Cantidades de Reactivos y Productos.

1) $2Li_{(s)} + 2H_2O_{(l)} \rightarrow 2LiOH_{(s)} + H_{2(g)}$

a) $\frac{2 \text{ mol de Litio}}{1 \text{ mol de } H_2} = \frac{6.2 \text{ mol de Li}}{x}$

$x = 3.1$ mol de Hidrógeno

b) $n = \frac{m}{M.A._{Li}} = \frac{80 \text{ g}}{6.94 \text{ g/mol}} = 11.53 \approx 11.5 \text{ mol}$

$\frac{2 \text{ mol de Li}}{1 \text{ mol de } H_2} = \frac{11.5 \text{ mol de Li}}{x \text{ mol de } H_2}$

$x = 5.75$ mol de $H_2$

$m = n \times M.M._{H_2}$ $\quad M.M._{H_2} = 2 \times 1.008$

$= 5.75 \text{ mol} \times 2.016 \text{ g/mol}$

$m = 11.59$ g de hidrógeno.

2) $NO_{(g)} + XO_{2(g)} \rightarrow NO_{2(g)}$

$x \cdot 2 + 1 = 2$

$2x = 1$

$x = 1/2$

$NO + 1/2\, O_2 \rightarrow NO_2 \quad \cdot 2$

$2NO + O_2 \rightarrow 2NO_2$

$\frac{1 \text{ mol de } O_2}{2 \text{ moles de } NO_2} = \frac{2 \text{ mol de } O_2}{x}$

$x = 4$ moles de $NO_2$

b) $M.M_{NO_2} = \underset{\downarrow \atop M.A._N}{14} + \underset{\downarrow \atop M.A._N}{2 \times 16} = 46\ g/mol$

$$n = \frac{50g}{46\ g/mol} = 1.1 \text{ mol de } NO_2$$

$$\frac{1 \text{ mol de } O_2}{2 \text{ mol de } NO_2} = \frac{x \text{ mol de } O_2}{1.1 \text{ mol de } NO_2}$$

$$x = 0.55 \text{ mol de } O_2.$$

3) $C_6H_{12}O_{6(s)} + O_{2(g)} \longrightarrow 6CO_{2(g)} + 6H_2O$

$$x \cdot 2 + 6 = 12 + 6$$
$$2x = 12$$
$$x = 6$$

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$$

$\downarrow$ glucosa

$$n = \frac{856g}{M.M._{glucosa}}$$

$$M.M._{glucosa} = 6 \times \underset{12}{M.A._C} + 12 \times \underset{1.008}{M.A._H} + 6 \times \underset{16}{M.A._O}$$
$$= 180.1\ g/mol$$

$$n = \frac{856g}{180.1\ g/mol} = 4.8 \text{ mol}$$

$$\frac{1 \text{ mol } C_6H_{12}O_6}{6 \text{ mol } CO_2} = \frac{4.8 \text{ mol de } C_6H_{12}O_6}{x}$$

$x = 28.8$ mol de $CO_2$ $\rightarrow$ $m = n \times M.M._{CO_2}$
$= 28.8 \times 44 = 1267.2g$

$$2C + O_2 \rightarrow 2CO$$

$$2CO + O_2 \rightarrow 2CO_2$$

$$H_2 + Br_2 \rightarrow 2HBr$$

$$2Mg + O_2 \rightarrow 2MgO$$

$$Cl_2 + 2NaI \rightarrow 2NaCl + I_2$$

$$S_8 + 8O_2 \rightarrow 8SO_2$$

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$$N_2O_5 \rightarrow N_2O_4 + XO_2$$

$$X \cdot 2 + 4 = 5$$

$$2X = 1$$

$$X = 1/2$$

$$N_2O_5 \rightarrow N_2O_4 + 1/2\,O_2 \quad / \cdot 2$$

$$2N_2O_5 \rightarrow 2N_2O_4 + O_2$$

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$NH_4NO_3 \rightarrow N_2O + 2H_2O$

$NH_4NO_2 \rightarrow N_2 + 2H_2O$

$6H_2O + P_4O_{10} \rightarrow 4H_3PO_4$

$Cu(NO_3)_2 \rightarrow Cu^{2+} + 2NO_3^-$

$H_2SO_4 \rightarrow H^+ + HSO_4^-$

$HSO_4^- \rightarrow H^+ + SO_4^{2-}$

$3CuO + 2NH_3 \rightarrow 3Cu + N_2 + 3H_2O$

Repaso: Unidades de Concentración.

1) Arreglado.

$$\boxed{M = \frac{n}{V(L)}}$$

$m_{soln} = 125g$

$M = 2.45M$

$d_{soln} = 0.976\ g/mL$

$$\boxed{d = \frac{m}{V}}$$

$\Downarrow$

$$V = \frac{125g}{0.976\ g/mL} = 128.1\ mL$$

$$128.1\ mL \times \frac{1L}{1000\ mL} = 0.128L$$

$n = M \times V(L)$

$= 2.45\ mol/L \times 0.128L$

$= 0.314\ mol$

2) a)

$$\% \, m/m = \frac{5.50 \text{ g de NaBr}}{83.7 \text{ g de soln}} \times 100$$

$$= 6.57 \% \, m/m$$

$\Downarrow$

Esto quiere decir que:
hay 6.57 g de soluto en 100 g de solución.

b) $$\% \, m/m = \frac{31.0 \text{ g de KCl}}{150 \text{ g de soln}} \times 100$$

$$= 20.6 \% \, m/m$$

3)

a) $$\% \, m/v = \frac{5.50 \text{ g de NaBr}}{78.2 \text{ mL de Soln}} \times 100$$

$$= 7.03 \% \, m/v$$

b) $$\% \, m/v = \frac{31.0 \text{ g de KCl}}{125 \text{ mL de soln}} \times 100$$

$d = \frac{m}{v}$

$$= 24.8 \% \, m/v$$

$$v = \frac{m}{d} = \frac{150 \text{ g}}{1.2 \text{ g/mL}}$$

$\Downarrow$

quiere decir que:
hay 24.8 g de soluto en 100 mL de solución.

c) $$\% \, m/v = \frac{31.0 \text{ g de soluto}}{150.3 \text{ mL}} \times 100 = 20.6 \% \, m/v$$

$m_{soln} = m_s + m_{solvente}$

$m_{soln} = 181 \text{ g de solución}$

$$v = \frac{181 \text{ g}}{1.2 \text{ g/mL}} = 150.3 \text{ mL}$$

4) $n = \frac{m}{M.M._{NaCl}}$ $\quad M.M._{NaCl} = M.A_{Na} + M.A._{Cl}$

$= 23 + 35.45$

$= 58.45\ g/mol$

$V(L) \Rightarrow 100\ mL \times \frac{1\ L}{1000\ mL} = 0.1\ L$

$n = \frac{50\ g}{58.45\ g/mol} = 0.86\ mol$

$M = \frac{0.86\ mol}{0.1\ L} = 8.6\ mol/L$

$M = 8.6$ Molar

5) a) $M = \frac{n}{V(L)} \rightarrow n = M \times V$

$= 0.4\ mol/L \times 0.025\ L$

$n = 0.01\ mol$

$n = \frac{m}{M.M_{CuSO_4}}$ $\quad M.M._{CuSO_4} = M.A._{Cu} + M.A_S + 4 \times M.A_O$

$= 63.5 + 32.1 + 4 \times 16$

$= 159.6\ g/mol$

$m = n \times M.M.\ CuSO_4$

$= 0.01\ mol \times 159.6\ g/mol$

$= 1.596$ gramos

$\approx 1.6$ gramos.

b)

$n = 0.8\ mol/L \times 0.050\ L$

$n = 0.04\ mol$

$m = 0.04\ mol \times 159.6\ g/mol$

$= 6.384$ gramos

$\simeq 6.4\ g$

c) $n = 5.5\ mol/L \times 1\ L$

$= 5.5\ mol$

$m = 5.5\ mol \times 159.6\ g/mol$

$= 877.8\ g$

6) $Na_2SO_4 \rightarrow 2Na^+ + SO_4^{2-}$

$n = M \times V(L)$

$= 1.2\ mol/L \times 0.025\ L$

$n = 0.03$ mol de iones $Na^+$

La estequiometría dice.

$$\frac{1\ mol\ Na_2SO_4}{2\ mol\ Na^+} = \frac{x\ mol\ de\ Na_2SO_4}{0.03\ mol\ de\ Na^+}$$

$x = 0.015$ mol de $Na_2SO_4$

$m = n \times M.M._{Na_2SO_4}$

$= 0.015\ mol \times 142\ g/mol$

$\boxed{m = 2.13\ g}$

$M.M_{Na_2SO_4} = 2 \times M.A_{Na} + M.A._S + 4 \times M.A_O$

$= 142\ g/mol$

b)

$n = 1.2\ mol/L \times 0.050\ L$

$n = 0.06$ mol de iones $SO_4^{2-}$

$$\frac{1\ mol\ de\ Na_2SO_4}{1\ mol\ de\ SO_4^{2-}} = \frac{x\ mol\ de\ Na_2SO_4}{0.06\ mol\ de\ SO_4^{2-}}$$

$x = 0.06$ mol de $Na_2SO_4$

$m = 0.06\ mol \times 142\ g/mol$

$= 8.52$ g de $Na_2SO_4$

7)

$n = 4\ mol/L \times 0.1\ L$

$n = 0.4$ mol

$M.M._{NaOH} = 23+16+1$
$= 40\ g/mol$

$m = 0.4\ mol \times M.M._{NaOH}$

$m = 16\ g.$

Se colocan 16 g de NaOH en un recipiente de 100 mL y luego adicionar agua hasta completar los 100 mL de solución, tapar y agitar.