Ex. 8

The value of（k_1+k_{-1}）for a first order opposite reaction is 0.0116min^{-1}. Given the equilibrium constant K_c=0.557. calculate the values of k_1 and k_{-1}?

The rate coefficients k_1 and k_2 of a parallel reaction are 4.65s^{-1} and 3.74s^{-1}, respectively. Calculate the time needed to consume 90% of the reactant?

Ex. 9

For an opposite reaction $A \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} B$, given $k_1 = 0.006\text{min}^{-1}$, $k_{-1} = 0.002\text{min}^{-1}$ 。 Only A existed at the beginning, c_{A0}= $1\text{mol}\cdot\text{dm}^{-3}$, try to calculate

（1）time needed when the concentrations of A and B are the same

（2）the concentrations of A and B after 100 mins

Ex. 10

For the following parallel reaction in CS_2 solution (second order reaction):

$$C_6H_5Cl + Cl_2 \longrightarrow HCl + o\text{-}C_6H_4Cl_2 \qquad C_6H_5Cl + Cl_2 \longrightarrow HCl + p\text{-}C_6H_4Cl_2$$

The initial concentration of C_6H_5Cl and Cl_2 in the solution are both $0.5\,mol\cdot dm^{-3}$, after 30mins

15% C_6H_5Cl convered into o-$C_6H_4Cl_2$, and 25% C_6H_5Cl convered into p-$C_6H_4Cl_2$

Calculate the reaction rate coefficients k_1 and k_2:

Ex. 11

A certain drug becomes ineffective when it decomposes by 30%. It has been measured that the drug decomposes 0.0069% and 0.35% per hour at 298.15K and 343.15K, and the decomposition rate of this drug is proportional to its concentration. At what temperature should the drug be stored to ensure its effectiveness within one year?

Ex. 12

For a first-order opposite reaction, $A \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} B$

The rate coefficient of the forward reaction and the equilibrium constant can be expressed as:

$$\lg\left(k_1/s^{-1}\right) = -\frac{2000}{T/K} + 4 \qquad \lg K = \frac{2000}{T/K} - 4$$

At the beginning of the reaction, C_{A0}=0.5mol/L, C_{B0}=0.05mol/L, try to calculate:

(1)The activation energy of the backward reaction;

(2)400K, the concentration of A and B after 10s?

(3)400K, the equilibrium concentration of A and B?

TEST 1

The decomposition of a certain drug belongs to first order reactions. The relation between rate coefficient and temperature can be expressed as:

$$\ln \frac{k}{\mathrm{h}^{-1}} = -\frac{8938}{T/\mathrm{K}} + 20400$$

Try to calculate:

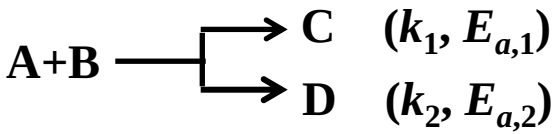
(1) the rate coefficient at 303K?

(2) Suppose that the drug becomes ineffective when it decomposes by 30%, how long can the drug be stored at 303K to ensure its effectiveness?

(3) At what temperature should the drug be stored to ensure its effectiveness within 2 years?

TEST 2

For a second order parallel reaction, the initial concentration of A and B both are *a* mol/L, and there are no products presented at *t*=0.



(1) try to give the integrated form of the rate equation?

(2) at 500K, *a*=0.5, the concnetration of C and D are 0.075 and 0.125mol/L respectively after 30mins, try to calculate k_1 and k_2?

(3) at 500K, given $E_{a,1}$=150kJ/mol, try to calcualte $E_{a,2}$ (two reactions have the same prefactors)