**BONDING REVIEW**

Read over all your notes and understand all details

**BONDING**

1. An atom has 6 total electrons. How many electrons will be involved in bonding with another atom?  
   ![4 valence](only involved in bonding)

2. Intramolecular bonds are bonds _______ molecules while Intermolecular bonds are bonds _______ molecules.

3. What is Electronegativity?

4. Fill in this table for **Intramolecular bonds**

<table>
<thead>
<tr>
<th>TYPE OF BOND</th>
<th>IS BETWEEN?</th>
<th>Eneg Diff</th>
<th>Electron sharing?</th>
<th>Type of charges produced</th>
<th>2. EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polar covalent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-polar covalent</td>
<td></td>
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</tr>
</tbody>
</table>

5. Fill in this table for the following compounds:

<table>
<thead>
<tr>
<th>Formula</th>
<th>Eneg Diff</th>
<th>Type of Intramolecular bond</th>
<th>Type of Intermolecular bond</th>
<th>Lewis dot diagram</th>
<th>Structural Diagram showing charges (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCl</td>
<td>0.6</td>
<td>Polar covalent</td>
<td>Dipole - Dipole</td>
<td><img src="" alt="Lewis dot diagram" /></td>
<td><img src="H-Cl-s" alt="Structural diagram" /></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td>CCl₄</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Cl₂</td>
<td></td>
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</tr>
<tr>
<td>Compound</td>
<td>Type of Bond</td>
<td>Polarity</td>
<td>Lewis Structure</td>
<td>Intermolecular Bonds</td>
<td></td>
</tr>
<tr>
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<tr>
<td>CO₂</td>
<td>Polar</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>C₂Cl₂</td>
<td>Polar</td>
<td>Dipole-Dipole</td>
<td>C-Cl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N₂</td>
<td>Nonpolar</td>
<td></td>
<td></td>
<td>N≡N</td>
<td></td>
</tr>
<tr>
<td>PO₄³⁻</td>
<td></td>
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</tr>
</tbody>
</table>

6. Fill in this table for Intermolecular bonds:

<table>
<thead>
<tr>
<th>Intermolecular bond</th>
<th>How it works (words and diagrams)</th>
<th>Type of molecules they primarily hold (give 2 examples)</th>
<th>Rank in strength</th>
<th>How to strengthen it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionic (crystal lattice)</td>
<td></td>
<td></td>
<td></td>
<td>-greater charge -smaller radius between atoms</td>
</tr>
<tr>
<td>London force</td>
<td></td>
<td></td>
<td></td>
<td>-more ○</td>
</tr>
<tr>
<td>Dipole-Dipole</td>
<td></td>
<td></td>
<td></td>
<td>-greater E_{\text{rep}} diff</td>
</tr>
<tr>
<td>Hydrogen bonds</td>
<td></td>
<td></td>
<td></td>
<td>F &gt; O &gt; N</td>
</tr>
</tbody>
</table>
7. Rank the following from highest to lowest M.P. /B.P.
KCl  H₂O  MgCl₂  He gas  CO  P₂O₅  CH₄  O₂

SOLUTION CHEMISTRY

8a. Chemical A, B, and C are added to water. Chemical A 'disappears' quickly, some of chemical B remains but most also 'disappears', and C 'just floats there'. Based on these observations, what types of molecules (I,PC,NPC) are:

A: __________________ B: __________________ C: __________________

b. What type of solvent (I, PC, NPC) would dissolve chemical C?

9a. Show how water can dissolve salt using words and diagrams. Mention the intermolecular bonding involved.

b. Show why oil and water don’t mix using words and diagrams.
Review and Practice

1. Calculate the concentration of the solute in mol/L in each of the following diluted solutions:
   a. 125 mL of 0.64 M HCl diluted to 2.0 L
   b. 25.0 mL of 0.22 M MgSO₄ diluted to 500.0 mL
   c. 10.0 mL of 4.0 M KOH diluted to 5.0 L
   d. 1.00 mL of 0.50 M NH₄Cl diluted to 250.0 mL

2. For each given solution, calculate the volume required to prepare each of the following diluted solutions:
   a. Given 6.0 M NaOH; need 5.0 L of 0.10 M NaOH.
   b. Given 12 M HNO₃; need 250 mL of 0.20 M HNO₃.
   c. Given 2.0 M HCl; need 0.50 L of 0.010 M HCl.
   d. Given 1.0 M BaCl₂; need 125 mL of 0.040 M BaCl₂.

3. Write dissociation equations for each of the following solutions and then calculate the concentration of each ion in each solution:
   a. 0.060 M Fe₂(SO₄)₃
   b. 2.40 M Li₃PO₄
   c. 0.23 M Ca(OH)₂
   d. 1.7 M (NH₄)₂PO₄
   e. 0.42 M Mg(ClO₄)₂

4. Calculate the concentration of each ion in each of the following mixed solutions in which no reaction occurs:
   a. 2.0 L of 0.40 M MgSO₄ mixed with 2.0 L of 0.080 M KI
   b. 3.0 L of 0.48 M NaOH mixed with 1.0 L of 0.32 M KOH
   c. 200 mL of 0.6 M AlBr₃ mixed with 300 mL of 0.4 M BaBr₂
   d. 20.0 mL of 0.50 M FeCl₃ mixed with 80.0 mL of 0.15 M NH₄Cl
   e. 6.4 g of NaCl and 5.2 g of KCl dissolved and made up to 250 mL

5. What is the identity of the precipitate formed during the reaction between lead(II) nitrate and potassium iodide?

6. Write a balanced equation for the reaction between solutions of silver nitrate and sodium chloride.

7. Write the net ionic equation for the following reactions:
   a. silver nitrate and sodium chloride
   b. lead(II) nitrate and potassium bromide
   c. sodium sulfate and barium chloride

8. Use Sol. Tab. to determine which of the following compounds are insoluble in water:
   a. sodium hydroxide
   b. ammonium acetate
   c. calcium sulfate
   d. lead(II) chloride
   e. potassium chloride
   f. calcium bromide

9. Why are spectator ions deleted to form net ionic equations?

10. Using Sol. Tab. to help determine solubilities, write the balanced formula equation for each of the following reactions. Then change each equation to the ionic form, and finally to the net ionic equation.
   a) NaOH(aq) + HCl(aq) →
   b) Bi(NO₃)₃(aq) + NaOH(aq) → Bi(OH)₃ + 3NaNO₃
   c) Pb(C₂H₅O₂)₂(aq) + K₂SO₄(aq) →