$6.02 \times 10^{23} =$ molecules/atoms

Name Mary B

1. What is the mass (in grams) of 3.50 mol of Cl_2 ?

$$\frac{3.50 \text{ mol} \mid 70.9 \text{ mass}}{\mid 1 \text{ mol}} = 248.15$$

(2 ×35.45)

2. How many moles of CH_4 are in 338 grams of CH_4 ?

$$\frac{338 \text{ g} \mid 1 \text{ mol}}{\mid 16.01 \text{ g}} = \boxed{21.1 \text{ moles}}$$

12.01 + 1.00×4

3. How many molecules of N_2O_5 are in 3.50 mol of N_2O_5?

$$\frac{3.50 \text{ mol} \mid 6.02 \times 10^{23}}{\mid 1 \text{ mol}} = 2.107 \times 10^{24}$$

4. How many moles of copper are in 1.204×10^{24} Cu atoms?

$$\frac{1.204 \times 10^{24} \mid \text{mol} \mid 1 \text{ moles}}{\mid 6.02 \times 10^{23}} = 2 \text{ moles}$$

5. How many molecules of N_2O are in 2.50 mol of N_2O?

$$\frac{2.50 \text{ moles} \mid 6.02 \times 10^{23}}{\mid 1 \text{ moles}} = 1.50 \times 10^{24}$$

6. How many moles of iron are in 275 Fe atoms?

$$\frac{275 \text{ atoms} \mid 1 \text{ mol}}{\mid 6.02 \times 10^{23}} = 4.56 \times 10^{-22}$$

7. What is the mass (in grams) of 2.50 mol of Mg?

$$\frac{2.50 \text{ moles} \mid 24.30 \text{ g}}{\mid 1 \text{ moles}} = 60.75$$

8. How many moles of NaCl are in 125 g of NaCl?

$$\frac{125 \text{ g} \mid 1 \text{ moles}}{\mid 58.43 \text{ g}} = \boxed{2.13}$$

22.48 + 35.45

9. What is the percent composition of PF_3?

$P = \dfrac{30.97}{87.91} = 35.2\%$

$F = \dfrac{3 \times 18.98}{87.91} = 64.8\%$

$30.97 + (3 \times 18.98) = 87.91$

10. What is the percent composition of N_2S_3?

$N = \dfrac{2 \times 14.00}{124.18} = 22.5\%$
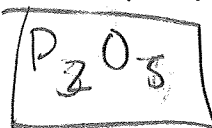
$(2 \times 14.00) + (3 \times 32.06) = 124.18$

$S = \dfrac{3 \times 32.06}{124.18} = 77.5\%$

11. A compound is found to consist of 43.64% phosphorus (P) and 56.36 % oxygen. Calculate the empirical formula.

$P = 43.64\%$

$\boxed{P_2O_5}$

$P = \dfrac{43.64\%}{30.97} = \dfrac{1.4 \, \times}{1.4} \quad 1 \times 2$

$O = \dfrac{56.36}{16}$

$\dfrac{3.5 \times}{1.4}$

2.5×2

12. A compound is 30.4% nitrogen and 69.6% oxygen. Calculate the empirical formula.

$N = \dfrac{30.4}{14.0} \qquad = \dfrac{2}{2} \times 1$

$O = \dfrac{69.6}{16}$

4.35

$\dfrac{4}{2} = 2$

NO_2