Chapter 10 Test Review (PreIB) Name: _____

Short Answer and Concept Review

1) What is a mole?
   A mole is 6.022×10^{23} particles of anything.

2) What does STP stand for? Standard temperature and pressure

3) How many liters does one mole of any gas occupy at STP? 22.4 L

4) What is the last name of the scientist that determined the number of particles in one mole?
   Avogadro

5) What are three types of "particles" in chemistry that a mole is useful to describe?
   Atoms, molecules, formula units

6) What is the mass of one mole of CO_2? AKA: find the molar mass! 44.01 g/mol

7) What is the empirical formula of: (a) N_4O_{10} __N_2O_5___ (b) C_6H_{12} ___CH_2_____

8) A compound has the empirical formula CH_4. Its mass is 96g. What is its molecular formula?
   C_6H_{24}

9) Calculate the formula mass of $Cu_3(PO_4)_2$
   380.59 g/mol

Conversions

10) Convert 47.5 L of NO_2 at STP to moles.

    2.12 mol

11) Convert 3.2×10^{23} atoms neon gas to liters at STP.

    11.90 L

12) Convert 720g of $Al_2(SO_4)_3$ to formula units.

    1.27×10^{24} formula units

13) How many moles are in 5.32×10^{24} molecules of CH_4?

8.83 mol

14) How many formula units are there in 345g $Be(NO_3)_2$?

1.56×10^{24} formula units

Percent Composition

15) Find the percent composition of each element in: Li_2SO_4

Li = 12.63%
S = 29.16%
O = 58.21%

16) Find the percent composition of *oxygen* in: $Mg_3(PO_4)_2$

O = 48.69%

Calculating Empirical and Molecular Formulas

17) A compound is 43.662 g phosphorus and 56.338 g oxygen. What is its empirical formula?

P_2O_5

18) A compound is composed of 40% carbon, 6.67% hydrogen, and 53.3% oxygen, and the molar mass is 60g. What is the molecular formula for the compound?

$C_2H_4O_2$

Challenge Question

What is the empirical formula of a compound that is 84.26% carbon and 15.91% hydrogen?

C_4H_9

(subscripts of the empirical formula are initially $C_1H_{2.25}$ …so the subscript 2.25 is $2\frac{1}{4}$ which is $\frac{9}{4}$ as an improper fraction… multiply all subscripts of the empirical formula by the denominator, 4, to get rid of the fraction)