**Ohm’s Law**

*Review the Textbook on Current, Voltage, and Resistance measurements.*

- **Phys 1402:** Serway/Vuille: Sections 17.3, 17.4; Quick Quiz 17.4, 17.5
- **Phys 2426:** Serway/Jewett: Sections 27.1, 27.2; Quick Quiz 27.2, 27.3

1. Name the devices for measurements of: (a) current, (b) potential difference, and (c) resistance.
   (a. Ammeter; b. Voltmeter; c. Ohmmeter)

2. What is the value of the current flowing through the circuit shown in Figure 1?
   (4 A)

3. What is the direction of the current (clockwise or counterclockwise) in Picture 1?
   (Clockwise)

4. If internal resistance of the battery shown in Picture 1 is 0.1Ω, what is emf of the battery?
   (12.4V)

5. How much power dissipates in the circuit shown in Picture 1?
   (49.6W)

6. What length of 3 mm diameter copper wire is needed to make 0.168Ω resistor, if the resistivity of copper is 1.72×10⁻⁸ Ω·m?
   (69.0m)

7. Of the five wires listed in Table 1, which one has the smallest resistance?
   (D, with a resistance of 0.0152 Ω.)

8. If the five wires listed in Table 1 are connected to identical batteries, which one carries the smallest current?
   (A, with a resistance of 0.603 Ω.)

<table>
<thead>
<tr>
<th>Wire</th>
<th>Material</th>
<th>Length</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Iron</td>
<td>2.0m</td>
<td>6.4e-4m</td>
</tr>
<tr>
<td>B</td>
<td>Copper</td>
<td>2.0m</td>
<td>6.4e-4m</td>
</tr>
<tr>
<td>C</td>
<td>Copper</td>
<td>2.0m</td>
<td>1.2e-3m</td>
</tr>
<tr>
<td>D</td>
<td>Copper</td>
<td>1.0m</td>
<td>1.2e-3m</td>
</tr>
<tr>
<td>E</td>
<td>Iron</td>
<td>2.0m</td>
<td>1.2e-3m</td>
</tr>
</tbody>
</table>

**Table 1:** Materials and dimensions of resistors; resistivity of copper is 1.72e⁻⁸ Ωm; resistivity of iron is 9.7e⁻⁸ Ωm