47. $n = CV$

$n = 39.2g\ H_3PO_4 \times \dfrac{1\ mol\ H_3PO_4}{97.994g\ H_3PO_4} = 0.40002\ mol\ H_3PO_4$

$C = ?\ \dfrac{mol}{L}$

$V = 0.500L$

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

$= \dfrac{0.40002\ mol}{0.500L}$

$= 0.80004\ M$

48. $n = 100g\ Na_2SO_4 \times \dfrac{1\ mol\ Na_2SO_4}{142.05g\ Na_2SO_4} = 0.70398\ mol\ Na_2SO_4$

$C = ?\ \dfrac{mol}{L}$

$V = 10.0L$

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

$= \dfrac{0.70398\ mol}{10.0L}$

$= 0.0704\ M$

49. $n = ?\ mol \dots to\ g\ C_6H_{12}O_6$

$C = 0.050\ \dfrac{mol}{L}$

$V = 0.250\ L$          $0.0125\ mol\ C_6H_{12}O_6 \times \dfrac{180.156g\ C_6H_{12}O_6}{1\ mol\ C_6H_{12}O_6} = 2.252g\ C_6H_{12}O_6$

$n = CV$

$= 0.050\ \dfrac{mol}{L} \times 0.250L$

$= 0.0125\ mol$

50. $CuSO_4 \cdot 5H_2O \rightarrow CuSO_4 + 5H_2O$
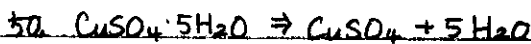
$n = ?\ mol\ CuSO_4$

$V = 2.0L$

$C = 3.0\ \dfrac{mol}{L}$      $6\ mol\ CuSO_4 \times \dfrac{1\ mol\ CuSO_4 \cdot 5H_2O}{1\ mol\ CuSO_4} \times \dfrac{249.683g\ CuSO_4 \cdot 5H_2O}{1\ mol\ CuSO_4 \cdot 5H_2O} = 1498.098g$

$n = CV$                                                      $CuSO_4 \cdot 5H_2O$

$= 3.0\ \dfrac{mol}{L} \times 2.0L$

$= 6\ mol$

51. $n = ?\ mol\ Na_3PO_4$      $n = CV$

$C = 0.320\ \dfrac{mol}{L}$        $= 0.320\ \dfrac{mol}{L} \times 0.250L$

$V = 0.250L$          $= 0.08\ mol$

$0.08\ mol\ Na_3PO_4 \times \dfrac{163.9408g\ Na_3PO_4}{1\ mol\ Na_3PO_4} = 13.115g\ Na_3PO_4$

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

$C = 0.14\ \dfrac{mol}{L}$

$V = ?\ L$

$V = \dfrac{n}{c}$

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

$= 0.9786\ L\ HCl$

53. $C_s V_s = C_D V_D$

$C_s = 0.95\ M$

$V_s = ?\ mL \qquad V_s = \dfrac{C_D V_D}{C_s}$

$C_D = 0.15\ M \qquad = \dfrac{0.15M \times 200mL}{0.95M}$

$V_D = 200\ mL \qquad = 31.58\ mL$

54. $C_s = 0.55\ M$

$V_s = 55.0\ mL \qquad C_D = \dfrac{C_s V_s}{V_D}$

$C_D = ?\ M \qquad = \dfrac{0.55M \times 55.0mL}{250mL}$

$V_D = 250\ mL \qquad = 0.121\ M$

55. $C_s = 1.50\ M$

$V_s = 50.0\ mL \qquad V_D = \dfrac{C_s V_s}{C_D}$

$C_D = 0.45\ M \qquad = \dfrac{1.50M \times 50.0mL}{0.45M}$

$V_D = ?\ mL \qquad = 166.\overline{6}\ mL$

56. $2HNO_3(aq) + Ca(OH)_2(s) \Rightarrow Ca(NO_3)_2(aq) + 2H_2O(\ell)$
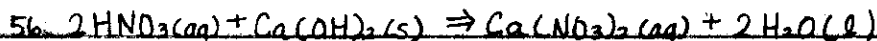
$n = ?\ mol\ HNO_3$

$C = 5.00\ \dfrac{mol}{L}$

$V = 0.125\ L \qquad 0.625\ mol\ HNO_3 \times \dfrac{1\ mol\ Ca(NO_3)_2}{2\ mol\ HNO_3} \times \dfrac{164.086g\ Ca(NO_3)_2}{1\ mol\ Ca(NO_3)_2} = 51.2769g\ Ca(NO_3)_2$

$n = CV$

$= 5.00\ \dfrac{mol}{L} \times 0.125\ L$

$= 0.625\ mol$

57. $Na_2CO_3 (aq) + 2HCl (aq) \Longrightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$

$0.200g\ Na_2CO_3 \times \frac{1\,mol\,Na_2CO_3}{105.988g\,Na_2CO_3} \times \frac{2\,mol\,HCl}{1\,mol\,Na_2CO_3} = 0.00377\ mol\ HCl$
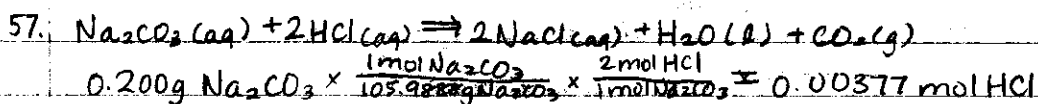
$n = 0.00377\ mol\ HCl$

$C = ?$

$V = 0.0300\ L$

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

$\quad = \frac{0.00377\,mol}{0.0300\,L}$

$\quad = 0.1256\ \frac{mol}{L}$

58. $BaCl_2 (aq) + H_2SO_4 (aq) \longrightarrow BaSO_4 (s) + 2HCl(aq)$
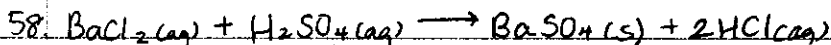
$0.300g\ BaSO_4 \times \frac{1\,mol\,BaSO_4}{233.392g\,BaSO_4} \times \frac{1\,mol\,H_2SO_4}{1\,mol\,BaSO_4} = 0.001285\ mol\ H_2SO_4$

$n = 0.001285\ mol\ H_2SO_4$

$C = ?$

$V = 0.050\ L$

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

$\quad = \frac{0.001285\,mol}{0.050\,L}$

$\quad = 0.0257\ M$

59. $14H^+(aq) + 6Fe^{2+}(aq) + K_2Cr_2O_7(aq) \longrightarrow 6Fe^{3+}(aq) + 2Cr^{3+}(aq) + 2K^+(aq) + 7H_2O(l)$
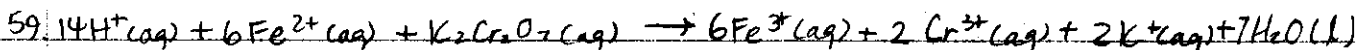
$V = 0.0301\ L$

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

$n = ?$ $\qquad\qquad 0.00049665\ mol\ K_2Cr_2O_7 \times \frac{6\,mol\,Fe^{2+}}{1\,mol\,K_2Cr_2O_7} \times \frac{55.845g\,Fe^{2+}}{1\,mol\,Fe^{2+}} = 0.1664g\,Fe^{2+}$

$n = CV$

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

$\quad = 0.00049665\ mol$

60. $NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l)$ limiting excess - find out mols.
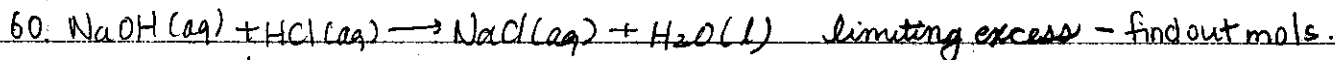
$C = 0.120\ \frac{mol}{L}\ NaOH$

$V = 0.050\ L$

$n = ?$ $\qquad\qquad 0.006\ mol\ NaOH \times \frac{1\,mol\,HCl}{1\,mol\,NaOH} = 0.006\ mol\ HCl\ (required)$

$n = CV$

$\quad = 0.120\ \frac{mol}{L} \times 0.050\ L$ $\qquad\qquad \therefore 0.006\ mol\ NaOH \times \frac{1\,mol\,NaCl}{1\,mol\,NaOH} \times \frac{58.4425g\,NaCl}{1\,mol\,NaCl} =$

$\quad = 0.006\ mol\ NaOH\ (available)$ $\qquad\qquad\qquad\qquad 0.350655g\ NaCl$

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

$V = 0.0394\ L$

$n = ?$

$n = CV$ $\qquad\qquad\qquad\qquad 0.006501\ mol\ HCl \times \frac{1\,mol\,NaOH}{1\,mol\,HCl} = 0.006501\ mol\ NaOH$

$\quad = 0.165\ \frac{mol}{L} \times 0.0394\ L$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad (required).$

$\quad = 0.006501\ mol\ HCl\ (available)$