Mole Conversions and Other review!

Name________________________________________

Part 1 – One Step Mole Conversions

Moles -> atoms [How many atoms are in...] 
1. 0.5 moles of Manganese (Mn) 
2. 10 moles of Aluminum (Al) 

Atoms → Moles [How many moles are...] 
3. 12.04x10^23 atoms Vanadium (V) 
4. 3.01x10^23 atoms Mercury (Hg) 

Mole -> Grams 
5. What is the mass of 2.25 mol of iron, Fe? 
6. What is the mass of 0.375 mols potassium, K? 

Grams -> moles 
7. How many moles are in 12.15 g Mg 
8. How many moles are in 18g Carbon? 

Part 2: Two Step Problems 

Atom <-> grams 
1. What is the mass in grams of 7.5 × 10^15 atoms of nickel, Ni? 
2. What is the mass of 12 x 10^23 atoms of Arsenic, As? 
3. How many atoms of sulfur, S, are in 4.00 g of sulfur? 
4. How many atoms are in 16g of Oxygen 

Part 3: Doing problems with compounds instead of elements 

1. How many molecules of water (H₂O) do you have in a 10g sample? 
2. A can of soda has 39g of Sugar (C₆H₁₂O₆), how many moles of sugar do we have? 
3. How many molecules of Methane (CH₄) are in a 23g sample? 
4. There are 7x10²⁰ Formula Units of salt (NaCl) in a grain of salt. How many moles of Salt do we have? 
5. A bottle of Hydrogen Peroxide (H₂O₂) contains 500g. How many molecules are there?
6. There are 700 moles of Hydrogen Gas (H₂) in a Balloon. How many grams of gas are there?

7. A bottle of vinegar contains 5 moles of Acetic Acid (CH₃COOH). How many molecules are there?

8. A piece of chalk (CaCO₃) weigh 2g. How many molecules of chalk are there?

**Part 4: Oxidation Number Practice**

Assign oxidation numbers to each atom in the following compounds or ions:

a. HCl  
   c. PCl₃  
   e. HNO₃  
   g. P₄O₁₀  
   i. N₂O₅

b. CF₄  
   d. SO₂  
   f. KH  
   h. HClO₃  
   j. GeCl₂

**Part 5: Percent Composition Practice**

1. Find the percentage compositions of the following:
   
   a. PbCl₂  
   b. Ba(NO₃)₂

2. Find the mass percentage of water in ZnSO₄•7H₂O.

3. Magnesium hydroxide is 54.87% oxygen by mass. How many grams of oxygen are in 175 g of the compound? How many moles of oxygen is this?

4. A first year chemistry students made three batches of ethanol. They got percent compositions for each samples to be the following:

<table>
<thead>
<tr>
<th>Sample</th>
<th>% Carbon</th>
<th>% Hydrogen</th>
<th>% Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1</td>
<td>37.48%</td>
<td>12.58%</td>
<td>49.94%</td>
</tr>
<tr>
<td>Sample 2</td>
<td>52.14%</td>
<td>13.13%</td>
<td>34.73%</td>
</tr>
<tr>
<td>Sample 3</td>
<td>46.13%</td>
<td>12.90%</td>
<td>40.97%</td>
</tr>
</tbody>
</table>

The student thinks that some of her samples may be contaminated with water (effecting their % results in the table above) Which Samples have been contaminated? How do you know?

**Part 6: Naming**

Name all the compounds in Part 4