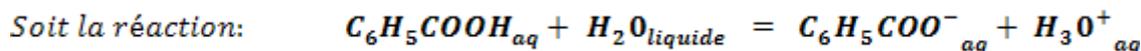
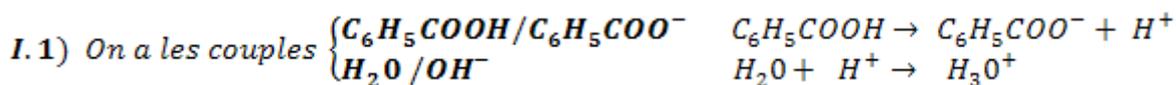


## Exercice 2 :



$$C(C_6H_5COOH) = 5,00 \cdot 10^{-3} \text{ mol} \cdot L^{-1}$$

<i>x en moles</i>		$C_6H_5COOH_{aq}$	$H_2O_l \rightleftharpoons C_6H_5COO^-_{aq}$	$H_3O^+_{aq}$
Etat initial	0	$5,00 \cdot 10^{-3} \cdot V$	excès	0
Etat intermédiaire	x	$5,00 \cdot 10^{-3} \cdot V - x$	excès	x
Etat équilibre	$x_{eq}$	$5,00 \cdot 10^{-3} \cdot V - x_{eq}$	excès	$x_{eq}$

I. 2)  $\sigma = \sum \lambda_i [X_i]$  donc  $\sigma = \lambda_{C_6H_5COO^-} [C_6H_5COO^-]_{eq} + \lambda_{H_3O^+} [H_3O^+]_{eq}$

or  $[C_6H_5COO^-]_{eq} = [H_3O^+]_{eq} = \frac{x_{eq}}{V} \Rightarrow \frac{x_{eq}}{V} (\lambda_{C_6H_5COO^-} + \lambda_{H_3O^+}) \rightarrow \frac{x_{eq}}{V} = \frac{\sigma}{\lambda_{C_6H_5COO^-} + \lambda_{H_3O^+}}$

$$213 \mu S \cdot cm^{-1} = 213 \cdot 10^{-3} mS \cdot (10^{-2} m)^{-1} = 213 \cdot 10^{-3} \cdot mS \cdot 10^2 m^{-1} = 21,3 mS \cdot m^{-1}$$

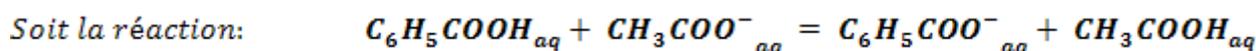
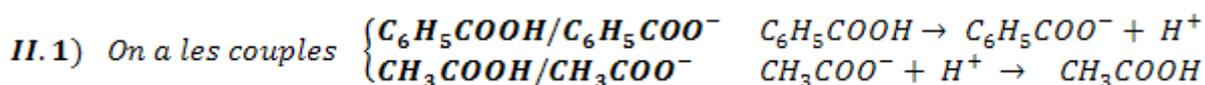
$$\frac{x_{eq}}{V} = \frac{21,3}{35 + 3,24} = \frac{21,3}{38,24} = 5,57 \cdot 10^{-1} \text{ mol} \cdot m^{-3} = 5,57 \cdot 10^{-4} \text{ mol} \cdot L^{-1}$$

$$[C_6H_5COO^-] = [H_3O^+] = \frac{x_{eq}}{V} = 5,57 \cdot 10^{-4} \text{ mol} \cdot L^{-1}$$

$$[C_6H_5COOH] = \frac{5V - x_{eq}}{V} = 5 - \frac{x_{eq}}{V} = 5 - 5,57 \cdot 10^{-4} = 4,44 \text{ mol} \cdot L^{-1}$$

I. 3)  $K_A = \frac{[C_6H_5COO^-] \cdot [H_3O^+]}{[C_6H_5COOH]} = \frac{(5,57 \cdot 10^{-4})^2}{4,44} = 6,91$

$$\rightarrow pK_A = -\text{Log}(K_A) = -\text{Log}(6,91) = 4,16$$



$$C(C_6H_5COOH) = \frac{1,00 \cdot 10^{-3}}{200 \cdot 10^{-3}} = 0,50 \text{ mol} \cdot L^{-1} \quad C(CH_3COO^-) = \frac{1,00 \cdot 10^{-3}}{200 \cdot 10^{-3}} = 0,50 \text{ mol} \cdot L^{-1}$$

<i>x en moles</i>		$C_6H_5COOH_{aq}$	$CH_3COO^-_{aq} \rightleftharpoons C_6H_5COO^-_{aq}$	$CH_3COOH_{aq}$
Etat initial	0	0,50	0,50	0
Etat intermédiaire	x	$0,50 - x$	$0,50 - x$	x
Etat équilibre	$x_{eq}$	$0,50 - x_{eq}$	$0,50 - x_{eq}$	$x_{eq}$

$$II.2) K_{(C_6H_5COOH)(C_6H_5COO^-)} = \frac{[C_6H_5COO^-] * [H_3O^+]}{[C_6H_5COOH]}$$

$$K_{(CH_3COOH)(CH_3COO^-)} = \frac{[CH_3COO^-] * [H_3O^+]}{[CH_3COOH]}$$

$$Nommons \begin{cases} pK_{A1} = pK_{(C_6H_5COOH)(C_6H_5COO^-)} = 4,2 \\ pK_{A2} = pK_{(CH_3COOH)(CH_3COO^-)} = 4,8 \end{cases}$$

$$K = \frac{[C_6H_5COO^-] * [CH_3COOH]}{[C_6H_5COOH] * [CH_3COO^-]} = \frac{\frac{[C_6H_5COO^-] * [H_3O^+]}{[C_6H_5COOH]}}{\frac{[CH_3COO^-] * [H_3O^+]}{[CH_3COOH]}} = \frac{K_{(C_6H_5COOH)(C_6H_5COO^-)}}{K_{(CH_3COOH)(CH_3COO^-)}} = \frac{10^{-pK_{A1}}}{10^{-pK_{A2}}}$$

$$\Rightarrow K = 10^{pK_{A2} - pK_{A1}} = 10^{4,8 - 4,2} = 10^{0,6} = 3,98$$

il est indépendant de la quantité de réactifs apportés à l'état initial