

Name: _____

Class Period: _____

**Physics: Circuits
Problem Set**

Concept Questions:

1. What are the properties of a series circuit and parallel circuit?
2. A cell phone ($R = 65.0 \Omega$), an ipod ($R = 80.0 \Omega$), and laptop ($R = 105 \Omega$) are wired in a series circuit, connected to a 120.0 v power source.
 - A. Which device receives the most voltage?
 - B. Through which device does the most current flow?

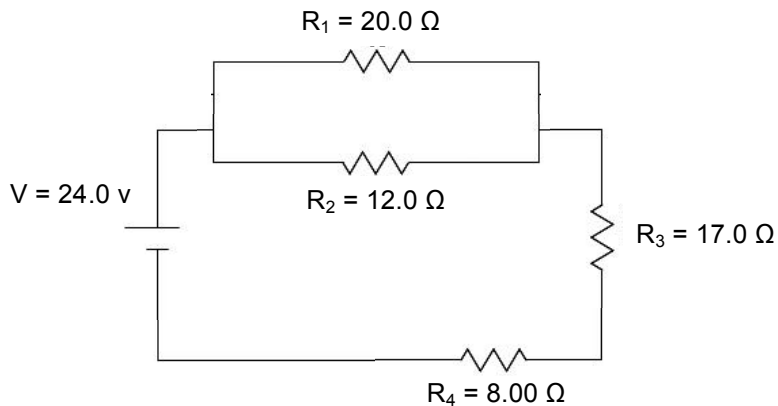
Lab Technique:

3. What do the colored bands mean on a resistor? (Know how to use the resistor color chart)
4. What do you never do when measuring resistance?
5. What does it mean if you see a 1. and no decimals after it on the multimeter display? What should you do?
6. What happens if you have your leads reversed/backwards?
7. What is different when you measure voltage vs current?

Mathematical Questions:

8. A light bulb has 480Ω of resistance and is connected to a 120 v emf.
 - A. What is the power emitted by the bulb?
 - B. What is the current of the bulb?
 - C. How much charge travels through this circuit in 20.0 s?
9. Three resistors are connected together in a **parallel** circuit ($R_1 = 10.0 \Omega$, $R_2 = 32.0 \Omega$, and $R_3 = 28.0 \Omega$). What is their equivalent resistance?
(Hint: It's not the same as if they were connected in a series)
10. Every morning, Sam plugs in his 18.0Ω toaster, his 11.0Ω electric hot plate, and 14.0Ω coffeemaker in all at the same time. They form a parallel circuit connected to a 120.0 v source.
 - A. Sketch the circuit.
 - B. What is the current through each device?
 - C. If the maximum amount of current flowing through the circuit is 15.0 A, can he have all three appliances plugged in at the same time?

11. A circuit has 3 resistors ($R_1 = 525.0 \Omega$, $R_2 = 750.0 \Omega$, and $R_3 = 980.0 \Omega$) connected in a series and connected to a voltage source of 85.0 v.
- Draw the circuit diagram for this circuit and find the equivalent resistance
 - What is the current from the battery?
 - How much voltage will each resistor receive?
12. Find the following for the circuit shown below:
- The equivalent resistance
 - The total current at the battery
 - The current and voltage through each resistor.



Numerical Answers:

8. A) $P = 30.0 \text{ W}$
 B) $I = 0.250 \text{ A}$
 C) $|\Delta q| = 5.00 \text{ C}$

9. $R_{eq} = 5.99 \Omega$

10. B) $I_1 = 6.67 \text{ A}$
 $I_2 = 10.9 \text{ A}$
 $I_3 = 8.57 \text{ A}$

- C) $I_{total} = 26.14 \text{ A}$
 (Too much for this circuit)

11. A) $R_{eq} = 2,255 \Omega$
 B) $I = 0.0378 \text{ A}$
 C) $V_1 = 19.8 \text{ v}$
 $V_2 = 28.4 \text{ v}$
 $V_3 = 37.0 \text{ v}$

12. A) $R_{eq} = 32.5 \Omega$
 B) $I = 0.738 \text{ A}$
 C)

	$R_1 =$ 20.0 Ω	$R_2 =$ 12.0 Ω	$R_3 =$ 17.0 Ω	$R_4 =$ 8.00 Ω
Current	0.277 A	0.462 A	0.738 A	0.738 A
Voltage	5.54 v	5.54 v	12.5 v	5.90 v