Resistivity and Ohm's Law Worksheet

1) What is the current in an electric circuit if 10. coulombs of charge are transferred through the circuit in 5.0 seconds?

2) During a thunderstorm, a lightning strike transfers 12 coulombs of charge in $2.0 \times 10^{-3}$ second. What is the average current produced in this strike?

3) A wire carries a current of 2.0 amperes. How many electrons pass a given point in this wire in 1.0 second?

4) Plastic insulation surrounds a wire having diameter $d$ and length $l$ as shown below.

   ![Diagram of a wire with plastic insulation]

   A decrease in the resistance of the wire would be produced by an increase in the
   A) length $l$ of the wire   C) temperature of the wire
   B) diameter $d$ of the wire   D) thickness of the plastic insulation

5) 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) 90. C   B) 0.10 C   C) 10. C   D) 33 C

6) A manufacturer recommends that the longer the extension cord used with an electric drill, the thicker (heavier gauge) the extension cord should be. This recommendation is made because the resistance of a wire varies
   A) directly with length and inversely with cross-sectional area
   B) inversely with length and directly with cross-sectional area
   C) inversely with both length and cross-sectional area
   D) directly with both length and cross-sectional area

7) 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

8) A 0.500-meter length of wire with a cross-sectional area of $3.14 \times 10^{-6}$ meters squared is found to have a resistance of $2.53 \times 10^{-3}$ ohms. According to the resistivity chart, the wire could be made of
   A) silver   B) aluminum   C) copper   D) nichrome

9) 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) aluminum   C) copper   D) silver
10) Which graph best represents the relationship between resistance and length of a copper wire of uniform cross-sectional area at constant temperature?

A) 

B) 

C) 

D) 

11) The table below lists various characteristics of two metallic wires, A and B.

<table>
<thead>
<tr>
<th>Wire</th>
<th>Material</th>
<th>Temperature (°C)</th>
<th>Length (m)</th>
<th>Cross-Sectional Area (m²)</th>
<th>Resistance (Ω)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>silver</td>
<td>20.</td>
<td>0.10</td>
<td>0.010</td>
<td>R</td>
</tr>
<tr>
<td>B</td>
<td>silver</td>
<td>20.</td>
<td>0.20</td>
<td>0.020</td>
<td>???</td>
</tr>
</tbody>
</table>

If wire A has resistance R, then wire B has resistance

A) R  
B) 4R  
C) \( \frac{R}{2} \)  
D) 2R

12) Several pieces of copper wire, all having the same length but different diameters, are kept at room temperature. Which graph best represents the resistance, R, of the wires as a function of their cross-sectional areas, A?

A) 

B) 

C) 

D) 