

More Solution Calculations

47.  $n = CV$

$$n = 39.2 \text{ g H}_3\text{PO}_4 \times \frac{1 \text{ mol H}_3\text{PO}_4}{97.997 \text{ g H}_3\text{PO}_4} = 0.40002 \text{ mol H}_3\text{PO}_4$$

$$C = ? \frac{\text{mol}}{\text{L}}$$

$$V = 0.500 \text{ L}$$

$$C = \frac{n}{V}$$

$$= \frac{0.40002 \text{ mol}}{0.500 \text{ L}}$$

$$= 0.80004 \text{ M}$$

48.  $n = 100 \text{ g Na}_2\text{SO}_4 \times \frac{1 \text{ mol Na}_2\text{SO}_4}{142.05 \text{ g Na}_2\text{SO}_4} = 0.70398 \text{ mol Na}_2\text{SO}_4$

$$C = ? \frac{\text{mol}}{\text{L}}$$

$$V = 10.0 \text{ L}$$

$$C = \frac{n}{V}$$

$$= \frac{0.70398 \text{ mol}}{10.0 \text{ L}}$$

$$= 0.0704 \text{ M}$$

49.  $n = ? \text{ mol ... to g C}_6\text{H}_{12}\text{O}_6$

$$C = 0.050 \frac{\text{mol}}{\text{L}}$$

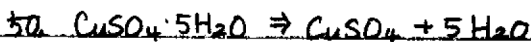
$$V = 0.250 \text{ L}$$

$$0.0125 \text{ mol C}_6\text{H}_{12}\text{O}_6 \times \frac{180.156 \text{ g C}_6\text{H}_{12}\text{O}_6}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} = 2.252 \text{ g C}_6\text{H}_{12}\text{O}_6$$

$$n = CV$$

$$= 0.050 \frac{\text{mol}}{\text{L}} \times 0.250 \text{ L}$$

$$= 0.0125 \text{ mol}$$



$$n = ? \text{ mol CuSO}_4$$

$$V = 2.0 \text{ L}$$

$$C = 3.0 \frac{\text{mol}}{\text{L}}$$

$$1 \text{ mol CuSO}_4 \times \frac{1 \text{ mol CuSO}_4 \cdot 5\text{H}_2\text{O}}{1 \text{ mol CuSO}_4} \times \frac{249.683 \text{ g CuSO}_4 \cdot 5\text{H}_2\text{O}}{1 \text{ mol CuSO}_4 \cdot 5\text{H}_2\text{O}} = 1498.098 \text{ g CuSO}_4 \cdot 5\text{H}_2\text{O}$$

$$n = CV$$

$$= 3.0 \frac{\text{mol}}{\text{L}} \times 2.0 \text{ L}$$

$$= 6 \text{ mol}$$

error here - the 6 mol is already  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

51.  $n = ? \text{ mol Na}_3\text{PO}_4$   $n = CV$

$$C = 0.320 \frac{\text{mol}}{\text{L}}$$

$$= 0.320 \frac{\text{mol}}{\text{L}} \times 0.250 \text{ L}$$

$$V = 0.250 \text{ L}$$

$$= 0.08 \text{ mol}$$

$$0.08 \text{ mol Na}_3\text{PO}_4 \times \frac{163.9408 \text{ g Na}_3\text{PO}_4}{1 \text{ mol Na}_3\text{PO}_4} = 13.115 \text{ g Na}_3\text{PO}_4$$

Hilroy

$$52. n = 5.0 \text{ g HCl} \times \frac{1 \text{ mol HCl}}{36.46 \text{ g HCl}} = 0.137 \text{ mol HCl}$$

$$C = 0.14 \frac{\text{mol}}{\text{L}}$$

$$V = ? \text{ L}$$

$$V = \frac{n}{C}$$

$$= \frac{0.137 \text{ mol HCl}}{0.14 \frac{\text{mol}}{\text{L}}}$$

$$= 0.9786 \text{ L HCl}$$

$$53. C_s V_s = C_o V_o$$

$$C_s = 0.95 \text{ M}$$

$$V_s = ? \text{ mL}$$

$$C_o = 0.15 \text{ M}$$

$$V_o = 200 \text{ mL}$$

$$V_s = \frac{C_o V_o}{C_s}$$

$$= \frac{0.15 \text{ M} \times 200 \text{ mL}}{0.95 \text{ M}}$$

$$= 31.58 \text{ mL}$$

$$54. C_o = 0.55 \text{ M}$$

$$V_s = 55.0 \text{ mL}$$

$$C_o = ? \text{ M}$$

$$V_o = 250 \text{ mL}$$

$$C_o = \frac{C_s V_s}{V_o}$$

$$= \frac{0.55 \text{ M} \times 55.0 \text{ mL}}{250 \text{ mL}}$$

$$= 0.121 \text{ M}$$

$$55. C_s = 1.50 \text{ M}$$

$$V_s = 50.0 \text{ mL}$$

$$C_o = 0.45 \text{ M}$$

$$V_o = ? \text{ mL}$$

$$V_o = \frac{C_s V_s}{C_o}$$

$$= \frac{1.50 \text{ M} \times 50.0 \text{ mL}}{0.45 \text{ M}}$$

$$= 166.6 \text{ mL}$$



$$n = ? \text{ mol HNO}_3$$

$$C = 5.00 \frac{\text{mol}}{\text{L}}$$

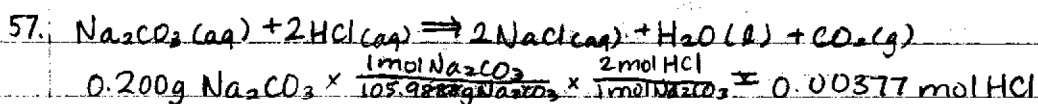
$$V = 0.125 \text{ L}$$

$$n = CV$$

$$= 5.00 \frac{\text{mol}}{\text{L}} \times 0.125 \text{ L}$$

$$= 0.625 \text{ mol}$$

$$0.625 \text{ mol HNO}_3 \times \frac{1 \text{ mol Ca}(\text{NO}_3)_2}{2 \text{ mol HNO}_3} \times \frac{164.086 \text{ g Ca}(\text{NO}_3)_2}{1 \text{ mol Ca}(\text{NO}_3)_2} = 51.2769 \text{ g Ca}(\text{NO}_3)_2$$

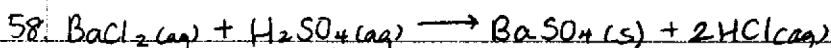


$n = 0.00377\text{ mol HCl}$

$C = ?$

$V = 0.0300\text{ L}$

$C = \frac{n}{V}$   
 $= \frac{0.00377\text{ mol}}{0.0300\text{ L}}$   
 $= 0.125\overline{6}\frac{\text{mol}}{\text{L}}$



$0.300\text{g BaSO}_4 \times \frac{1\text{mol BaSO}_4}{233.392\text{g BaSO}_4} \times \frac{1\text{mol H}_2\text{SO}_4}{1\text{mol BaSO}_4} = 0.001285\text{ mol H}_2\text{SO}_4$

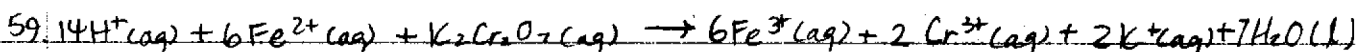
$n = 0.001285\text{ mol H}_2\text{SO}_4$

$C = ?$

$V = 0.050\text{ L}$

$C = \frac{n}{V}$   
 $= \frac{0.001285\text{ mol}}{0.050\text{ L}}$

$= 0.0257\text{ M}$



$V = 0.0301\text{ L}$

$C = 0.0165\frac{\text{mol}}{\text{L}}$

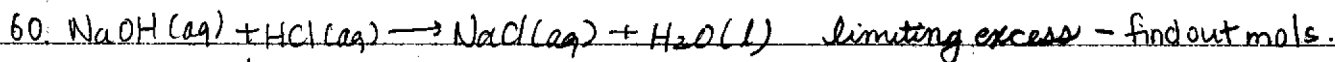
$n = ?$

$0.00049665\text{ mol K}_2\text{Cr}_2\text{O}_7 \times \frac{6\text{mol Fe}^{2+}}{1\text{mol K}_2\text{Cr}_2\text{O}_7} \times \frac{55.845\text{g Fe}^{2+}}{1\text{mol Fe}^{2+}} = 0.1664\text{g Fe}^{2+}$

$n = CV$

$= 0.0165\frac{\text{mol}}{\text{L}} \times 0.0301\text{ L}$

$= 0.00049665\text{ mol}$



$C = 0.120\frac{\text{mol}}{\text{L}}\text{ NaOH}$

$V = 0.050\text{ L}$

$n = ?$

$0.006\text{ mol NaOH} \times \frac{1\text{mol HCl}}{1\text{mol NaOH}} = 0.006\text{ mol HCl (required)}$

$n = CV$

$= 0.120\frac{\text{mol}}{\text{L}} \times 0.050\text{ L}$

$= 0.006\text{ mol NaOH (available)}$

$\therefore 0.006\text{ mol NaOH} \times \frac{1\text{mol NaCl}}{1\text{mol NaOH}} \times \frac{58.4425\text{g NaCl}}{1\text{mol NaCl}} =$

$0.350655\text{ g NaCl}$

$C = 0.165\frac{\text{mol}}{\text{L}}$

$V = 0.0394\text{ L}$

$n = ?$

$n = CV$

$= 0.165\frac{\text{mol}}{\text{L}} \times 0.0394\text{ L}$

$= 0.006501\text{ mol HCl (available)}$

$0.006501\text{ mol HCl} \times \frac{1\text{mol NaOH}}{1\text{mol HCl}} = 0.006501\text{ mol NaOH (required)}$