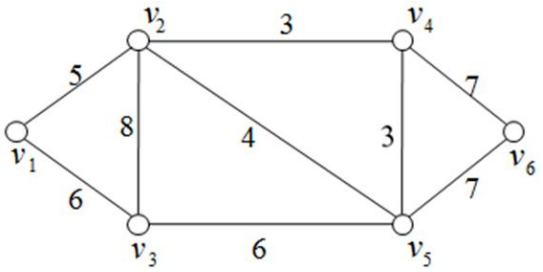
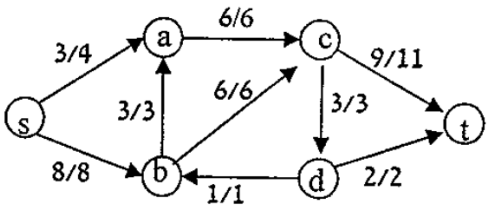
Name: .....

1. Find a minimum cost spanning tree in the following edge-weighted graph using Kruskal's algorithm:



2. Does there exist a simple graph with degree sequence $5, 5, 5, 4, 2, 1, 1, 1$? Use the Havel–Hakimi algorithm here.

3. Consider the network in the figure using the usual notations (s is the source, t is the sink; and the label of an edge e is $f(e)/c(e)$ where f is a flow, c is the capacity function).



a) Check that the flow f in the figure is feasible.
b) Determine the value of the flow f.
c) Determine the capacity of the $[S, T]$-cut for $S = \{s, a, b, c\}$ and $T = \{d, t\}$.

4. Prove that if a simple graph G has $2n$ vertices and every vertex of G has degree at least n, then G is connected.