

# KEY FOR HW#1

## SELECTED PROBLEMS

$$\text{IV } 4) (6.02 \times 10^{23} \text{ ATOMS C}) \left( \frac{1 \text{ mol C}}{6.02 \times 10^{23} \text{ ATOMS}} \right) \left( \frac{12 \text{ g C}}{1 \text{ mol C}} \right)$$

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

$$5) (12.04 \times 10^{23} \text{ ATOMS Ag}) \left( \frac{1 \text{ mol Ag}}{6.02 \times 10^{23} \text{ ATOMS}} \right) \left( \frac{107.87 \text{ g}}{1 \text{ mol Ag}} \right)$$

$$= 215.74 \text{ g Ag}$$

$$\text{V } 2) (1.5 \times 10^{23} \text{ ATOMS Mg}) \left( \frac{1 \text{ mol Mg}}{6.02 \times 10^{23} \text{ ATOMS}} \right) \left( \frac{24.31 \text{ g Mg}}{1 \text{ mol Mg}} \right)$$

$$= 6.06 \text{ g Mg}$$

$$3) (4.5 \times 10^{12} \text{ ATOMS Cl}) \left( \frac{1 \text{ mol Cl}}{6.02 \times 10^{23} \text{ ATOMS}} \right) \left( \frac{35.45 \text{ g Cl}}{1 \text{ mol Cl}} \right)$$

$$= 2.66 \times 10^{-10} \text{ g Cl}$$

$$4) (8.42 \times 10^8 \text{ MOLECULES } \text{Ba}(\text{NO}_3)_2) \left( \frac{1 \text{ mol } \text{Ba}(\text{NO}_3)_2}{6.02 \times 10^{23} \text{ MOLECULES}} \right) \left( \frac{261.35 \text{ g } \text{Ba}(\text{NO}_3)_2}{1 \text{ mol } \text{Ba}(\text{NO}_3)_2} \right)$$

$$= .0037 \text{ g } \text{Ba}(\text{NO}_3)_2 = 3.7 \times 10^{-3} \text{ g } \text{Ba}(\text{NO}_3)_2$$

$$5) (25 \text{ MOLECULES } \text{WO}_3) \left( \frac{1 \text{ mol } \text{WO}_3}{6.02 \times 10^{23} \text{ MOLECULES}} \right) \left( \frac{231.85 \text{ g}}{1 \text{ mol } \text{WO}_3} \right)$$

$$= 9.63 \times 10^{-21} \text{ g } \text{WO}_3$$

$$\text{IV } 5) \frac{(5.4 \times 10^{23} \text{ atoms B}) \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left( \frac{10.81 \text{ g}}{1 \text{ mol B}} \right)}{(6.02 \times 10^{23} \text{ atoms}) \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left( \frac{10.81 \text{ g}}{1 \text{ mol B}} \right)}$$

$$= 9.7 \text{ g B}$$

$$6) \frac{(8.02 \times 10^{22} \text{ atoms}) \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left( \frac{32.06 \text{ g}}{1 \text{ mol}} \right)}{(6.02 \times 10^{23} \text{ atoms}) \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left( \frac{32.06 \text{ g}}{1 \text{ mol}} \right)}$$

$$= 4.3 \text{ g S}$$

$$9) = \frac{(1 \times 10^{-10} \text{ mol Au}) \left( \frac{196.97 \text{ g}}{1 \text{ mol}} \right)}{(6.02 \times 10^{23} \text{ atoms}) \left( \frac{1 \text{ mol}}{6.02 \times 10^{23} \text{ atoms}} \right) \left( \frac{196.97 \text{ g}}{1 \text{ mol}} \right)} = 1.97 \times 10^{-8} \text{ g}$$

① KEY FOR HW #1 (SELECTED PROBLEMS)

$$1) (20g \text{ Pb(NO}_3)_2) \left( \frac{1 \text{ mol}}{331.2 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ MOLEC}}{\text{mol}} \right)$$

$$= 3.6 \times 10^{22} \text{ MOLECULES Pb(NO}_3)_2$$

$$(3.6 \times 10^{22} \text{ MOLECULES Pb(NO}_3)_2) \left( \frac{9 \text{ ATOMS TOTAL}}{\text{MOLECULE Pb(NO}_3)_2} \right)$$

$$= 3.24 \times 10^{23} \text{ ATOMS TOTAL}$$

$$2) (5 \text{ mol NH}_3) \left( \frac{17.04 \text{ g}}{\text{mol NH}_3} \right) = 85.2 \text{ g}$$

$$3) (1 \text{ mol H}_2\text{O}) \left( \frac{2 \text{ mol H ATOMS}}{1 \text{ mol H}_2\text{O}} \right) = 2 \text{ mol H ATOMS}$$

$$4) (3 \text{ mol H}_2\text{SO}_4) \left( \frac{98.06 \text{ g}}{\text{mol H}_2\text{SO}_4} \right) = 294.18 \text{ g}$$

$$5) (15 \text{ g Zn}) \left( \frac{1 \text{ mol}}{65.37 \text{ g}} \right) = .23 \text{ mol Zn}$$

$$6) (2.0 \times 10^{23} \text{ ATOMS Hg}) \left( \frac{1 \text{ mol Hg}}{6.02 \times 10^{23} \text{ ATOMS}} \right) \left( \frac{200.59 \text{ g}}{\text{mol Hg}} \right)$$

$$= 66.6 \text{ g Hg}$$

OVER

$$\text{III} \rightarrow 8. (180 \text{ g H}_2\text{O}) \left( \frac{1 \text{ mol H}_2\text{O}}{18.015 \text{ g}} \right)$$

$$= 9.99 \text{ mol H}_2\text{O}$$

$$9. (30 \text{ g Al}_2(\text{SO}_4)_3) \left( \frac{1 \text{ mol Al}_2(\text{SO}_4)_3}{342.14 \text{ g}} \right) = .0877 \text{ mol Al}_2(\text{SO}_4)_3$$

$$(.0877 \text{ mol Al}_2(\text{SO}_4)_3) \left( \frac{3 \text{ mol S ATOMS}}{1 \text{ mol Al}_2(\text{SO}_4)_3} \right) = .26 \text{ mol S ATOMS}$$

$$10. (1.0877 \text{ mol Al}_2(\text{SO}_4)_3) \left( \frac{2 \text{ mol Al}}{1 \text{ mol Al}_2(\text{SO}_4)_3} \right)$$

$$= .18 \text{ mol Al ATOMS}$$

$$\text{#7. } \frac{350 \text{ g NO}_3}{62.01 \text{ g}} \left( \frac{1 \text{ mol}}{62.01 \text{ g}} \right) \left( \frac{6.02 \times 10^{23} \text{ MOLEC}}{1 \text{ mol}} \right) \left( \frac{4 \text{ ATOMS}}{1 \text{ MOLECULE}} \right)$$

$$= 1.36 \times 10^{25} \text{ ATOMS}$$

#7.  
350 g  
62.01  
2.01

VII

$$11. (4.5 \text{ mol H}_2) \left( \frac{2.02 \text{ g}}{\text{mol}} \right) = \boxed{9.09 \text{ g H}_2}$$

$$12. (2 \text{ L} \times 1000 \text{ mL}) \left( \frac{1 \text{ g}}{\text{mL}} \right) = \boxed{2000 \text{ g H}_2\text{O}}$$

$$13. (2000 \text{ g H}_2\text{O}) \left( \frac{1 \text{ mol}}{18.02 \text{ g}} \right) = 110.9877 \text{ mol H}_2\text{O}$$

$$(110.9877 \text{ mol H}_2\text{O}) \left( \frac{2 \text{ mol H}}{1 \text{ mol H}_2\text{O}} \right) = \boxed{221.98 \text{ mol H}}$$

$$14. (221.98 \text{ mol H}) \left( \frac{6.02 \times 10^{23} \text{ atoms}}{\text{mol}} \right) = \boxed{1.34 \times 10^{26} \text{ atoms H}}$$