

**Electrical Current and Circuits Unit
Pre-Quiz**

Directions: Use this pre-quiz to prepare for the Unit Quiz.

Part I Free Response

Question 1 Draw a series circuit with the following components. Use the symbols from your Reference Tables.

- (1) 9V battery
- (1) lamp
- (1) 10Ω resistor

Draw Circuit Here

- a) Calculate the total resistance in the circuit if the current through the lamp is 0.3A. Show all work in including equation, substitution and units.
- b) Calculate the resistance of the lamp.
- c) Calculate the potential difference across the lamp. Show all work in including equation, substitution and units.
- d) How does the current through the lamp compare to the current through the resistor?
- e) If the lamp is left on, how much electrical energy will the lamp use in 1 minute? Show all work in including equation, substitution and units.
- f) Draw the symbol for an ammeter to measure the current in the circuit.

Question 2 Draw a parallel circuit with the following components. Use the symbols from your Reference Tables.

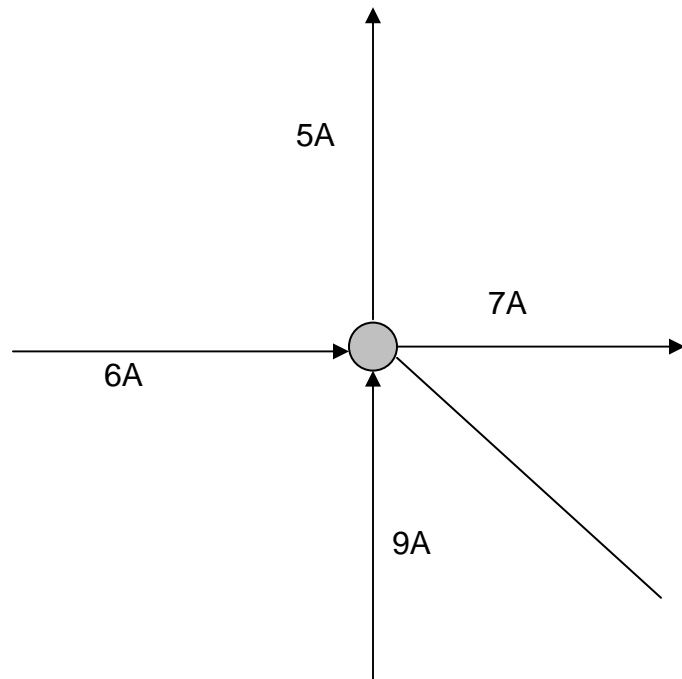
- (1) 9V battery
- (1) switch
- (3) lamps 6Ω each
 - label 1, 2, 3

Draw Circuit Here

- g) Calculate the total resistance in the circuit. Show all work in including equation, substitution and units.
- h) What is the voltage drop across lamp 1?
- i) Calculate the total current in the circuit. Show all work in including equation, substitution and units.
- j) What is the current moving through lamp 2?
- k) Draw the symbol for a voltmeter to measure the potential difference across lamp 3.
- l) If lamp 3 is removed
- a. How will this effect the brightness of the other two lamps?
 - b. What effect will this have on the total resistance?
- m) What is the power dissipated in lamp 2? Show all work in including equation, substitution and units.

Question 3

Determine the direction and magnitude (amount) of current that is flowing in the un-labeled line. Draw the arrow head and label the missing amount in amps.



Part II Multiple Choice

- 1) What is the resistance at 20°C of a 1.50-meter-long aluminum conductor that has a cross-sectional area of $1.13 \times 10^{-6} \text{ meter}^2$?
A) $3.74 \times 10^{-2} \Omega$ B) $1.87 \times 10^{-3} \Omega$ C) $1.33 \times 10^6 \Omega$ D) $2.28 \times 10^{-2} \Omega$
- 2) A current of 3.0 amperes is flowing in a circuit. How much charge passes a given point in the circuit in 30. seconds?
A) 10. C B) 33 C C) 90. C D) 0.10 C
- 3) A complete circuit is left on for several minutes, causing the connecting copper wire to become hot. As the temperature of the wire increases, the electrical resistance of the wire
A) decreases B) remains the same C) increases
- 4) A wire carries a current of 2.0 amperes. How many electrons pass a given point in this wire in 1.0 second?
A) 2.0×10^{18} B) 2.0×10^{19} C) 1.3×10^{19} D) 1.3×10^{18}
- 5) Pieces of aluminum, copper, gold, and silver wire each have the same length and the same cross-sectional area. Which wire has the *lowest* resistance at 20°C ?
A) gold B) silver C) copper D) aluminum
- 6) What is the current in an electric circuit if 10. coulombs of charge are transferred through the circuit in 5.0 seconds?
A) 15 A B) 50. A C) 2.0 A D) 0.50 A

