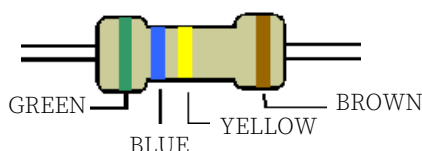


NAME: _____

Quiz 02: Ohm's Law

Answer each of the following questions. If a numerical answer is required, please show your work, express the answer with the correct number of significant digits, and include the algebraic sign where appropriate. Each question is worth 1 point, unless otherwise noted. There is no partial credit.

- True or **false**: Two bulbs in series are each brighter than a single bulb, when connected to the same 3V power source.
- True or **false**: If one bulb in a series circuit burns out, the remaining bulbs are unaffected.
- True** or false: If one bulb in a parallel circuit burns out, the remaining bulbs are unaffected.
- True or **false**: Two bulbs in series will draw more current than two bulbs in parallel when connected to the same 3V power supply.
- True** or false: If the power supply remains in the HI setting, the maximum current produced is sufficient to permanently damage the current probe.



- You are handed the 4-band resistor shown above. Use the color chart on the right to determine its resistance.
- True** or false: The example resistor shown above has a lower tolerance than those we used in lab.
- The 68Ω resistor has a tolerance of $\pm 5\%$. What would be the **smallest** value of measured resistance that would be within tolerance? Answer numerically with three sig figs.
- The 68Ω resistor has a tolerance of $\pm 5\%$. What would be the **largest** value of measured resistance that would be within tolerance? Answer numerically with three sig figs.
- When you test the 51Ω resistor, your slope has a value $R = 47.43\Omega$. Is this resistor within tolerance?
A) Yes. B) **No.** C) No way to tell!

Band 1	Band 2	Band 3	4 - BAND	Band 4
VALUE	VALUE	MULTIPLIER		TOLERANCE
BROWN 1	BLACK 0	BLACK $\times 1$ or no zeros		BROWN $\pm 1\%$
RED 2	BROWN 1	BROWN $\times 10$ or +1 zero		RED $\pm 2\%$
ORANGE 3	RED 2	RED $\times 100$ or +2 zeros		
YELLOW 4	ORANGE 3	ORANGE $\times 1k$ or +3 zeros		
GREEN 5	YELLOW 4	YELLOW $\times 10k$ or +4 zeros		GREEN $\pm 5\%$
BLUE 6	GREEN 5	GREEN $\times 100k$ or +5 zeros		BLUE $\pm 25\%$
VIOLET 7	BLUE 6	BLUE $\times 1M$ or +6 zeros		VIOLET $\pm 1\%$
GREY 8	VIOLET 7			GOLD $\pm 5\%$
WHITE 9	GREY 8	GOLD $\times 1$		SILVER $\pm 10\%$
	WHITE 9	SILVER $\times 0.1$		
VALUE	VALUE	MULTIPLIER		TOLERANCE

Green	Blue	Yellow
5	6	$\times 10k = 4 \text{ zeros}$
$R = 560,000\Omega$		

- When you test the 10Ω resistor, your slope has a value $R = 9.85\Omega$. What is the **percent error** in this value? Answer numerically with three sig figs.
- When two 10Ω resistors are wired in series, what was the slope of the voltage vs current graph? Select the response closest to the experimental value you recorded.
A) $R = 0\Omega$ B) $R = 5\Omega$ C) $R = 10\Omega$ D) **$R = 20\Omega$** E) $R = 100\Omega$

$$low = (0.95)(68\Omega) = 64.6\Omega$$

$$high = (1.05)(68\Omega) = 71.4\Omega$$

$$low = (0.95)(51\Omega) = 48.45\Omega$$

$$\%error = \left[\frac{10 - 9.85}{10} \right] \times 100 = 1.5\%$$

- When a 51Ω resistor is wired in series with a 68Ω resistor, what slope (equivalent resistance) would you expect? Answer numerically with three sig figs.

$$R = R_1 + R_2$$

$$R = 51\Omega + 68\Omega = 119\Omega$$

- True or false: The light bulb is non-ohmic.
- What does the break, or discontinuity, in the voltage vs current curve for the light bulb mean?
A) It means that the person increasing the voltage stopped for a moment, then continued to turn the knob.
B) It means that the bulb is faulty. A properly functioning bulb should have a perfectly linear graph, just like the resistors.
C) **The bulb starts with a lower resistance. When the filament starts to glow, the resistance increases because of the heat generated.**
D) The bulb starts with a *higher* resistance. When the filament starts to glow, it reduces the resistance and the slope of the curve decreases.
E) What discontinuity? The graph starts perfectly linear, and remains perfectly linear over the entire range of voltage tested.