Design and Analysis of Algorithm (CS 412)
Instructor: Dr. Ayesha Enayet
Date: _____
CS 6th

SIS ID:_____ Name:_____

Note: Attempt all the questions

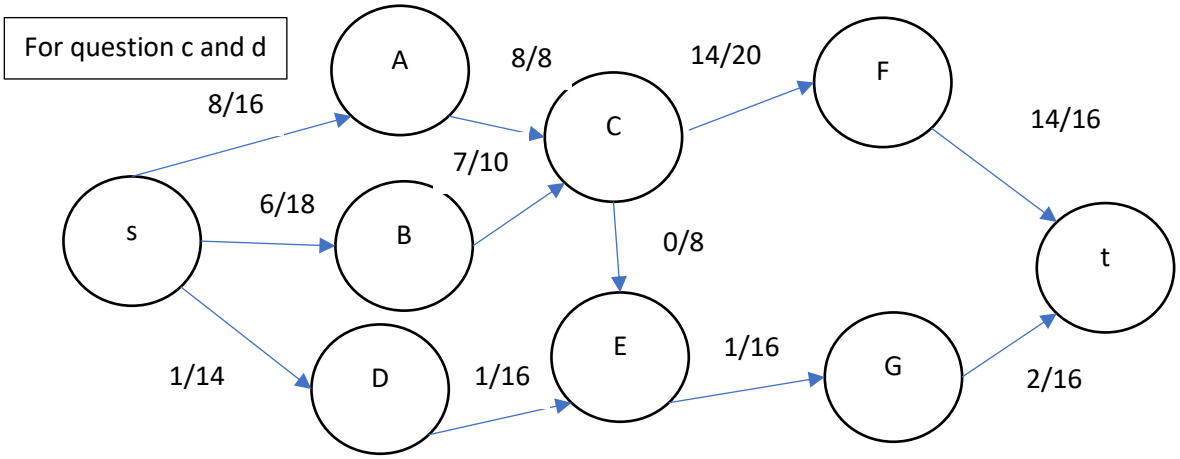
a. Which of the following is not a valid termination condition for Ford-Fulkerson algorithm?
   1. No augmenting path is left in the residual graph.
   2. Current flow is the maximum flow.
   3. The residual graph contains negative capacities.
   4. The sink node is unreachable from the source node.

b. What is the significance of residual graph in Ford-Fulkerson algorithm?
   a) It represents the original graph before any augmentation.
   b) It represents the graph after the maximum flow has been achieved.
   c) It represents the graph with residual capacities after each augmentation.
   d) It represents the graph with reversed edges.

c. Does the following flow network satisfy the capacity constraint and flow conservation properties? Justify your answer. [write answer at the back side of this page]
   It does not satisfy the flow constraint: Inward flow in B,C is not equal to outward flow in B,C

d. Identify whether the following graph is bipartite. Justify your answer.
   No, the graph is not two-colorable.

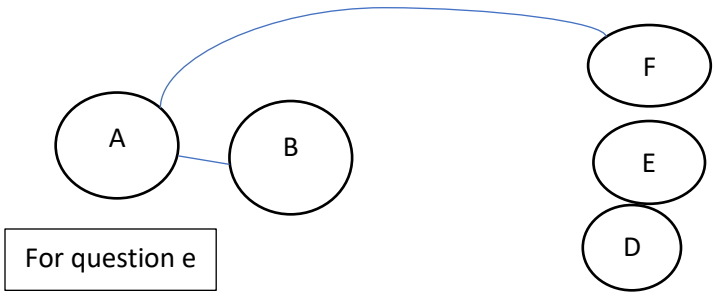
For question c and d



e. An articulation point is a vertex whose removal increases the number of connected components in the graph. It represents a single point of failure in the graph. Identify the articulation point(s) in the following graph.

C is the articulation point

Resultant connected components are [A,B,F], [E], and [D].



For question e