Ch. 10 Quiz Review

Name: _____

10.1 10.2 – Moles & Mole Calculations

$1\ mol = 6.022 \times 10^{23}$ particles , $1\ mol = (\text{Molar Mass})\ g$

10.3 – % composition & chemical formulas

$$\%\ \text{by mass of element} = \frac{\text{mass of element}}{\text{mass of compound}}(100\%)$$

$$\%\ \text{by mass of element} = \frac{\text{mass of element in 1 mol compound}}{\text{Molar mass of compound}}(100\%)$$

Molecular Formula = (x) E.F. (X = whole #)

$$\text{Molecular Formula} = \left(\frac{\text{Molar Mass}}{\text{E.F. mass}}\right) \text{E.F.}$$

One mole of a substance contains Avogadro's Number (6.02×10^{23}) of molecules.

How many molecules are in the quantities below?

1. 2.0 moles
2. 1.5 moles
3. 0.75 mole
4. 3.4×10^{26}
5. 7.5×10^{19}

GRAM FORMULA MASS

Name _____

Determine the gram formula mass (the mass of one mole) of each compound below.

1. $KMnO_4$ _____
2. KCl _____
3. Na_2SO_4 _____
4. $Ca(NO_3)_2$ _____
5. $Al_2(SO_4)_3$ _____
6. $(NH_4)_3PO_4$ _____

MOLES AND MASS

Name _____

1. 25 g of NaCl = _____ mols NaCl _____
2. 125 g of H_2SO_4 = _____ mols H_2SO_4 _____
3. 100. g of $KMnO_4$ = _____ mols $KMnO_4$ _____
4. 0.25 moles of KCl = _____ g KCl _____
5. 3.2 moles of $CuSO_4$ = _____ g $CuSO_4$ _____

Mixed Mol Problems

1. How many grams are there in 1.5×10^{25} molecules of CO_2?

_____

5. How many atoms are there in 1.3×10^{22} molecules of NO_2?

_____

6. A 5.0 g sample of O_2 is in a container, How many mols of O_2 are in the container?

_____

7. How many molecules of O_2 are in the container in Problem 6? How many atoms of oxygen?

_____

_____

PERCENTAGE COMPOSITION

Name _____

Determine the percentage composition of each of the compounds below.

1. $KMnO_4$

   K = _____

   Mn = _____

   O = _____

2. $Al_2(SO_4)_3$

   Al = _____

   S = _____

   O = _____

Solve the following problems.

3. How many grams of oxygen can be produced from the decomposition of 100. g of $KClO_3$? _____

4. How much iron can be recovered from 25.0 g of Fe_2O_3? _____

5. How much silver can be produced from 125 g of Ag_2S? _____

• WHAT IS THE EMPIRICAL FORMULA? •

1. 75% carbon, 25% hydrogen

2. 52.7% potassium, 47.3% chlorine

3. 22.1% aluminum, 25.4% phosphorus, 52.5% oxygen

• WHAT IS THE MOLECULAR FORMULA •

1. The empirical formula of a compound is NO_2. Its molecular mass is 92 g/mol. What is its molecular formula?

2. The empirical formula of a compound is CH_2. Its molecular mass is 70 g/mol. What is its molecular formula?

3. A compound is found to be 40.0% carbon, 6.7% hydrogen and 53.5% oxygen. Its molecular mass is 60. g/mol. What is its molecular formula?

4. A compound is 64.9% carbon, 13.5% hydrogen and 21.6% oxygen. Its molecular mass is 74 g/mol. What is its molecular formula?