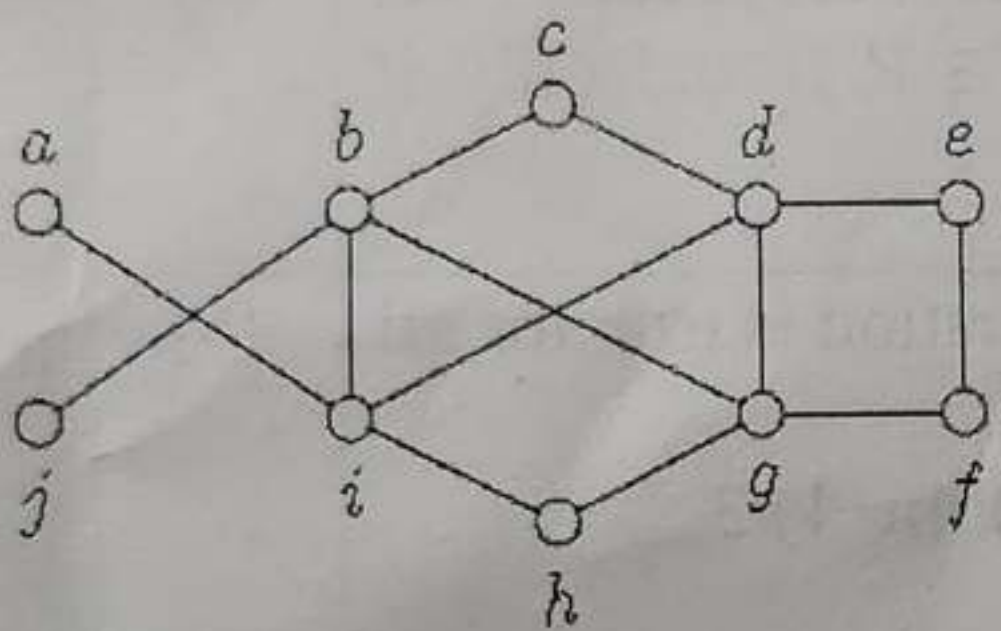
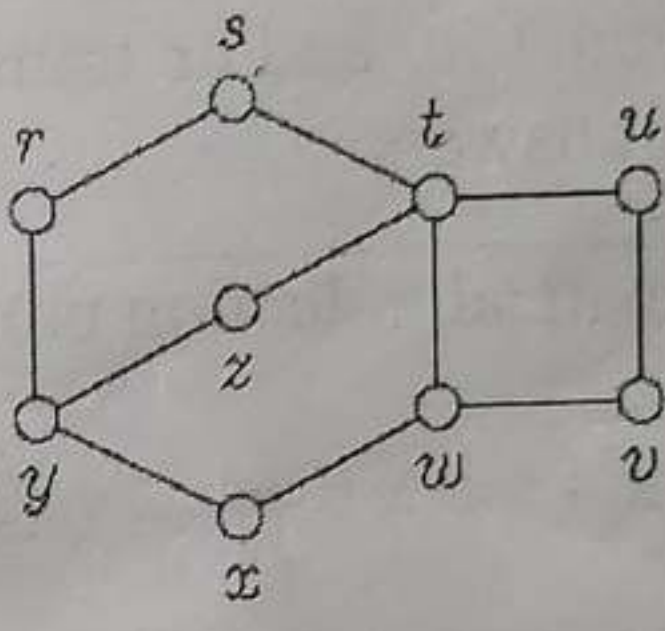
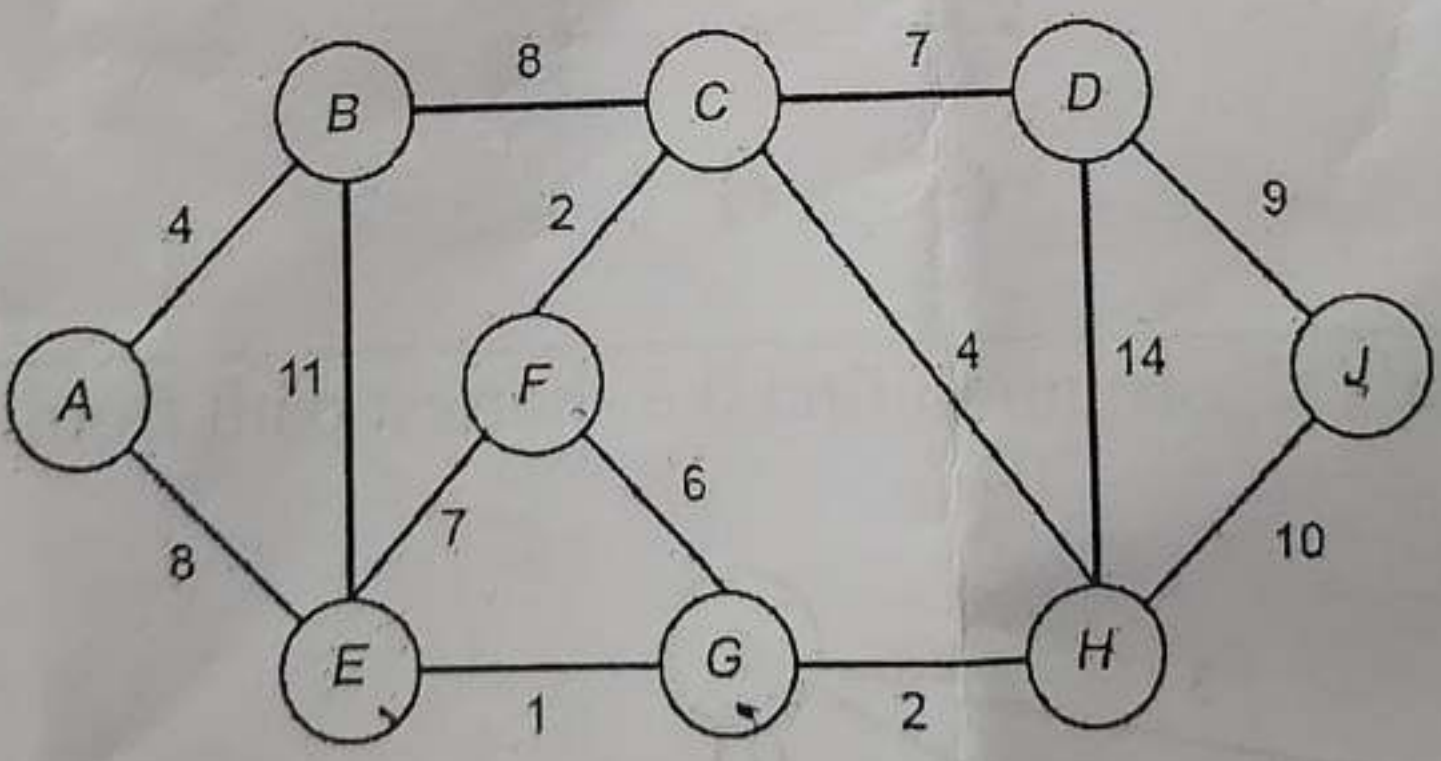
Time: 2:00 Hrs

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) Determine whether the relation R on the set of all real numbers is reflexive, symmetric, antisymmetric, and/or transitive, where $(x, y) \in R$ if and only if $xy \geq 0$. Justify your answers. b) By using mathematical induction prove that the given equation is true for all positive integers. $1 \times 2 + 3 \times 4 + 5 \times 6 + \dots + (2n - 1) \times 2n = n(n+1)(4n-1)/3$	[4]	
2.	a) Prove whether the following graphs G and G' are Isomorphic or not.  Graph G  Graph G'	[5]	[CO2]
	b) Apply the concept of Dijkstra's algorithm to find the shortest path from Node 1 to Node 8. 	[5]	[CO3]

3.	a) Find out if the graph below is Eulerian or Hamiltonian or both. If so, write the sequence of vertices of an Eulerian circuit and/or Hamiltonian cycle. If not, explain why it isn't Eulerian or Hamiltonian. 	[4]	[CO3]
	b) Justify whether each of the following graphs are Bipartite or not. If Bipartite, redraw the graph identifying the partite sets. If not, explain why they are not Bipartite.  Graph: A  Graph: B	[6ss]	
4.	a) Apply Prim's algorithm on the following graph starting at Node A to construct a Minimum Spanning Tree (MST) indicating the order in which edges are added to form the tree. and find the weight of the tree. 	[7]	[CO3]
	b) Draw Graph A from the following adjacency matrix. $A = \begin{pmatrix} 0 & 2 & 3 & 0 & 0 \\ 2 & 0 & 15 & 2 & 0 \\ 3 & 15 & 0 & 0 & 13 \\ 0 & 2 & 0 & 0 & 9 \\ 0 & 0 & 13 & 9 & 0 \end{pmatrix}$	[3]	