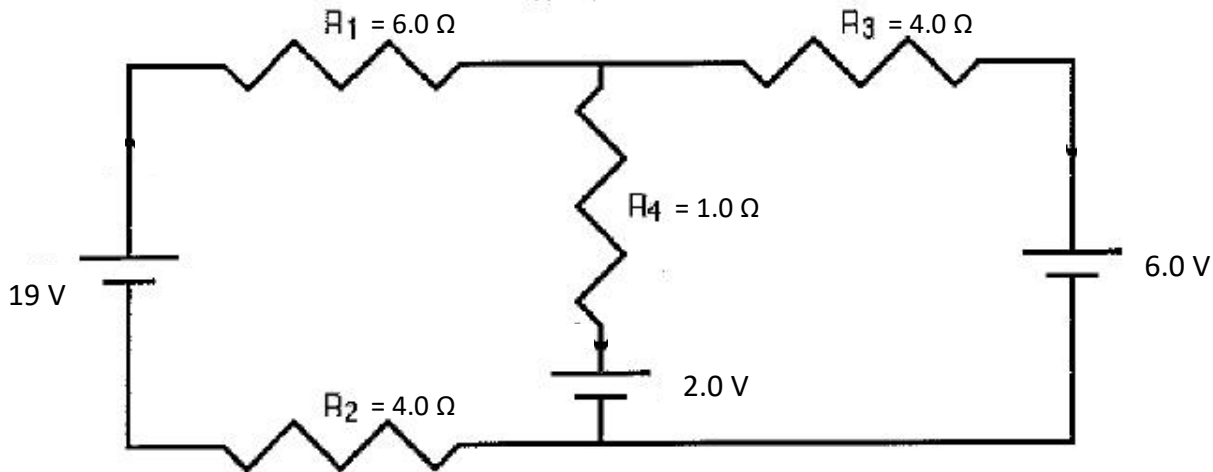
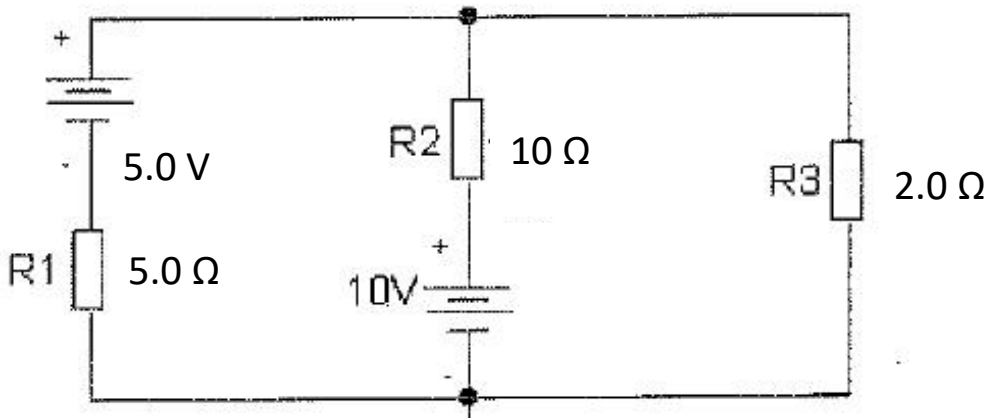


### Review Problems for Chapters 21-22 Test

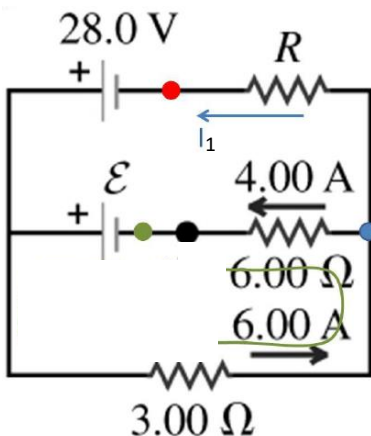
1. What is the resistance of 1.0 m of nichrome wire whose diameter is 0.04318 cm? The resistivity of nichrome is  $150 \times 10^{-8} \Omega\text{m}$ .
2. A lamp with a 100-Watt light bulb is plugged into a 120-Volt outlet.
  - a. How much current does the lamp draw?
  - b. What is the resistance of the lamp?
  - c. If electricity costs 10 cents per kiloWatt hour, how much does it cost to keep the lamp turned on for six hours?
3. Find all the currents in the circuit below:



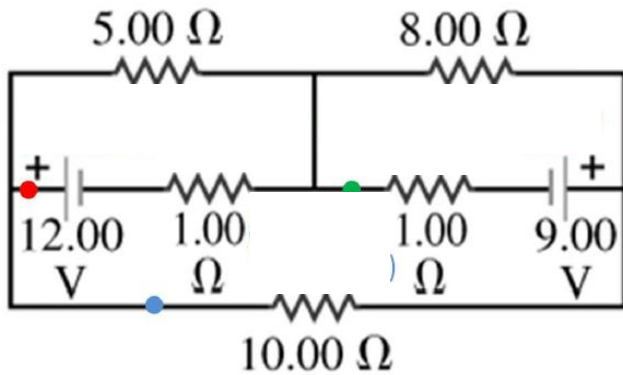
4. Find all the currents in the circuit below:



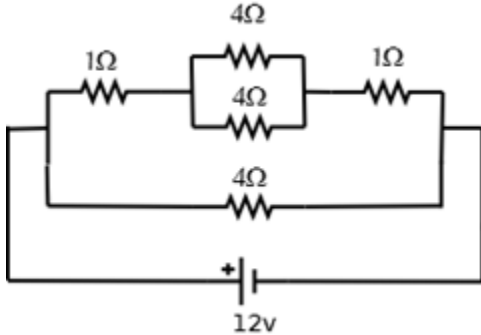
5. Find  $I_1$ ,  $R$ , and  $\epsilon$  in the circuit below:



6. Find all the currents in the circuit below:



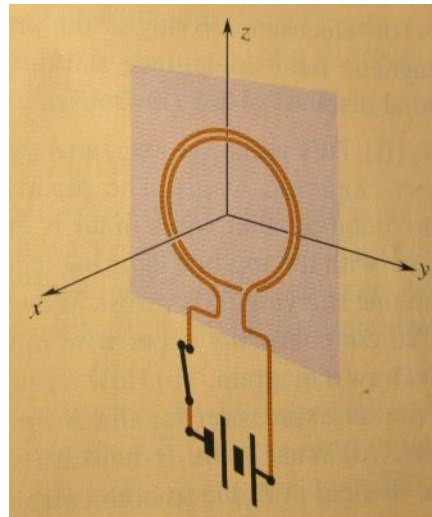
7. Find the equivalent resistance of the circuit below:



8. A straight wire 1.00 m long having a resistance of  $1.2 \Omega$  is attached to a 12-V battery. What is the magnitude of its B-field 2.0 cm away in air?

9. The figure at right shows a tight two-turn coil in air having a resistance of  $6.0 \Omega$  connected to an 18-V battery. The loop has a radius of 1.5 cm.

- How much current will flow through the coil when the switch is closed?
- In what direction will it flow, clockwise or counter-clockwise?
- In what direction is the B-field (generated by the current) at the center of the coil?
- How big is the B-field produced at the center?



10. We wish to pass 200 mA through a solenoid that is 25.0 cm long, in order to generate a B-field of 40.0 mT at its air-filled center. How many turns of wire must it have?

11. The 0.500-T magnetic field in a region is uniform and points in the positive x-direction. A small sphere with a mass of  $12 \times 10^{-5} \text{ kg}$  and a charge of  $30.0 \mu\text{C}$  is fired into that region at a speed of 950 m/s. If it enters at  $45.0^\circ$  to the positive x-axis, what are the magnitude and direction of the magnetic force it will experience?

12. A straight wire carrying 6.0 A of current from left to right makes an angle of  $31.2^\circ$  with a 0.01-T uniform B-field going straight out of the page. What are the magnitude and direction of the force exerted on a 1.0-cm length of wire?

13. A circular flat coil of wire encompassing an area of  $1.3 \times 10^{-3} \text{ m}^2$  has 20 turns and carries a current of 1.5 A. If it makes an angle of  $32^\circ$  with a B-field of 0.90 T, what is the magnitude of the torque acting on it?