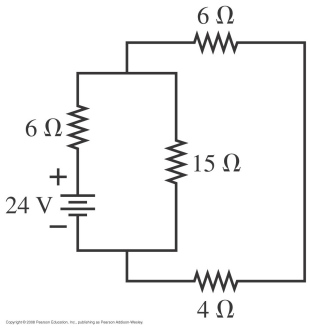
PHYS 212 Homework Assignment

Chapters 10

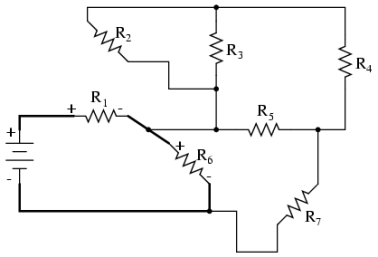
Problem 1 Three resistors (R_1, R_2 and R_3) are in series. The first resistor has a resistance of 10 Ω, the second has a resistance of 30 Ω, and there is a 100 mA current passing through the resistors when a 5.0 Volt potential difference is placed across the three resistors. What is the resistance of the third resistor?

Problem 2 You have a 2.0 Ω resistor, a 3.0 Ω resistor, a 6.0 Ω resistor, and a 6.0 Volt battery. Draw a diagram of a circuit in which all three resistors are used and the battery delivers 9.0 Watts of power.

Problem 3 For the circuit below, find the current through and the potential difference across each resistor.



Problem 4 For the circuit below, find the equivalent resistance. (Assume that each resistor has a resistance of R.)



Problem 5 You want to design an RC circuit that will slowly turn on a light over about a minute. The time constant for charging a capacitor is the same value as discharging the capacitor. If the light has a resistance of 20 Ω, what capacitance would the capacitor have for a time consant of one minute? You find that this is too slow for your application, if you had two of these capacitors how could you reduce the time constant by a factor of 2?