

Review: "The Mole" Quiz

- 1) Calculate the molecular mass of NH_4HCO_3 .

$$\text{N} = 14.01 \text{ g}$$

$$\text{H} = 5 \times 1.01 \text{ g} = 5.05 \text{ g}$$

$$\text{C} = 12.01 \text{ g}$$

$$\text{O} = 3 \times 16 \text{ g} = 48 \text{ g}$$

$$\boxed{79.07 \text{ g/mol}}$$

- 2) Convert 500 g H_2O to moles.

$$\frac{1 \text{ mol H}_2\text{O}}{18.02 \text{ g H}_2\text{O}} \times \frac{500 \text{ g H}_2\text{O}}{1} = \boxed{28 \text{ mol H}_2\text{O}}$$

- 3) Convert 5.13×10^{21} molecules NaCl to moles.

$$\frac{1 \text{ mol NaCl}}{6.02 \times 10^{23} \text{ molecules NaCl}} \times \frac{5.13 \times 10^{21} \text{ molecules NaCl}}{1} = \boxed{0.00852 \text{ mol NaCl}}$$

- 4) Convert 8.3×10^{25} molecules AgNO_3 to grams.

$$\frac{169.88 \text{ g AgNO}_3}{1 \text{ mol AgNO}_3} \times \frac{1 \text{ mol AgNO}_3}{6.02 \times 10^{23} \text{ molecules AgNO}_3} \times \frac{8.3 \times 10^{25} \text{ molecules AgNO}_3}{1} = \boxed{23,000 \text{ g AgNO}_3}$$

- 5) Convert 0.67 moles C_6H_6 (benzene) to grams.

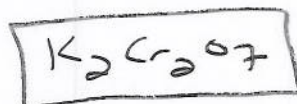
$$\frac{78.12 \text{ g C}_6\text{H}_6}{1 \text{ mol C}_6\text{H}_6} \times \frac{0.67 \text{ mol C}_6\text{H}_6}{1} = \boxed{52 \text{ g C}_6\text{H}_6}$$

- 6) Find the percent composition of H in H_2O_2 .

$$\frac{2.02 \text{ g H}}{34.02 \text{ g H}_2\text{O}_2} \times 100 = \boxed{5.94\% \text{ H in H}_2\text{O}_2}$$

- 7) Find the empirical formula for a compound composed of 26.6% K, 35.4% Cr and 38.0% O.

$$\begin{array}{l} \frac{1 \text{ mol K}}{39.10 \text{ g K}} \times \frac{26.6 \text{ g K}}{1} = \frac{0.68031}{0.68031} = 1 \times 2 = 2 \\ \frac{1 \text{ mol Cr}}{52 \text{ g Cr}} \times \frac{35.4 \text{ g Cr}}{1} = \frac{0.68077}{0.68031} = 1 \times 2 = 2 \\ \frac{1 \text{ mol O}}{16 \text{ g O}} \times \frac{38.0 \text{ g O}}{1} = \frac{2.375}{0.68031} = 3.5 \times 2 = 7 \end{array}$$



(Version 2) (Flip)
Review: "The Mole" Quiz

★ Different from Handout

1) Calculate the molecular mass of $\text{AgC}_2\text{H}_3\text{O}_2$.

$$\begin{aligned} \text{Ag} &= 107.87 \\ \text{C} &= 2 \times 12.01 \\ \text{H} &= 3 \times 1.01 \\ \text{O} &= 16 \times 2 \end{aligned}$$

$$\boxed{166.92 \text{ g/mol}}$$

2) Convert 225 g BaCl_2 to moles.

$$\frac{1 \text{ mol BaCl}_2}{208.23 \text{ g BaCl}_2} \times 225 \text{ g BaCl}_2 = \boxed{1.08 \text{ mol BaCl}_2}$$

3) Convert 7.29×10^{19} molecules HCl to moles.

$$\frac{1 \text{ mol HCl}}{6.02 \times 10^{23} \text{ molecules HCl}} \times 7.29 \times 10^{19} \text{ molecules HCl} = \boxed{1.21 \times 10^{-4} \text{ mol HCl}}$$

4) Convert 7.5×10^{26} molecules $\text{Al}(\text{OH})_3$ to grams.

$$\frac{78.01 \text{ g Al}(\text{OH})_3}{1 \text{ mol Al}(\text{OH})_3} \times \frac{1 \text{ mol Al}(\text{OH})_3}{6.02 \times 10^{23} \text{ molecules Al}(\text{OH})_3} \times 7.5 \times 10^{26} \text{ molecules Al}(\text{OH})_3 = \boxed{97,000 \text{ g Al}(\text{OH})_3}$$

5) Convert 0.78 moles Li_3N to grams.

$$\frac{34.83 \text{ g Li}_3\text{N}}{1 \text{ mol Li}_3\text{N}} \times 0.78 \text{ mol Li}_3\text{N} = \boxed{27 \text{ g Li}_3\text{N}}$$

6) Find the percent composition of H in H_3AsO_4 . $\rightarrow 141.95 \text{ g}$

$$3 \text{ H: } 1.01 \times 3 = 3.03 \text{ g}$$

$$\frac{3.03 \text{ g H}}{141.95 \text{ g H}_3\text{AsO}_4} = \boxed{2.13\% \text{ H in H}_3\text{AsO}_4}$$

7) Find the empirical formula for a compound composed of 40.00% C, 6.72% H and 53.28% O.

$$\begin{aligned} \frac{1 \text{ mol C}}{12.01 \text{ g C}} \times 40.00 \text{ g C} &= \frac{3.33056 \text{ mol C}}{3.33} = 1 \\ \frac{1 \text{ mol H}}{1.01 \text{ g H}} \times 6.72 \text{ g H} &= \frac{6.65347 \text{ mol H}}{3.33} = 2 \\ \frac{1 \text{ mol O}}{16.00 \text{ g O}} \times 53.28 \text{ g O} &= \frac{3.33 \text{ mol O}}{3.33} = 1 \end{aligned}$$

