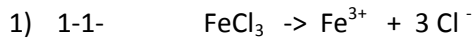


Correction de l'exercice de chimie :



1-2- $c = \frac{n}{V} = \frac{m/M}{V} = \frac{m}{M \cdot V} = \frac{271 \cdot 10^{-3}}{162,5 \times 250 \cdot 10^{-3}} \approx 6,67 \cdot 10^{-3} \text{ mol/L} = 6,67 \text{ mol/m}^3$

1-3- $[\text{Fe}^{3+}] = c \quad [\text{Cl}^-] = 3c$

2) 2-1- Le montage.

2-2-On ne doit pas utiliser une tension continue , pour éviter le phénomène d'électrolyse.

2-3- $G = \frac{I}{U} = \frac{83 \cdot 10^{-3}}{25} = 3,32 \cdot 10^{-3} \text{ S}$

2-4- $G = \sigma \cdot \frac{S}{L} \Rightarrow \sigma = \frac{G \cdot L}{S} = \frac{3,32 \cdot 10^{-3} \times 2 \cdot 10^{-2}}{4 \cdot 10^{-4}} = 0,166 \text{ S} \cdot \text{m}^{-1} = 166 \text{ mS} \cdot \text{m}^{-1}$

2-5- $\sigma = \lambda_{(\text{Fe}^{3+})} \times [\text{Fe}^{3+}] + \lambda_{(\text{Cl}^-)} \cdot [\text{Cl}^-] = \lambda_{(\text{Fe}^{3+})} \times c + \lambda_{(\text{Cl}^-)} \cdot 3c = c (\lambda_{(\text{Fe}^{3+})} + 3 \cdot \lambda_{(\text{Cl}^-)})$

2-6- $\sigma = c (\lambda_{(\text{Fe}^{3+})} + 3 \cdot \lambda_{(\text{Cl}^-)}) \Rightarrow \frac{\sigma}{c} = \lambda_{(\text{Fe}^{3+})} + 3 \lambda_{(\text{Cl}^-)} \Rightarrow \lambda_{(\text{Fe}^{3+})} = \frac{\sigma}{c} - 3 \lambda_{(\text{Cl}^-)}$

A.N: $\lambda_{(\text{Fe}^{3+})} = \frac{\sigma}{c} - 3 \lambda_{(\text{Cl}^-)} = \frac{0,166}{6,67} - 3 \times 76,3 \cdot 10^{-4} \approx 0,002 \text{ S} \cdot \text{m}^2 \cdot \text{mol}^{-1} = 20 \cdot 10^{-4} \text{ S} \cdot \text{m}^2 \cdot \text{mol}^{-1}$

Correction du 1^{er} exercice de physique :

1) $P_r = (R + r) I^2 = (30 + 2) \times 0,1^2 = 0,32 \text{ W}$

2) $P_u = E' I = 2,4 \times 0,1 = 0,24 \text{ W}$

3) $P_e = P_J + P_u = 0,32 + 0,24 = 0,56 \text{ W}$

4) 4-1- $P_J = 0,36 - 0,32 = 0,04 \text{ W}$ 4-2- $P_J = r I^2 \Rightarrow r = \frac{P_J}{I^2} = \frac{0,04}{0,1^2} = 4 \Omega$

5) $P_e = U_{PN} I \Rightarrow P_e = (E - r I) I \Rightarrow \frac{P_e}{I} = E - r I \Rightarrow E = \frac{P_e}{I} + r I = \frac{0,56}{0,1} - 4 \times 0,1 = 6 \text{ V}$

En utilisant la loi de Pouillet : $I = \frac{E - E'}{R + r + r'} = \frac{6 - 2,4}{30 + 4 + 2} = \frac{3,6}{36} = 0,1 \text{ A}$

6) $W_u = E' p \Rightarrow P_u \cdot \Delta t = m \cdot g \cdot h \Rightarrow h = \frac{P_u \cdot \Delta t}{m \cdot g} = \frac{0,24 \times 2}{0,05 \times 10} = 1,2 \text{ m}$

7) Energie électrique + thermique + chimique + énergie potentielle de pesanteur.

Correction du 2^{er} exercice de physique :

1) $U_{AB} = R_2 \cdot I_2 \Rightarrow R_2 = \frac{U_{AB}}{I_2} = \frac{8}{0,8} = 10 \Omega$: $\frac{1}{R_e} = \frac{1}{R_1} + \frac{1}{R_2} \Rightarrow R_e = \frac{R_1 \cdot R_2}{R_1 + R_2} = \frac{10 \times 10}{20} = 5 \Omega$

2) $U_{AB} = R_1 \cdot I_1 \Rightarrow I_1 = \frac{U_{AB}}{R_1} = \frac{8}{10} = 0,8 \text{ A} \Rightarrow I = I_1 + I_2 = 0,8 + 0,8 = 1,6 \text{ A}$

3) on a $P_J = (r + r'_1 + r'_2 + R_e) \cdot I^2 \Rightarrow \frac{P_J}{I^2} = r + r'_1 + r'_2 + R_e \Rightarrow r = \frac{P_J}{I^2} - (r'_1 + r'_2 + R_e) = \frac{38,4}{1,6^2} - (2 + 3 + 5) = 5 \Omega$:

4)a) $P_{u2} = E'_2 \cdot I = 4 \cdot (1,6) = 6,4 \text{ W}$

b) $P_t = P_{u1} + P_{u2} + P_J = 38,4 + 6 + 6,4 = 50,8 \text{ W}$

5) $P_t = E \cdot I \Rightarrow E = \frac{P_t}{I} = \frac{50,8}{1,6} \approx 31,75 \text{ V}$

6) $I = \frac{E - E'_1 - E'_2}{r + r'_1 + r'_2 + R_e} \Rightarrow I \times (r + r'_1 + r'_2 + R_e) = E - E'_1 - E'_2 \Rightarrow E'_1 = E - I \times (r + r'_1 + r'_2 + R_e) - E'_2 = 31,5 - 1,6 \times 1,6 - 4 = 3,75 \text{ V}$

7) $\rho = \frac{P_u}{P_t} = \frac{U_{PN} \cdot I}{E \cdot I} = \frac{E - r \cdot I}{E} = 1 - \frac{r \cdot I}{E} = 1 - \frac{5 \times 1,6}{31,75} = 74,8\%$

6) autre méthode : $P_{u1} = E'_1 \times I \Rightarrow E'_1 = \frac{P_{u1}}{I} = \frac{6}{1,6} = 3,75 \text{ V}$