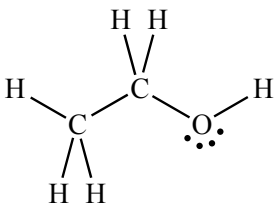
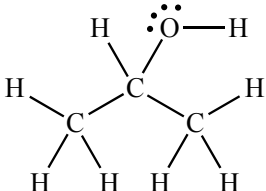
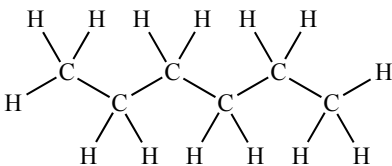
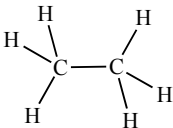
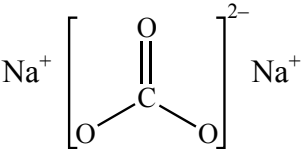
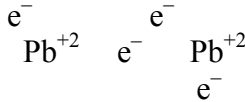
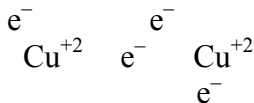
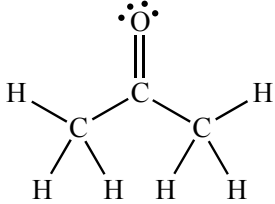

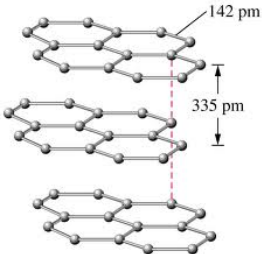
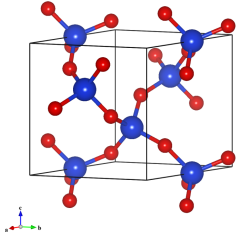


**Demo [15 pts]**  
**Conductivity, bp and mp**

Name \_\_\_\_\_  
 Period \_\_\_\_\_ Date \_\_\_\_\_

**Introduction:** To study and understand the conductivity, melting pts and boiling pts of substances.

**TABLE OF ALL THE SUBSTANCES IN THIS LAB:**

<u>POLAR COVALENT MOLECULAR</u>	<u>NON POLAR COVALENT MOLECULAR</u>	<u>IONIC</u>	<u>METALLIC</u>
<p><b>ethyl alcohol</b>            mp = -117.3°C            bp = 78.5°C</p>  <p><b>isopropyl alcohol</b>            mp = -89.5°C            bp = 82.4 °C</p> 	<p><b>Hexane</b>            mp = -95°C            bp = 69°C</p>  <p><b>ethane gas</b>            mp = -183°C            bp = -88°C</p> 	<p><b>NaCl</b>            (Sodium Chloride)            mp = 800°C</p> <p>Na<sup>+</sup> Cl<sup>-</sup></p> <p><b>Na<sub>2</sub>CO<sub>3</sub></b>            (sodium Carbonate)            mp = 851°C</p> 	<p><b>Lead (Pb)</b>            mp = 327°C</p>  <p><b>Copper (Cu)</b>            mp = 1085°C</p> 
<p><b>Acetone</b>            mp = -95.4°C            bp = 56.2 °C</p> 	<p style="text-align: center;"><u>NETWORK COVALENT</u></p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="565 1157 813 1514"> <p><b>Diamond (C)</b>              mp = 3550°C</p>  </div> <div data-bbox="943 1125 1203 1472"> <p><b>Graphite (C)</b>              mp = 3500°C</p>  </div> <div data-bbox="1260 1125 1495 1472"> <p><b>Quartz (SiO<sub>2</sub>)</b>              (no distinct mp)</p>  </div> </div>		

**PART 1: Conductivity:** I will demonstrate the conductivity of each of the following substances using the light bulb set up. Record conductivities below.

lead (s) \_\_\_\_\_ Na<sub>2</sub>CO<sub>3</sub> (s) \_\_\_\_\_ NaCl (aq) \_\_\_\_\_  
 copper (s) \_\_\_\_\_ NaCl (s) \_\_\_\_\_ graphite \_\_\_\_\_

1) Do copper and lead conduct electricity when solids? \_\_\_\_\_ Explain why or why not. (Include a description of their general structure.)

- 2) Does a solution of NaCl dissolved in water,  $\text{NaCl (aq)}$ , conduct electricity? \_\_\_\_\_  
Explain why or why not. *(Include a description of what is in the solution.)*
- 3) As pure solids, do  $\text{Na}_2\text{CO}_3$  and NaCl conduct electricity? \_\_\_\_\_  
Explain why or why not. *(Include a description of what the solids consist of.)*
- 4) Would molten NaCl,  $\text{NaCl (l)}$ , conduct electricity? \_\_\_\_\_ Explain why or why not. *(Again- describe substance.)*
- 5) Does graphite conduct electricity? \_\_\_\_\_ Explain why or why not. *(Include a description of its structure.)*
- 6) Diamond does **not** conduct electricity. Explain why not. *(Include a description of its structure.)*

**PART 2: Range of Melting points:** Look at the melting points of **ALL** the substances listed on front.

- 7) What is the melting point of NaCl? \_\_\_\_\_ This is a relatively high melting point. Explain why it is so high. *(Be specific describe the attractions that must be broken and explain why they are so strong.)*
- 8) What is the melting point of lead? \_\_\_\_\_ This is a relatively high melting point. Explain why it is so high. *(Be specific describe the attractions that must be broken and explain why they are so strong.)*

9) Give the names of the three network covalent substances listed on the front page of this demo:

\_\_\_\_\_

Why do these substances have such high melting points?

**PART 3: Boiling Point Comparisons:** Look at boiling points and structures on front.

10) Draw two molecules of isopropyl alcohol, put in partial charges and use a dotted line to show an attraction between molecules (Show an example of the strongest possible type of attraction.)

11) Draw two molecules of acetone, put in partial charges and use dots to show attraction between molecules. (Again, show an example of the strongest possible type of attraction.)

12) For both of the diagrams in #10 and #11, write in the type of intermolecular bond which holds the two molecules together. Draw an arrow pointing to where that intermolecular bond is in each diagram.

13) What is acetone's boiling point? \_\_\_\_\_ What is isopropyl alcohol's? \_\_\_\_\_  
Why is acetone's boiling point considerably lower than isopropyl alcohol's?

14) What is ethane's boiling point? \_\_\_\_\_ What is ethyl alcohol's boiling point? \_\_\_\_\_  
Why does ethane have a significantly lower boiling point than ethyl alcohol?

15) What is the boiling point of hexane? \_\_\_\_\_ What is the boiling point of ethane? \_\_\_\_\_  
Why does hexane have a considerably higher boiling point than ethane? (*Be careful—both are NP*)