The Mole

& Mole Conversions

Name: _____

Period: _____ Date: _____

I. What is the molar mass for the following?

1. a. SO_3

    b. Cd

    c. $Ba_3(PO_4)_2$

    d. KNO_3

II. Application: Answer the following questions.

2. Draw a model of the nucleus of a boron atom. Label the protons and neutrons.

3. What is the mass of one atom of boron? (in amu)

4. What is the mass of a mole of boron atoms? (hint: molar mass: g/mol)

5. Finally, how many boron atoms are contained in one mole of boron?

6. If you have a mole of boron and a mole of carbon would they have the same number of atoms in each mole?

7. Would they have the same mass? Explain. If not, what would be the mass of each mole?

III. Mole Conversion Problems (Be sure to show the dimensional analysis for each problem)

8. Determine the mass in grams of each of the following.

    a. 6.35 mol Al   b. 52.4 mol P

9. Convert each of the following from mole to number of particles.

    a. 32.45 mol $Cr_3(PO_4)_2$ = _____ formula units $Cr_3(PO_4)_2$

    b. 21.7 mol Rn = _____ Rn atoms

IV. Gases @ STP (Show the dimensional analysis, and be sure to put @ STP after the answer.

10. Set up each of the following conversion problems using dimensional analysis and solve for the answer.

    a. How many molecules of carbon dioxide, CO_2, are present in 7.5 L of CO_2 @STP?

    b. How many grams of argon, Ar, are present in 25.0 L of argon@STP?

V. Mixed Problems

1. Convert each of the following to mass in grams.
   a. 4.25×10^{24} atoms N

   b. 1.75×10^{23} atoms Pb

   c. 8.45×10^{23} molecules CH_4

2. Calculate the number of atoms.
   a. 25.75 g Hg

   b. 0.0740 g Mg

   c. 160 g Br

3. Convert each of the following to mass in grams.
   a. 0.150 mol $Ba(OH)_2$

   b. 4.850 L CCl_4 @ STP

   c. 1.355×10^{24} atoms Ca

4. Convert each of the following to liters (L) @ STP.
   a. 4.72×10^{24} atoms Kr

   b. 15.6 g He

   c. 12.4 mol carbon monoxide, CO.

5. Calculate the following conversions.
   a. 200.0 g $FeCl_2$ = _____ formula units $FeCl_2$

   b. 3.7 mol Na = _____ g Na

   c. 250.0 mol Al_2O_3 = _____ g Al_2O_3

Challenge!   a. 250.0 *kg* $MgCl_2$ = _____ moles $MgCl_2$

   b. How many *chlorine atoms* are present in 12.75 g of CCl_4?