

10.3 Practice Problems

$$\textcircled{1} \quad \% C = \frac{1.94 \text{ g C}}{5.0 \text{ g Total}} \times 100 = 38.8\% C$$

$$\% H = \frac{.48 \text{ g H}}{5.0 \text{ g Total}} \times 100 = 9.6\% H$$

$$\% S = \frac{2.58 \text{ g S}}{5.0 \text{ g Total}} \times 100 = 51.6\% S$$

$$\textcircled{2} \quad .847 \text{ g Total} \times \frac{50.51 \text{ g F}}{100 \text{ g Total}} = .428 \text{ g F}$$

$$.847 \text{ g Total} \times \frac{49.49 \text{ g Fe}}{100 \text{ g Total}} = .419 \text{ g Fe}$$

$$\textcircled{3} \quad \% C = \frac{2.63 \text{ g C}}{3.58 \text{ g Total}} \times 100 = 73.5\% C$$

$$\% H = \frac{.370 \text{ g H}}{3.58 \text{ g Total}} \times 100 = 10.3\% H$$

$$\% O = \frac{.58 \text{ g O}}{3.58 \text{ g Total}} \times 100 = 16.2\% O$$

$$\textcircled{4} \quad 2.876 \text{ g Total} \times \frac{66.07 \text{ g C}}{100 \text{ g Total}} = 1.90 \text{ g C}$$

$$2.876 \text{ g Total} \times \frac{6.71 \text{ g H}}{100 \text{ g Total}} = .193 \text{ g H}$$

$$2.876 \text{ g Total} \times \frac{4.06 \text{ g N}}{100 \text{ g Total}} = .117 \text{ g N}$$

$$2.876 \text{ g Total} \times \frac{23.16 \text{ g O}}{100 \text{ g Total}} = .666 \text{ g O}$$

$$\textcircled{5} \quad \% \text{Cl} = \frac{2.7369 \text{ g Cl}}{3.9460 \text{ g Tot. l}} \times 100 = 69.36\% \text{ Cl}$$

$$\% \text{O} = \frac{.4116 \text{ g O}}{3.9460 \text{ g Tot. l}} \times 100 = 10.43\% \text{ O}$$

$$\% \text{P} = \frac{.7971 \text{ g P}}{3.9460 \text{ g Tot. l}} \times 100 = 20.20\% \text{ P}$$

$$\textcircled{12} \quad 1.723 \text{ g C} \times \frac{1 \text{ mol C}}{12 \text{ g C}} = .143 \text{ mol C} \quad \frac{\phantom{.143 \text{ mol C}}}{.028} = 5$$

$$2.89 \text{ g H} \times \frac{1 \text{ mol H}}{1 \text{ g H}} = 2.89 \text{ mol H} \quad \frac{\phantom{2.89 \text{ mol H}}}{.028} = 10 \quad \text{C}_5\text{H}_{10}\text{O}$$

$$0.459 \text{ g O} \times \frac{1 \text{ mol O}}{16 \text{ g O}} = .0286 \text{ mol O} \quad \frac{\phantom{.0286 \text{ mol O}}}{.028} = 1$$

$$\textcircled{13} \quad 47.9 \text{ g Zn} \times \frac{1 \text{ mol Zn}}{65.4 \text{ g Zn}} = .732 \text{ mol Zn} \quad \frac{\phantom{.732 \text{ mol Zn}}}{.732} = 1$$

$$52.1 \text{ g Cl} \times \frac{1 \text{ mol Cl}}{35.5 \text{ g Cl}} = 1.467 \text{ mol Cl} \quad \frac{\phantom{1.467 \text{ mol Cl}}}{.732} = 2$$



$$\textcircled{14} \quad 1.75 \text{ g C} \times \frac{1 \text{ mol C}}{12 \text{ g C}} = .1458 \text{ mol C} \quad \frac{\phantom{.1458 \text{ mol C}}}{.1458} = 1$$



$$46.75 \text{ g Br} \times \frac{1 \text{ mol Br}}{79.9 \text{ g Br}} = .585 \text{ mol Br} \quad \frac{\phantom{.585 \text{ mol Br}}}{.1458} = 4$$

$$\textcircled{15} \quad 20.23 \text{ g Al} \times \frac{1 \text{ mol Al}}{27 \text{ g Al}} = .749 \quad = 1$$



$$79.77 \text{ g Cl} \times \frac{1 \text{ mol Cl}}{35.5 \text{ g Cl}} = 2.24 \quad = 3$$

$$\textcircled{16} \quad 24.74 \text{ g K} \times \frac{1 \text{ mol K}}{39 \text{ g K}} = \frac{.634 \text{ mol K}}{.633} = 1$$

$$34.76 \text{ g Mn} \times \frac{1 \text{ mol Mn}}{54.9 \text{ g Mn}} = \frac{.633 \text{ mol Mn}}{.633} = 1 \quad \text{KMnO}_4$$

$$40.50 \text{ g O} \times \frac{1 \text{ mol O}}{16 \text{ g O}} = \frac{2.53 \text{ mol O}}{.633} = 4$$

$$\textcircled{17} \quad 4.288 \text{ g C} \times \frac{1 \text{ mol C}}{12 \text{ g C}} = \frac{.357 \text{ mol C}}{.357} = 1$$

CO

$$5.712 \text{ g O} \times \frac{1 \text{ mol O}}{16 \text{ g O}} = \frac{.357 \text{ mol O}}{.357} = 1$$

$$\textcircled{18} \quad 2.16 \text{ g Al} \times \frac{1 \text{ mol Al}}{27 \text{ g Al}} = \frac{.08 \text{ mol Al}}{.08} = 1 \times 2 = 2$$

$$3.85 \text{ g S} \times \frac{1 \text{ mol S}}{32 \text{ g S}} = \frac{.12 \text{ mol S}}{.08} = 1.5 \times 2 = 3 \quad \text{Al}_2\text{S}_3\text{O}_{12}$$

$$7.68 \text{ g O} \times \frac{1 \text{ mol O}}{16 \text{ g O}} = \frac{.48 \text{ mol O}}{.08} = 6 \times 2 = 12$$

$$(22) \quad 30.45 \text{ g N} \times \frac{1 \text{ mol N}}{14 \text{ g N}} = \frac{2.175}{2.175} = 1$$

Empirical

$$69.55 \text{ g O} \times \frac{1 \text{ mol O}}{16 \text{ g O}} = \frac{4.346}{2.175} = 2$$

NO_2

$$14 + 2(16) = 46$$

$$\frac{\text{Molar mass}}{\text{Empirical Mass}} = \frac{92}{46} = 2$$



$$(23) \quad 42.4 \text{ g H} \times \frac{1 \text{ mol H}}{1 \text{ g H}} = \frac{42.4}{14.14} = 3$$

Empirical

$$169.7 \text{ g C} \times \frac{1 \text{ mol C}}{12 \text{ g C}} = \frac{14.14}{14.14} = 1$$

CH_3

$$12 + 3(1) = 15$$

$$\frac{\text{Molar mass}}{\text{Empirical Mass}} = \frac{30}{15} = 2$$



$$(24) \quad 302.2 \text{ g I} \times \frac{1 \text{ mol I}}{126.9 \text{ g I}} = \frac{2.38}{.796} = 3$$

BI_3

$$8.6 \text{ g B} \times \frac{1 \text{ mol B}}{10.8 \text{ g B}} = \frac{.796}{.796} = 1$$

$$10.8 + 3(126.9) = 391.5$$

$$\frac{391.5}{391.5} = 1$$



$$\textcircled{25} \quad 56.36 \text{ g O}_x \times \frac{1 \text{ mol O}}{16 \text{ g O}} = \frac{3.52 \text{ mol O}}{1.41} = 2.5 \times 2 = 5$$

$$43.64 \text{ g P}_x \times \frac{1 \text{ mol P}}{31 \text{ g P}} = \frac{1.41 \text{ mol P}}{1.41} = 1 \times 2 = 2$$



$$2(31) + 5(16) = 142$$

$$\frac{\text{Molar Mass}}{\text{Mass Empirical}} = \frac{283.9}{142} = 2$$

