Chapter 7 Pretest Name _____
Chemical Quantities

Section 7.1: The Mole (A measure of matter)

1. What is the gram molecular mass of sucrose ($C_{12}H_{22}O_{11}$)?

2. What is the gram molecular mass of each of the following compounds?
   a) PCl_5

   b) UF_6

3. Calculate the gram formula mass of each of the following ionic compounds.
   a) $KMnO_4$

   b) $Ca_3(PO_4)_2$

4. How many moles is 3.52×10^{24} molecules of water?

5. How many atoms of zinc are in 0.60 mole of zinc?

6. What is the mass of 1.00 mol of oxygen (O_2)?

Section 7.2: Mole-Mass and Mole-Volume Relationships

1. What is the molar mass of each of the following compounds?
   a) $C_6H_{12}O_6$ b) $NaHCO_3$ c) C_7H_{12} d) KNH_4SO_4

2. Calculate the mass in grams of each of the following:
   a) 8.0 mole lead oxide (PbO)

   b) 0.75 mole hydrogen sulfide (H_2S)

   c) 0.00100 mole silicon tetrahydride (SiH_4)

   d) 1.50×10^{-2} mole molecular oxygen (O_2)

   d) 2.30 mole ethylene glycol ($C_2H_6O_2$)

3. How many grams are there in 1.73 mole of dinitrogen pentoxide (N_2O_5)?

4. How many grams are there in 0.658 mol of calcium phosphate $Ca_3(PO_4)_2$?

5. Calculate the number of moles in each of the following:
   a) 0.50 g sodium bromide (NaBr)

   b) 13.5 g $Mg(NO_3)_2$

   c) 1.02 g $MgCl_2$

   d) 0.00100 g CH_3Cl

   e) 1.50×10^{-3} g $C_3H_6(OH)_2$

6. A chemist plans to use 435.0 grams of NH_4NO_3 in a reaction. How many moles of the compound is this?

7. A solution is to be prepared in a laboratory. The solution requires 0.0465 mole of $C_{20}H_{24}N_2O_2$. What mass, in grams, should the laboratory technician obtain in order to make the solution?

8. What is the volume at STP of 2.66 mole of CH_4?

9. What is the equivalent in moles of 135 L of NH_3 gas in STP?

Section 7.1: Percent Composition and Chemical Formulas

1. A compound analyzed in a chemistry laboratory consists of 5.34 g of carbon, 0.42 g of hydrogen, and 47.08 g of chlorine. What is the percent composition of this compound?

2. Find the percent composition of a compound containing tin and chlorine if 18.35 g of the compound contains 5.74 g of tin.

3. 3.907 g of carbon combines completely with 0,\.874 g of hydrogen to form a compound. What is the percent composition of this compound?

4. From the formula for calcium acetate, $Ca(C_2H_3O_2)_2$, calculate the mass of carbon that can be obtained from 65.3 g of the compound.

5. How many grams of aluminum are there in 25.0 g of aluminum oxide Al_2O_3?

6. How many grams of iron are there in 21.6 g of iron (III) oxide Fe_2O_3?

7. Determine the empirical formula of each of the following compounds from the percent composition:
   a) 7.8% carbon and 92.2% chlorine

   b) 10.0% C, 0.80% H, 89.1% Cl