

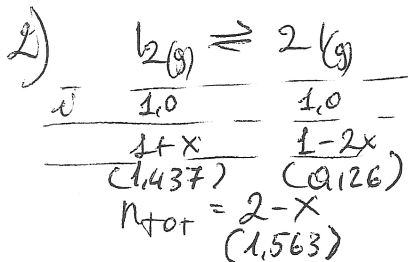
Soluzioni della I^a Esercitazione Maggio 2014

1) $PV = nRT = \frac{m}{M}RT \rightarrow M = \frac{mRT}{PV} = \frac{18 \times 0,0821 \times 428,15}{\frac{740}{760} \times 7,22} = 90,0 \text{ g/mol}$

100 g composto:

$n_C = \frac{26,68}{12,01} = 2,22 \text{ mol}$; $n_H = \frac{2,24}{1,01} = 2,22 \text{ mol}$; $n_O = \frac{71,07}{16,00} = 4,44 \text{ mol}$

f. MINIMA $\text{CHO}_2 \rightarrow M_{\text{CHO}_2} = 45,0 \text{ g/mol} \rightarrow$ f. MOLECOLARE $\text{C}_2\text{H}_2\text{O}_4$

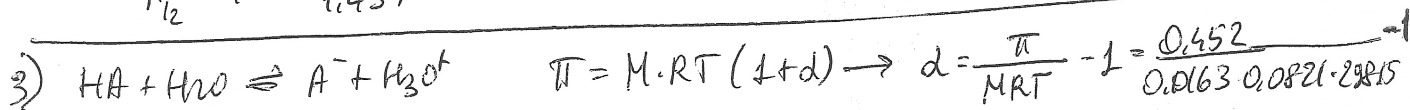


$X_1(\text{eq}) = 0,081 < \frac{1}{2} X_1(\text{c}) \rightarrow$ indica che l'equilibrio si sposta verso sinistra.

$V = 1,0 \text{ l}$

$1-2x = 0,162 - 0,081x \rightarrow 1,919x = 0,838 \rightarrow x = 0,437$

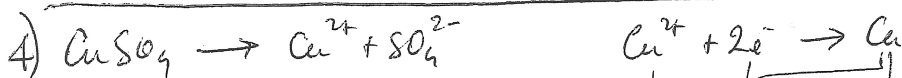
$K_c = \frac{n_1^2}{n_2} \cdot \frac{1}{V} = \frac{(0,126)^2}{1,437} = 1,105 \cdot 10^{-2}$



$[\text{H}_3\text{O}^+] = Cd = 0,0163 \times 0,1133 = 2,165 \cdot 10^{-3} \text{ M} \rightarrow \text{pH} = 2,66$

$\text{NaA} \xrightarrow{\text{H}_2\text{O}} \text{Na}^+ + \text{A}^-$
 $\text{A}^- + \text{H}_2\text{O} \rightleftharpoons \text{HA} + \text{OH}^-$
 $K_b = \frac{K_w}{K_a} = \frac{10 \cdot 10^{-15}}{3,32 \cdot 10^{-4}} = 3,01 \cdot 10^{-11}$
 $K_a = \frac{[\text{H}_3\text{O}^+]^2}{C - [\text{H}_3\text{O}^+]} = \frac{(2,165 \cdot 10^{-3})^2}{0,0163 - 2,165 \cdot 10^{-3}} = 3,32 \cdot 10^{-4} \gg 10^{-7}$

$Ck_b = 3,01 \cdot 10^{-12} \gg 10^{-14}$ $[\text{OH}^-]^2 - K_w - Ck_b = 0$
 $[\text{OH}^-] = \sqrt{K_w + Ck_b} = 1,74 \cdot 10^{-6} \rightarrow \text{pOH} = 5,76 \rightarrow \text{pH} = 8,24$



$n_{\text{Cu}} = n_{\text{CuSO}_4} = \frac{20}{159,60} = 0,125 \text{ mol}$

$n_{\text{Cu}}(\text{eff.}) = 0,125 \times \frac{75}{1000} = 9,40 \cdot 10^{-3} \text{ mol}$

$m_{\text{eff}} = \frac{Q}{F} = \frac{I \cdot t}{F}$ $n_{\text{Cu}} = \frac{I \cdot t}{2F} \cdot \frac{95}{100} \rightarrow t = \frac{n_{\text{Cu}} \cdot 2F \cdot 100}{I \cdot 95} = \frac{9,40 \cdot 10^{-3} \times 2 \times 96486 \cdot 100}{0,5 \cdot 95} = 3818,2 \text{ s}$

$t = 1 \text{ h } 3' 38'' \leftarrow \frac{3600''}{1 \text{ h}} + \frac{180''}{3'} + \frac{38''}{1''} \leftarrow t = 3818,2 \text{ s}$