

REVIEW QUESTIONS

Chapter 5

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

Sample 1	38.9 g C	448 g of Cl
Sample 2	14.8 g C	134 g of Cl

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:

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

Alternately,

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

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.

$$\text{mass of carbon in sample} = 7.83 \text{ g} - (2.90 \text{ g} + 4.06 \text{ g}) = 0.87 \text{ g}$$

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

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

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

a) $\text{C}_{17}\text{H}_{22}\text{ClNO}_4$ # of elements: 5 # of atoms: 45

b) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ # of elements: 4 # of atoms: 19

c) $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$ # of elements: 5 # of atoms: 21

4. Complete the table below with the missing information:

Formula	No. of ions	No. of Oxygen atoms	No. of Hydrogen atoms
$\text{Al}(\text{HSO}_4)_3$	4	12	3
$\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$	3	4	6
$(\text{NH}_4)_3\text{PO}_4$	4	4	12

5. Name each compound shown below:

a) KClO_3 potassium chlorate

b) $\text{Fe}(\text{OH})_3$ iron (III) hydroxide

c) Ag_2S silver sulfide

d) BrF_5 bromine pentafluoride

e) $\text{Pb}(\text{CO}_3)_2$ lead (IV) carbonate

f) NI_3 nitrogen triiodide

6. Write formula for each compound below:

a) copper(II) chlorite $\text{Cu}(\text{ClO}_2)_2$

b) tetraphosphorus triselenide P_4Se_3

c) iron(II) phosphate $\text{Fe}_3(\text{PO}_4)_2$

d) magnesium nitride Mg_3N_2

e) ammonium carbonate $(\text{NH}_4)_2\text{CO}_3$

7. Is each name correct for the given formula? If not, provide the correct name.

- a) HNO_3 (aq) ~~hydrogen nitrate~~ **nitric acid**
- b) CaI_2 ~~calcium diiodide~~ **calcium iodide**
- c) $\text{Pb}(\text{CO}_3)_2$ ~~lead(II) carbonate~~ **lead(IV) carbonate**
- d) PCl_5 ~~phosphorus chloride~~ **phosphorus pentachloride**

8. Complete the table below with the missing information:

Formula	Type of Compound (Ionic, Molecular, Acid)	Name
N_2H_4	molecular	dinitrogen tetrahydride
KNO_3	ionic	potassium nitrate
H_2CO_3	acid	carbonic acid
CBr_4	molecular	carbon tetrabromide