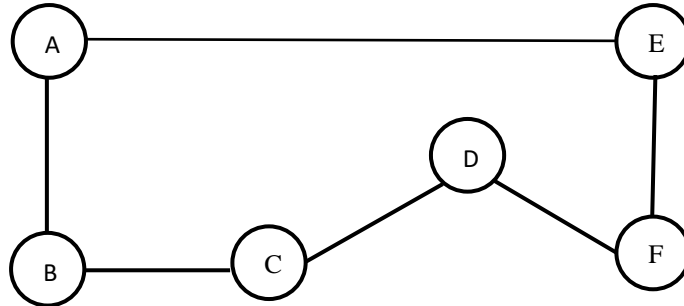# COMP261 Test Questions (Week 4 – 6)
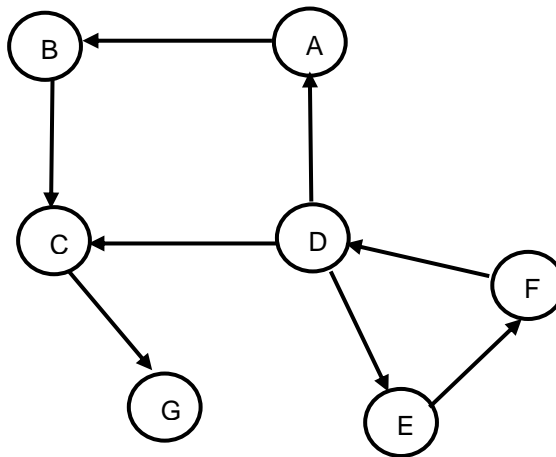
Max marks: 25

1. Which of the following statements is true for the following undirected graph G: (2 marks)

   a) G is a bi-connected graph.
   b) G has 2 articulation points.
   c) G has 3 articulation points.
   d) G has 4 articulation points.

   [Ans. A]

2. State true or false. The following graph is a strongly connected graph. (2 marks)


[Ans. False]

3. Which of the following statements is/are true when Trajan's algorithm is applied for finding the connected components / articulation points of a graph G.   (2 marks)
   a) Back-edge is an edge that appears in G but not in the corresponding DFS.
   b) A cross-edge is an edge that appears in G but not in the corresponding DFS.
   c) Both back-edges and cross-edges are ignored in Tarjan's algorithm.
   d) Depth of a node is always greater than or equal to its reach-back.

[Ans. a, b, d]

4. Given the following graph G, what will be the final value of reach-Back for the nodes C and node F? (6 marks)
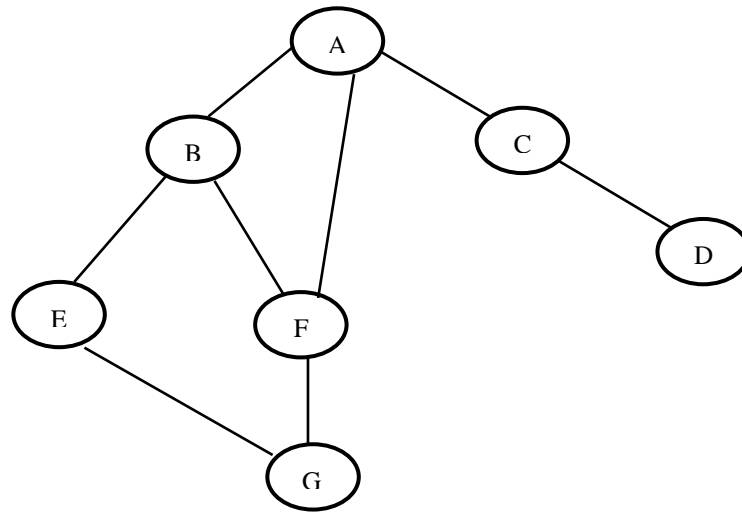
[Ans. C: 2 F: 1]

5. Find the cost of the minimum cost spanning tree of the following graph. You should show the edges and their weights (e.g., AC 6) in the order of being added into the tree by the Prim's algorithm considering A as the starting node. (6 marks)
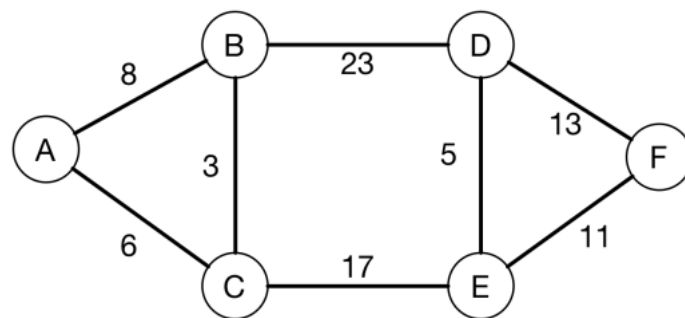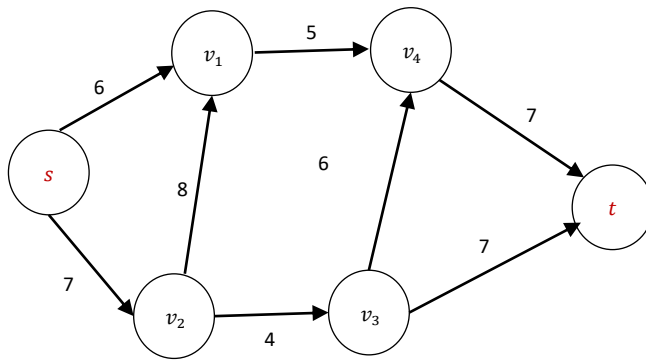

[Ans. AC 6, CB 3, CE 17, ED 5, EF 11. COST: 42]

6. In Kruskal's algorithm why is it always preferred to merge shorter trees into deeper ones during a Union operation? (3 marks)
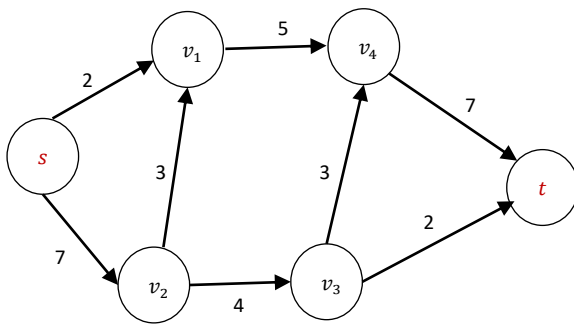
[Ans. reduces FIND complexity from O(n) to O(log(n))]

7. Given the following flow network G which of the following is true. (4 marks)
   a) Both Flow 1 and flow 2 are valid
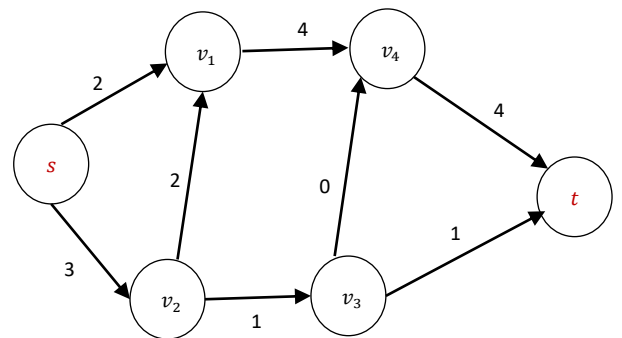   b) Only Flow 1 is valid
   c) Only Flow 2 is valid

d) None of the flows are valid

Graph G

Flow F1

Flow F2

[Ans. C]