REVIEW QUESTIONS
Chapter 5

1. Two samples of a compound containing carbon and chlorine are decomposed and the following data was obtained:

<table>
<thead>
<tr>
<th>Sample 1</th>
<th>Sample 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>38.9 g C</td>
<td>14.8 g C</td>
</tr>
<tr>
<td>448 g Cl</td>
<td>134 g Cl</td>
</tr>
</tbody>
</table>

Based on the data obtained, are these samples the same compound? Show why or why not.

Compare the % C in the two samples to see if these are the same compound or not:

\[
\text{% C in sample 1} = \frac{38.9 \text{ g C}}{486.9 \text{ g total}} \times 100 = 7.99\% \\
\text{% C in sample 2} = \frac{14.8 \text{ g C}}{148.8 \text{ g total}} \times 100 = 9.95\%
\]

Alternately, 

\[
\text{sample 1} = \frac{38.9 \text{ g C}}{448 \text{ g Cl}} = 0.0868 \\
\text{sample 2} = \frac{14.8 \text{ g C}}{134 \text{ g Cl}} = 0.110
\]

Therefore samples are not the same compound

2. A 7.83 g sample of HCN contains 2.90 g of H and 4.06 g of N. Find the mass of carbon in a sample of HCN with a mass of 3.37 g.

mass of carbon in sample = 7.83 g – (2.90 g + 4.06 g) = 0.87 g

\[
\text{% C in sample 1} = \frac{0.87 \text{ g C}}{7.83 \text{ g total}} \times 100 = 11.1\%
\]

mass of C in sample 2 = 3.37 g total \(\times\) \(\frac{11.1 \text{ g C}}{100 \text{ g total}}\) = 0.37 g C \quad (2 \text{ sf})

3. For the compounds listed below, determine the number of elements and the total number of atoms in each:

a) C\textsubscript{17}H\textsubscript{22}Cl\textsubscript{2}NO\textsubscript{4} 
   \# of elements: 5 
   \# of atoms: 45

b) (NH\textsubscript{4})\textsubscript{2}Cr\textsubscript{2}O\textsubscript{7} 
   \# of elements: 4 
   \# of atoms: 19

c) CuSO\textsubscript{4}•5 H\textsubscript{2}O 
   \# of elements: 5 
   \# of atoms: 21
4. Complete the table below with the missing information:

<table>
<thead>
<tr>
<th>Formula</th>
<th>No. of ions</th>
<th>No. of Oxygen atoms</th>
<th>No. of Hydrogen atoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al(HSO₄)₃</td>
<td>4</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>Ca(C₂H₃O₂)₂</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>(NH₄)₃PO₄</td>
<td>4</td>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

5. Name each compound shown below:
   a) KClO₃  __potassium chlorate__
   b) Fe(OH)₃ __iron (III) hydroxide__
   c) Ag₂S  __silver sulfide__
   d) BrF₅  __bromine pentafluoride__
   e) Pb(CO₃)₂ __lead (IV) carbonate__
   f) NI₃  __nitrogen triiodide__

6. Write formula for each compound below:
   a) copper(II) chlorite __Cu(ClO₂)₂__
   b) tetraphosphorus triselenide __P₄Se₃__
   c) iron(II) phosphate __Fe₃(PO₄)₂__
   d) magnesium nitride __Mg₃N₂__
   e) ammonium carbonate __(NH₄)₂ CO₃__
7. Is each name correct for the given formula? If not, provide the correct name.

   a) \( \text{HNO}_3 \) (aq) \hspace{1cm} \text{hydrogen nitrate} \hspace{1cm} \text{nitric acid}

   b) \( \text{CaI}_2 \) \hspace{1cm} \text{calcium diiodide} \hspace{1cm} \text{calcium iodide}

   c) \( \text{Pb}((\text{CO}_3)_2) \) \hspace{1cm} \text{lead(I) carbonate} \hspace{1cm} \text{lead(IV) carbonate}

   d) \( \text{PCl}_5 \) \hspace{1cm} \text{phosphorus chloride} \hspace{1cm} \text{phosphorus pentachloride}

8. Complete the table below with the missing information:

<table>
<thead>
<tr>
<th>Formula</th>
<th>Type of Compound (Ionic, Molecular, Acid)</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{N}_2\text{H}_4 )</td>
<td>molecular</td>
<td>\text{dinitrogen tetrahydride}</td>
</tr>
<tr>
<td>( \text{KNO}_3 )</td>
<td>ionic</td>
<td>\text{potassium nitrate}</td>
</tr>
<tr>
<td>( \text{H}_2\text{CO}_3 )</td>
<td>acid</td>
<td>\text{carbonic acid}</td>
</tr>
<tr>
<td>( \text{CBr}_4 )</td>
<td>molecular</td>
<td>\text{carbon tetrabromide}</td>
</tr>
</tbody>
</table>