

CHEM UNIT 4 HW 2

FITCH



$$\frac{(5 \text{ mol Na}) \times (2 \text{ mol NaCl})}{(2 \text{ mol Na})} = \underline{\underline{5 \text{ mol NaCl}}}$$



a) $\frac{(10 \text{ mol O}_2) \times (2 \text{ mol H}_2)}{1 \text{ mol O}_2} = \underline{\underline{20 \text{ mol H}_2}}$

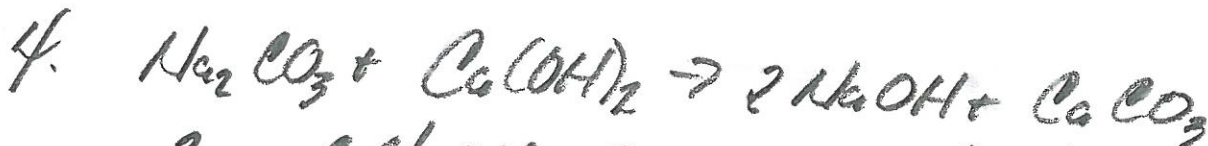
b) $\frac{(15 \text{ mol H}_2\text{O}) \times (1 \text{ mol O}_2)}{(2 \text{ mol H}_2\text{O})} = \underline{\underline{7.5 \text{ mol O}_2}}$

c) $\frac{(15 \text{ mol H}_2\text{O}) \times (18.02 \text{ g})}{1 \text{ mol}} = \underline{\underline{270.3 \text{ g H}_2\text{O}}}$



15 mol Fe = ? mol Cu

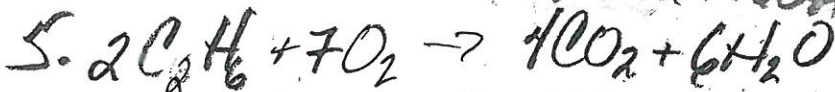
$$\frac{(15 \text{ mol Fe}) \times (1 \text{ mol Cu})}{(1 \text{ mol Fe})} = \underline{\underline{15 \text{ mol Cu}}}$$



2 mol NaOH = ? mol Na_2CO_3 + ? mol Ca(OH)_2

$$\frac{(2 \text{ mol NaOH}) \times (1 \text{ mol Na}_2\text{CO}_3)}{(2 \text{ mol NaOH})} = \underline{\underline{1 \text{ mol Na}_2\text{CO}_3}}$$

$$\frac{(2 \text{ mol NaOH}) \times (1 \text{ mol Ca(OH)}_2)}{(2 \text{ mol NaOH})} = \underline{\underline{1 \text{ mol Ca(OH)}_2}}$$



a) $\frac{(4.5 \text{ mol C}_2\text{H}_6) \times (7 \text{ mol O}_2)}{(2 \text{ mol C}_2\text{H}_6)} = \underline{\underline{15.75 \text{ mol O}_2}}$

b) $\frac{(4.5 \text{ mol C}_2\text{H}_6) \times (4 \text{ mol CO}_2)}{(2 \text{ mol C}_2\text{H}_6)} = \underline{\underline{9 \text{ mol CO}_2}}$ $\frac{(4.5 \text{ mol C}_2\text{H}_6) \times (6 \text{ mol H}_2\text{O})}{(2 \text{ mol C}_2\text{H}_6)} = \underline{\underline{13.5}}$

U 4 HUND (CONT.)

24.01

(2)



$$b) (.75 \text{ mol NaOH}) \left(\frac{1 \text{ mol } H_2SO_4}{2 \text{ mol NaOH}} \right) = .375 \text{ mol } H_2SO_4$$

$$\left(.375 \text{ mol } H_2SO_4 \right) \left(\frac{98.03 \text{ g}}{\text{mol}} \right) = 36.73 \text{ g } H_2SO_4$$

$$c) (.75 \text{ mol NaOH}) \left(\frac{1 \text{ mol } Na_2SO_4}{2 \text{ mol NaOH}} \right) = .375 \text{ mol } Na_2SO_4$$

1.22.99g +
 1.22.99g +
 4.16g =

$$(.375 \text{ mol } Na_2SO_4) \left(\frac{142.04 \text{ g}}{\text{mol}} \right) = 53.27 \text{ g } Na_2SO_4$$

$$(.75 \text{ mol NaOH}) \left(\frac{2 \text{ mol } H_2O}{2 \text{ mol NaOH}} \right) = .75 \text{ mol } H_2O$$

$$(.75 \text{ mol } H_2O) \left(\frac{18.02 \text{ g}}{\text{mol}} \right) = 13.52 \text{ g } H_2O$$



$$b) (25 \text{ mol NaCl}) \left(\frac{2 \text{ mol Na}}{2 \text{ mol NaCl}} \right) = 25 \text{ mol Na}$$

$$(25 \text{ mol Na}) \left(\frac{22.99 \text{ g}}{\text{mol}} \right) = 574.75 \text{ g Na}$$

$$(25 \text{ mol NaCl}) \left(\frac{1 \text{ mol } Cl_2}{2 \text{ mol NaCl}} \right) = 12.5 \text{ mol } Cl_2$$

$$(12.5 \text{ mol } Cl_2) \left(\frac{70.90 \text{ g}}{\text{mol}} \right) = 886.25 \text{ g } Cl_2$$

U4 HW2 (cont.)

③



$$b) (2.25 \text{ g Ag}) \left(\frac{1 \text{ mol}}{107.87 \text{ g}} \right) = .02086 \text{ mol Ag}$$

$$\left(.02086 \text{ mol Ag} \right) \left(\frac{1 \text{ mol Cu}(\text{NO}_3)_2}{2 \text{ mol Ag}} \right) = \underline{\underline{.01043 \text{ mol Cu}(\text{NO}_3)_2}}$$

$$c) (.02086 \text{ mol Ag}) \left(\frac{1 \text{ mol Cu}}{2 \text{ mol Ag}} \right) = \underline{\underline{.01043 \text{ mol Cu}}}$$

$$(.02086 \text{ mol Ag}) \left(\frac{2 \text{ mol AgNO}_3}{2 \text{ mol Ag}} \right) = \underline{\underline{.02086 \text{ mol AgNO}_3}}$$



$$\left(\begin{array}{l} 7.5385 \text{ g Fe} \\ 7.1600 \text{ g O} \end{array} \right) (4000 \text{ g Fe}_2\text{O}_3) \left(\frac{1 \text{ mol}}{159.70 \text{ g}} \right) = 25.04696 \text{ mol Fe}_2\text{O}_3$$

$$(25.04696 \text{ mol Fe}_2\text{O}_3) \left(\frac{3 \text{ mol CO}}{1 \text{ mol Fe}_2\text{O}_3} \right) = \underline{\underline{75.14 \text{ mol CO}}}$$

$$b) (25.04696 \text{ mol Fe}_2\text{O}_3) \left(\frac{2 \text{ mol Fe}}{1 \text{ mol Fe}_2\text{O}_3} \right) = \underline{\underline{50.09 \text{ mol Fe}}}$$

$$(25.04696 \text{ mol Fe}_2\text{O}_3) \left(\frac{3 \text{ mol CO}_2}{1 \text{ mol Fe}_2\text{O}_3} \right) = \underline{\underline{75.14 \text{ mol CO}_2}}$$

U4 HW 2 (CONT)

(4)



a) $(100 \text{ kg CH}_3\text{OH}) \left(\frac{1000 \text{ g}}{\text{kg}} \right) = 100,000 \text{ g CH}_3\text{OH}$
 $= 1 \times 10^5 \text{ g CH}_3\text{OH}$

$(1 \times 10^5 \text{ g CH}_3\text{OH}) \left(\frac{1 \text{ mol}}{32.05 \text{ g}} \right) = 3120.1248 \text{ mol CH}_3\text{OH}$

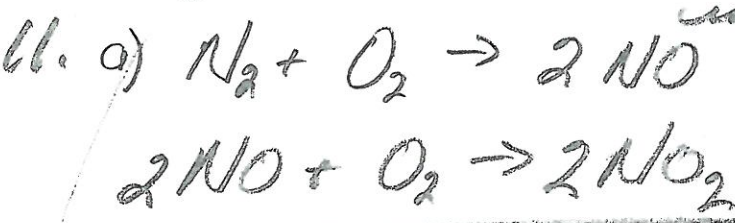
12.01g
+
2(1.01g)
+
16g

$(3120.1248 \text{ mol CH}_3\text{OH}) \left(\frac{1 \text{ mol CO}}{1 \text{ mol CH}_3\text{OH}} \right) = 3120.12 \text{ mol CO}$

$(3120.1248 \text{ mol CO}) (28.01 \text{ g/mol}) = 87,384.70 \text{ g CO}$

$(3120.1248 \text{ mol CH}_3\text{OH}) \left(\frac{2 \text{ mol H}_2}{1 \text{ mol CH}_3\text{OH}} \right) = 6240.25 \text{ mol H}_2$

$(6240.25 \text{ mol H}_2) (2.02 \text{ g/mol}) = 12605.3 \text{ g H}_2$



b) $(384 \text{ g O}_2) \left(\frac{1 \text{ mol}}{32 \text{ g}} \right) = 12 \text{ mol O}_2$

$(12 \text{ mol O}_2) \left(\frac{2 \text{ mol NO}_2}{1 \text{ mol O}_2} \right) = 24 \text{ mol NO}_2$

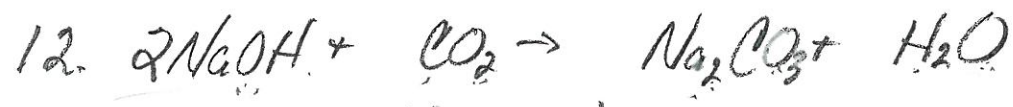
$(24 \text{ mol NO}_2) \left(\frac{46.01 \text{ g}}{\text{mol}} \right) = 1104.24 \text{ g NO}_2$

Q4 HW 2 (CONT)



11. c) (12 mol O2) / (1 mol O2) * (2 mol NO) = 24 mol NO

(24 mol NO) * (30.01 g/mol) = 720.24 g NO



a) (925g CO2) / (44.01g/mol) = 21.01795 mol CO2

(21.01795 mol CO2) * (2 mol NaOH) / (1 mol CO2) = 42.04 mol NaOH

b. (21.01795 mol CO2) * (1 mol Na2CO3) / (1 mol CO2) = 21.02 mol Na2CO3

(21.01795 mol CO2) * (1 mol H2O) / (1 mol CO2) = 21.02 mol H2O



a) (4.5 mol AgNO3) * (1 mol NaBr) / (1 mol AgNO3) = 4.5 mol NaBr

(4.5 mol NaBr) * (102.90 g/mol) = 463.05 g NaBr

b. (4.5 mol AgNO3) * (1 mol AgBr) / (1 mol AgNO3) = 4.5 mol AgBr

(4.5 mol AgBr) * (187.795 g/mol) = 845.01 g AgBr

12.01
32.00
44.01g

11
22.99
14.91
2.30

11
107.87
79.91
87.78

CP4 HW 2 (CONT)

6



$$a) (150 \text{ g H}_2\text{SO}_4) \left(\frac{1 \text{ mol}}{99.08 \text{ g}} \right) = 1.52936 \text{ mol H}_2\text{SO}_4$$

$$\left(1.52936 \text{ mol H}_2\text{SO}_4 \right) \left(\frac{2 \text{ mol NaHCO}_3}{1 \text{ mol H}_2\text{SO}_4} \right) = 3.05872 \text{ mol NaHCO}_3 = 3.06 \text{ mol NaHCO}_3$$

$$b) (1.52936 \text{ mol H}_2\text{SO}_4) \left(\frac{2 \text{ mol CO}_2}{1 \text{ mol H}_2\text{SO}_4} \right) = 3.06 \text{ mol CO}_2$$

$$\begin{array}{r} 12.01 \\ 32.00 \\ \hline 44.01 \text{ g} \end{array} \left(1.52936 \text{ mol H}_2\text{SO}_4 \right) \left(\frac{1 \text{ mol Na}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \right) = 1.53 \text{ mol Na}_2\text{SO}_4$$

$$\begin{array}{r} 45.98 \\ + 32.06 \\ 64.00 \\ \hline 142.04 \end{array} \left(1.52936 \text{ mol H}_2\text{SO}_4 \right) \left(\frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{SO}_4} \right) = 3.06 \text{ mol H}_2\text{O}$$

$$(3.06 \text{ mol CO}_2) \left(\frac{44.01 \text{ g}}{1 \text{ mol}} \right) = 134.67 \text{ g CO}_2$$

$$(1.53 \text{ mol Na}_2\text{SO}_4) \left(\frac{142.04 \text{ g}}{1 \text{ mol}} \right) = 217.32 \text{ g Na}_2\text{SO}_4$$

$$(3.06 \text{ mol H}_2\text{O}) \left(\frac{18.02 \text{ g}}{1 \text{ mol}} \right) = 55.14 \text{ g H}_2\text{O}$$