**NOTES 8.3: Resistance and Ohm’s Law**

**What is resistance?**



Which tube has more ***resistance***? (circle the correct one)

**Resistors**

 ****

**OHMS LAW:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**How is voltage related to current?**

****The amount of current that flows through a wire depends on the voltage. The greater the voltage the faster the charges flow.

**V = IR**

**If ↑ V then ↑ I**

**If ↓ V then ↓ I**

**How is current related to resistance?**

Amount of current also depends on
how the wire resists the flow of the charge.

**V = IR**

**If ↓ R then ↑ I**

**If ↑ R then ↓ I**

**Ohm’s Law**

Unit for Resistance is called the \_\_\_\_\_\_\_\_\_\_\_ ( )

**Ohm’s Law is the relationship between Voltage (V), Current (I), and Resistance (R):**

**Resistor Colour code**



**Problem:** A vacuum cleaner is plugged into a 120 V outlet. The vacuum cleaner is rated at 12000 mA. What is the resistance of the motor and circuitry of the vacuum? (V=IR)

1. Identify the known variables.
2. Identify all the unknown variables.
3. Adjust formula to solve for unknown.
4. Convert all values to standard units!
5. Substitute the numbers into the formula and solve.

**Practice:**

**Recall Conversions:** To use Ohm’s Law, units must be in the standard ***volts (V), amperes (A), and ohms (Ω)***.

Mega = 1 000 000 times, kilo = 1000 times, milli = 1/1000 times (times the base unit)

|  |  |  |  |
| --- | --- | --- | --- |
| Current **Conversion** | **Conversion Factors** | **Conversion**  | **Conversion Factor** |
| **1 kA = 1000 A** | $\frac{1 kA}{1000 A}$ **or** $\frac{1000 A}{1 kA} $ | **1 A = 1000 mA** | $\frac{1 A}{1000 mA}$ **or** $\frac{1000 mA}{1 A}$ |
| **Conversion**  | **Conversion Factor** |
| **1 MA = 1000 kA=**$1×10^{6}$**A** | $\frac{1 MA}{1×10^{6} A}$ **or** $\frac{1×10^{6} m}{1 MA}$ |

 **Conversion practice**

3.54 MV x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ V

1 kV x \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ V

1000 mV x \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ V

**CURRENT:**

1 MA x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ A

1 kA x \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ A

1000 mA x \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ A

**RESISTANCE:**

1 MΩ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ω

1 kΩ x \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ Ω

1000 mΩ x \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_ Ω

**Practice Problems Pg. 293 #1 – 3 – Ohm’s Law Calculations –no conversions!**

1.
2.

**Pg. 294 #1 – 3 (Conversions required before using formula)**

1.
2.

***Assign:*** *On a separate piece of paper, do pg. 301 #8 – 13; pg. 303 #26 – 31*