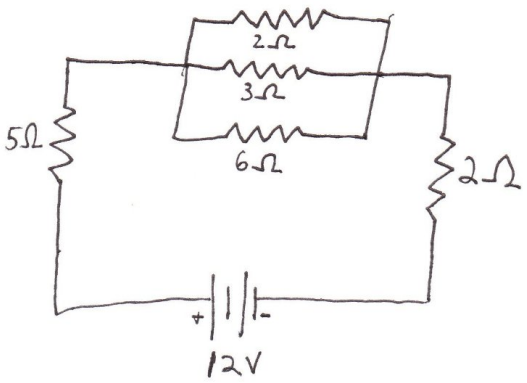
PHY 122 HW 6

1. Explain the difference between EMF and terminal voltage in an ideal battery. Give an example where the difference between the two might matter.

2. Using the diagram below, answer questions (a) through (c):

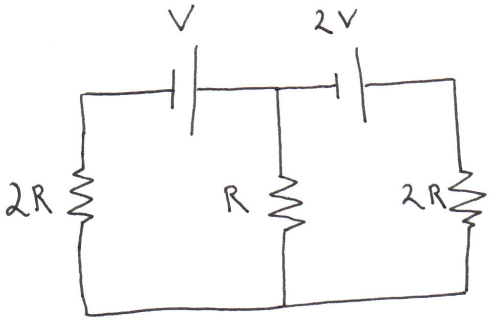


   (a) What is the equivalent resistance of the network of resistors connected to the battery?

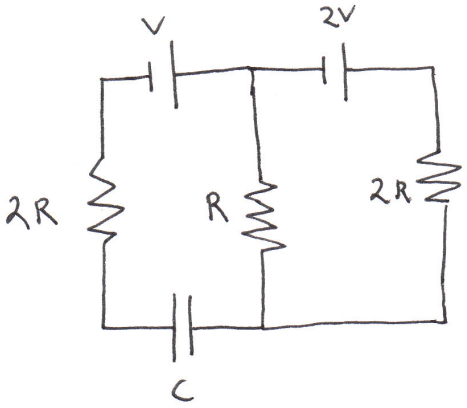
   (b) What is the current through the 5 Ohm resistor?

   (c) What is the total power dissipated by the circuit?

3. Using the circuit below, write out the equations for the current through each resistor.



4. Now consider the same circuit with an added capacitor as shown below:



   (a) If you are measuring at a time when the battery has just been connected and the capacitor has no charge, what is the current through each resistor?

   (b) After the capacitor has acquired its maximum charge, what is the current through each resistor?

   (c) Express the maximum charge on the capacitor in terms of R, V, and C.

5. A 12 V battery is connected to a 60 Ω resistor in series with a perfect ammeter, which measures .19 A of current. What is the internal resistance of the battery?