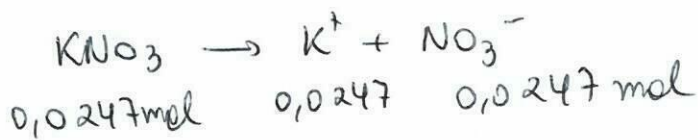


1) a) 2,500g KNO_3
 $\text{MM} = 101,1 \text{ g/mol}$

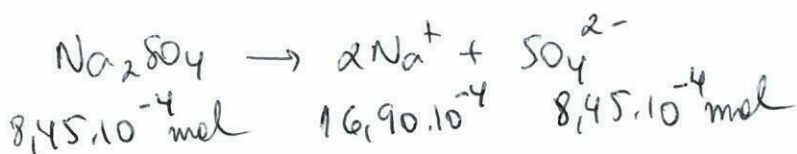
$101,1 \text{ g} - 1 \text{ mol}$
 $2,500 \text{ g} - x$
 $x = 0,0247 \text{ mol } \text{KNO}_3$



$\therefore [\text{K}^+] = [\text{NO}_3^-] = \frac{0,0247 \text{ mol}}{0,1 \text{ L}} = 0,247 \text{ mol/L}$

b) 120mg Na_2SO_4
 $\text{MM} = 142 \text{ g/mol}$

$142 \text{ g} - 1 \text{ mol}$
 $0,120 \text{ g} - x$
 $x = 8,45 \cdot 10^{-4} \text{ mol}$

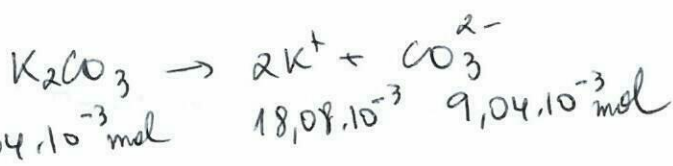


$[\text{Na}^+] = \frac{16,90 \cdot 10^{-4} \text{ mol}}{0,050 \text{ L}} = \frac{16,90 \cdot 10^{-4} \text{ mol}}{0,038 \text{ mol/L}}$

$[\text{SO}_4^{2-}] = \frac{8,45 \cdot 10^{-4} \text{ mol}}{0,050 \text{ L}} = 0,0169 \frac{\text{mol}}{\text{L}}$

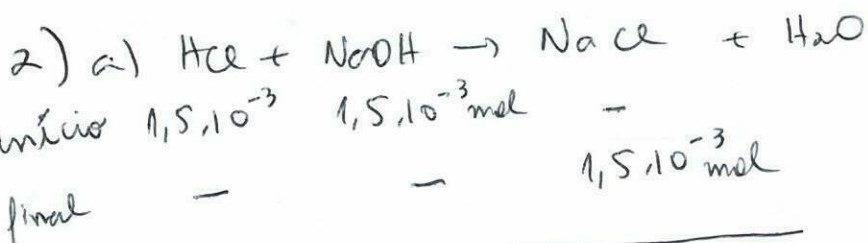
c) 1,250g K_2CO_3
 $\text{MM} = 138,2 \text{ g/mol}$

$138,2 \text{ g} - 1 \text{ mol}$
 $1,250 \text{ g} - x$
 $x = 9,04 \cdot 10^{-3} \text{ mol}$

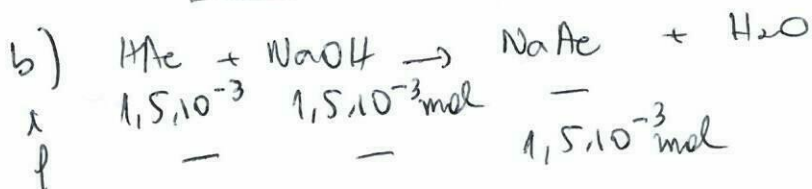


$[\text{K}^+] = \frac{18,08 \cdot 10^{-3} \text{ mol}}{0,5 \text{ L}} = 0,036 \text{ mol/L}$

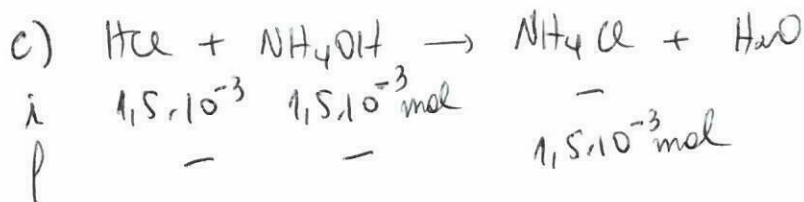
$[\text{CO}_3^{2-}] = \frac{9,04 \cdot 10^{-3} \text{ mol}}{0,5 \text{ L}} = 0,01808 \frac{\text{mol}}{\text{L}}$



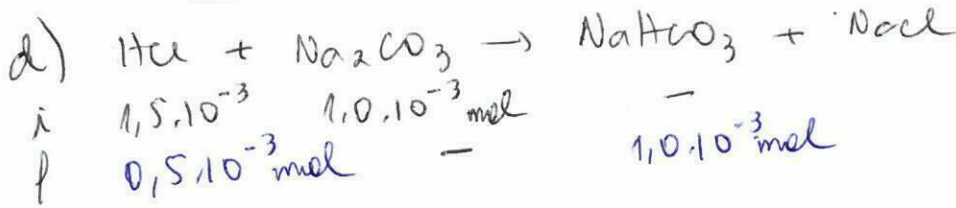
nenhum reagente em excesso



nenhum reagente em excesso

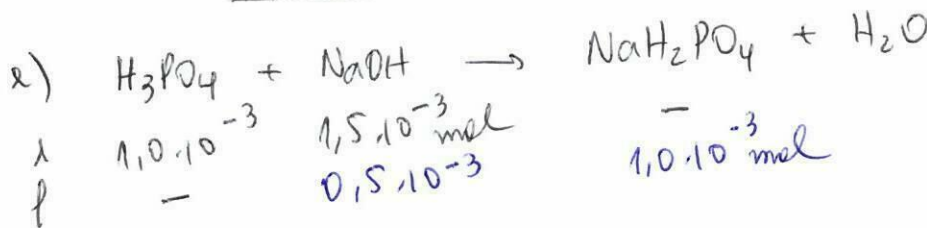
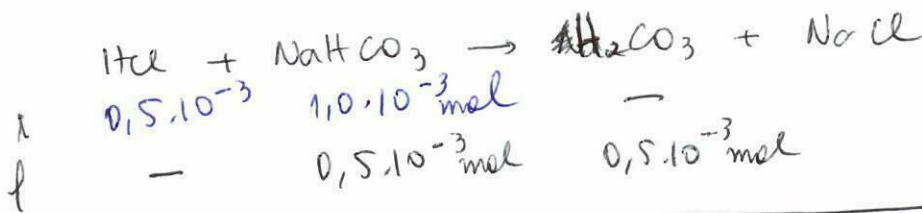


nenhum reagente em excesso



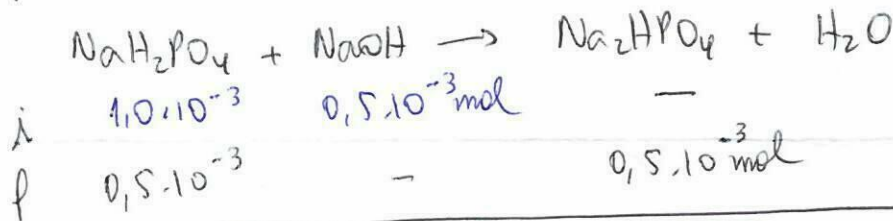
nenhum reagente em excesso;

produtos da reação:
 NaHCO_3 e H_2CO_3



nenhum reagente em excesso;

produtos da reação:
 NaH_2PO_4 e Na_2HPO_4

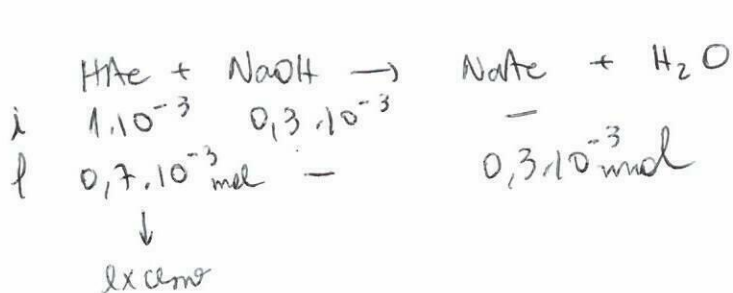


3) a) 10 ml HAc 0,1 mol/L + 6 ml NaOH 0,05 mol/L

HAc: $0,1 \text{ mol} - 1000 \text{ ml}$
 $x - 10 \text{ ml}$
 $x = 1 \cdot 10^{-3} \text{ mol HAc}$

NaOH: $0,05 \text{ mol} - 1000 \text{ ml}$
 $x - 6 \text{ ml}$

$x = 0,3 \cdot 10^{-3} \text{ mol NaOH}$

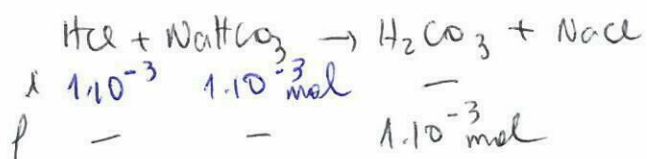
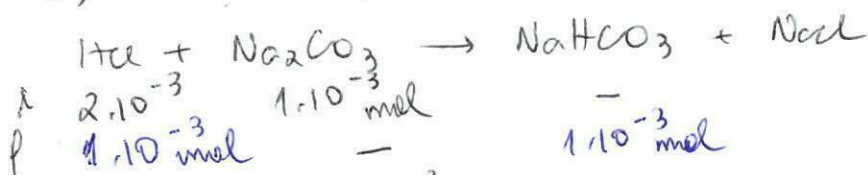


$[\text{HAc}] = \frac{0,7 \cdot 10^{-3} \text{ mol}}{(10+6) \cdot 10^{-3} \text{ L}} = 0,04375 \frac{\text{mol}}{\text{L}}$

$[\text{NaAc}] = \frac{0,3 \cdot 10^{-3} \text{ mol}}{(10+6) \cdot 10^{-3} \text{ L}} = 0,01875 \frac{\text{mol}}{\text{L}}$

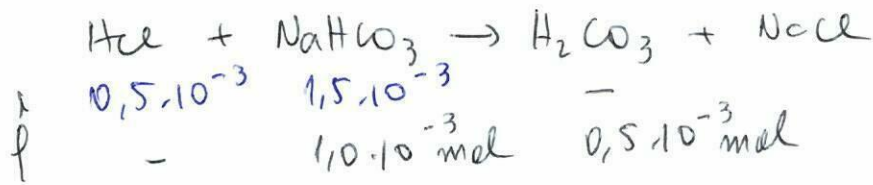
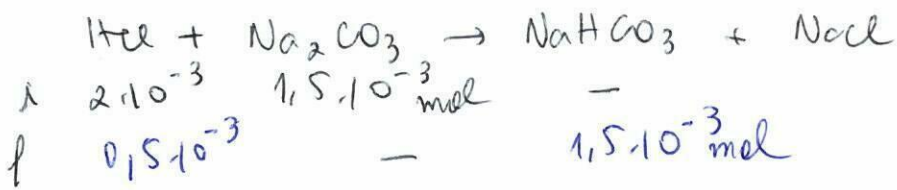
b) 10 ml HCl 0,2 mol/L = $2 \cdot 10^{-3} \text{ mol HCl}$

+ 10 ml Na_2CO_3 0,1 M = $1 \cdot 10^{-3} \text{ mol}$



$[\text{H}_2\text{CO}_3] = \frac{1 \cdot 10^{-3} \text{ mol}}{(10+10) \cdot 10^{-3} \text{ L}} = 0,05 \text{ mol/L}$

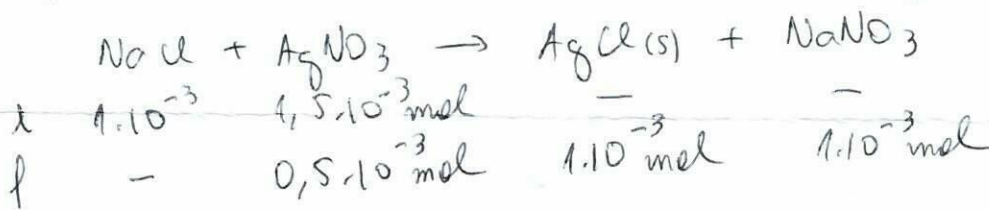
c) 10ml HCl 0,2 mol/L = $2 \cdot 10^{-3}$ mol + 10ml Na_2CO_3 0,15 mol/L = $1,5 \cdot 10^{-3}$ mol



$$[\text{NaHCO}_3] = \frac{1 \cdot 10^{-3} \text{ mol}}{(10+10) \cdot 10^{-3} \text{ L}} = 0,05 \text{ mol/L}$$

$$[\text{H}_2\text{CO}_3] = \frac{0,5 \cdot 10^{-3} \text{ mol}}{(10+10) \cdot 10^{-3} \text{ L}} = 0,025 \text{ mol/L}$$

d) 10ml NaCl 0,1 mol/L = $1 \cdot 10^{-3}$ mol + 5ml AgNO_3 0,3 mol/L = $1,5 \cdot 10^{-3}$ mol

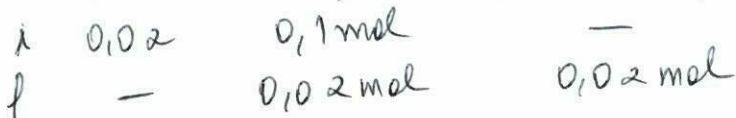
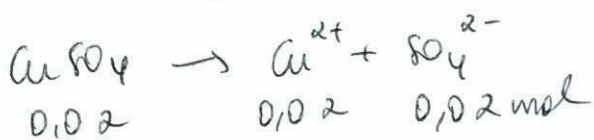


$$[\text{AgNO}_3] = \frac{0,5 \cdot 10^{-3} \text{ mol}}{(10+5) \cdot 10^{-3} \text{ L}} = 0,033 \text{ mol/L}$$

$$[\text{NaNO}_3] = \frac{1 \cdot 10^{-3} \text{ mol}}{(10+5) \cdot 10^{-3} \text{ L}} = 0,067 \text{ mol/L}$$

4) 3,2g CuSO_4 ($M_M = 160 \text{ g/mol}$) = 0,02 mol

100ml NH_3 1,0 mol/L = 0,1 mol



$$[\text{Cu}(\text{NH}_3)_4^{2+}] = \frac{0,02 \text{ mol}}{0,1 \text{ L}} = 0,2 \text{ mol/L}$$

errado! a concentração final aqui ficará 0,1 mol/L
errado! o correto é 0,2L (100mL de NH_3 + 100mL da solução de CuSO_4)

$$5) a) \text{NiCl}_2 \text{ 12,5\% (m/m)} = 12,5 \text{ g} - 100 \text{ g solução}$$

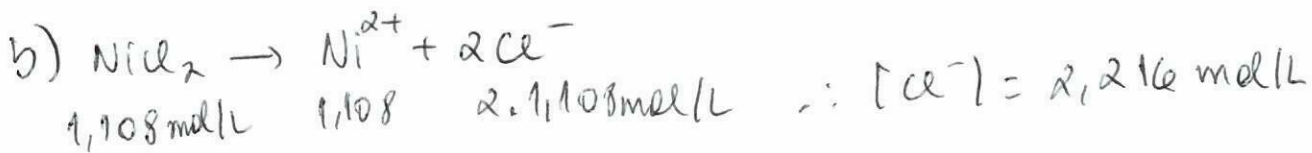
$$d = 1,149 \text{ g/ml}$$

$$\begin{array}{r} 1,149 \text{ g} - 1 \text{ ml} \\ 100 \text{ g} - V \end{array} \therefore V = 87,03 \text{ ml}$$

$$\therefore 12,5 \text{ g} / 100 \text{ g} = 12,5 \text{ g} / 87,03 \text{ ml} = 143,6 \text{ g/L}$$

$$\begin{array}{r} \text{MM} = 129,6 \text{ g} - 1 \text{ mol} \\ 143,6 \text{ g} - x \end{array} \therefore x = 1,108 \text{ mol}$$

$$\therefore 12,5\% \text{ (m/m)} = 12,5 \text{ g} / 100 \text{ g} = 12,5 \text{ g} / 87,03 \text{ ml} = 143,6 \text{ g/L} = 1,108 \text{ mol/L} =$$



$$c) 143,6 \text{ g}$$

$$e) 25 \text{ ml NaCl } 0,050 \text{ mol/L} = 1,25 \cdot 10^{-3} \text{ mol}$$



$$\begin{array}{r} 1 \text{ mol} - 1 \text{ mol} \\ x - 1,25 \cdot 10^{-3} \end{array}$$

$$x = 1,25 \cdot 10^{-3} \text{ mol}$$

$$\text{AgNO}_3: 0,1000 \text{ mol} - 1000 \text{ ml}$$

$$1,25 \cdot 10^{-3} \text{ mol} - V$$

$$\therefore V = 12,50 \text{ ml} =$$