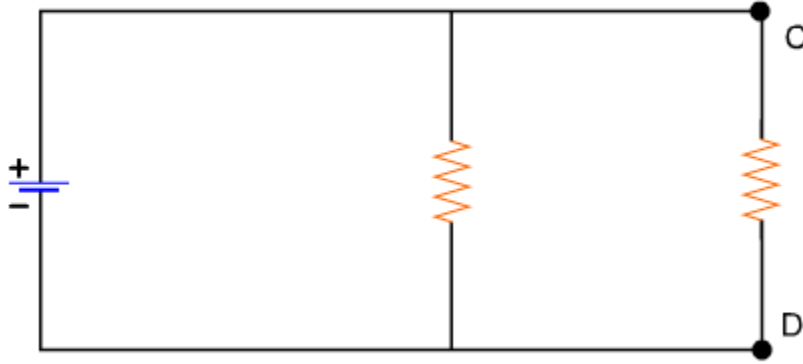


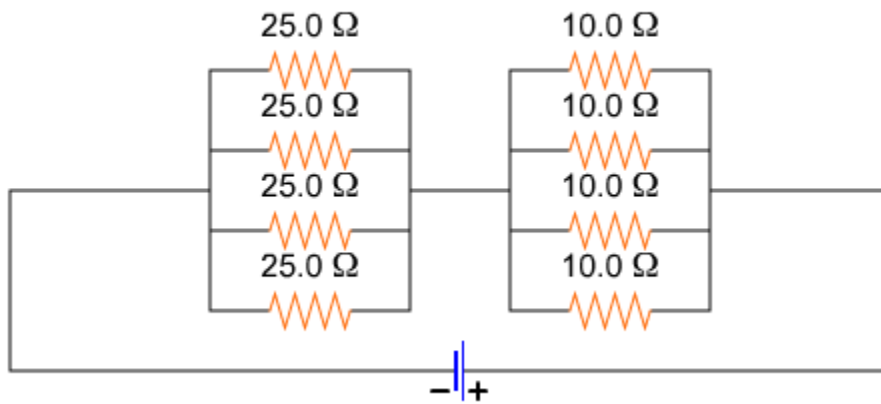
Ohm's Law Problem Set

1. A current of 1.00 mA passes through a copper wire for 60.0 s. (a) How many coulombs of charge pass any point in the wire during this time period? (b) How many electrons pass any point in the wire during this time period? (c) How many protons pass any point in the wire during this time period?
2. A device found at some amusement parks asks you to "test your personal force" by grasping two conducting bars, one in each hand, and tolerating a muscle-clenching flow of direct current through your body. Assuming that your body is an ohmic material, the resistance of your body between your two hands (if you are not sweating!) is about $1.00 \times 10^4 \Omega$. What voltage does the machine have to apply to the conducting bars to drive a current of 30.0 mA through your body, causing strenuous muscle contraction?
3. You find a used battery and discover that it is no longer strong enough to power your CD player. Out of curiosity, you decide to find out what potential difference it actually supplies. You connect it to a 1.25 k Ω resistor and an ammeter (a device that measures current) and discover that the current through the circuit is 1.03 mA. What is the potential difference?
4. A battery is connected to either (a) three 5 Ω resistors wired in series or (b) one 10 Ω resistor. Which configuration will have the most current flowing through it?
5. The four heating elements on an electric stove are wired in parallel so that any combination of them can be on at the same time. When an element is on, it behaves as a 6.70 Ω resistor. When all of the heating elements are on, what is the equivalent resistance of the stove?
6. Physicists often demonstrate the power of electricity by simulating lightning with a device called a Tesla coil. Charge is deposited onto a metal sphere until it amasses so much electric potential that it discharges through the air in the form of a spark. With larger Tesla coils, this spark resembles a miniature lightning bolt. Find the average current into a Tesla coil that amasses 1.38×10^{-6} C of charge in 5.72 s.
7. A certain lightbulb filament when hot has a resistance of 205 Ω . The potential difference across the filament at a certain instant is standard household voltage, 120 V. (a) What current is flowing through the bulb at that time?
8. Consider a circuit containing a battery and several resistors. You measure the current flowing out one end of the battery, and also measure the current entering the other end. Do you expect these measurements to be the same or different? Explain.
9. Are the light fixtures in a typical building wired in series or in parallel? How do you know?
10. The total potential difference across two resistors in series is 34.0 V. The current through them is 6.50 A. One resistor's resistance is 2.00 Ω . What is the other resistor's resistance?

11. The potential difference across points C and D is 9.2 V. The current flowing past C is 4.6 A. The two resistors are identical. (a) What is the resistance of each one? (b) What is their equivalent resistance?



12. What is the equivalent resistance of the circuit shown?



13. What will the ammeter read? Report this as a positive number

