$$-\int_{[A]_0}^{[A]} \frac{d[A]}{[A]^2} = \int_0^t k\,dt \Rightarrow \frac{1}{[A]} - \frac{1}{[A]_0} = kt \Rightarrow \frac{1}{a-y} - \frac{1}{a} = kt$$

$$\Rightarrow k = \frac{y}{(a-y)at} = \frac{3/4}{1/4.10^{-2}.2} = 1,5.10^2 \frac{l}{mol.h}$$

$t_{1/2} = ?$ $\quad [A] = \frac{[A]_0}{2}$

$$\frac{1}{[A]} - \frac{1}{[A]_0} = kt \Rightarrow \frac{1}{\frac{[A]_0}{2}} - \frac{1}{[A]_0} = k.t_{1/2}$$

$$\Rightarrow t_{1/2} = \frac{1}{k[A]_0} = \frac{1}{1,5.10^2.10^{-2}} = 39,6\ min = 0,66\ h.$$

2/ L'énergie d'activation E_a.

$$\begin{cases} k_1 = A e^{-\frac{E_a}{RT_1}} \Rightarrow \ln k_1 = \ln A - \frac{E_a}{RT_1} \\ k_2 = A.e^{-\frac{E_a}{RT_2}} \Rightarrow \ln k_2 = \ln A - \frac{E_a}{RT_2} \end{cases}$$

$$\ln \frac{k_1}{k_2} = \frac{E_a}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$\Rightarrow E_a = \frac{\ln k_1/k_2 \cdot R\, T_2.T_1}{T_1 - T_2}$$

A.N : $E_a = 1,38.10^{-4}\ J$.

Exercice 3 :

Soit la réaction $A \longrightarrow B + C$

1/ calcul de t : pour $X_A = 50\%$ $\quad C_{A0} \quad 0 \quad 0$

$C_{A0} - C_{A0}X_A \quad C_A X_A \quad C_A X_A$

$$-\int_{[A]_0}^{[A]} \frac{d[A]}{[A]^2} = k\int_0^t dt \Rightarrow \frac{1}{[A]} - \frac{1}{[A]_0} = k.t$$

$$\frac{1}{C_{A0}(1-X_A)} - \frac{1}{C_{A0}} = kt$$

$$\Rightarrow t = \frac{1}{k}\left[\frac{1}{C_{A0}(1-X_A)} - \frac{1}{C_{A0}}\right] = 1,33\ min$$