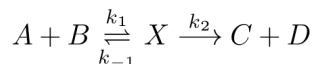


Dynamics and Kinetics. Exercise 3

Problem 1

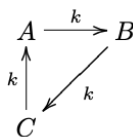
For each of the following reaction mechanisms, give the equilibrium concentration, if it exists, of all the chemical species for the initial concentrations stated.

(a)



Initial concentrations: $[A]_0 = 2$, $[B]_0 = 1$, $[X]_0 = [C]_0 = [D]_0 = 0$.

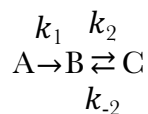
(b)



All the rate constants are equal; initial concentrations: $[A]_0 = 1$, $[B]_0 = [C]_0 = 0$.

Problem 2

Given is the following consecutive reaction with a reversible second step:



- a) Derive expressions for the concentrations of A and B. The initial conditions are $[B]_0 = [C]_0 = 0$.
- b) How can you obtain an expression for the concentration of C? (No need to write the expression down, just give the ansatz).
- c) Draw a sketch of the concentrations of A, B, and C if $k_2 = k_{-2} \gg k_1$. Describe the most important features of your sketch and the reasons why the system behaves as you sketched it. Which other complex reaction has the same time dependence for the concentrations of A, B, and C?
- d) Draw a sketch of the concentrations of A, B, and C, if $k_2 = k_{-2} \ll k_1$. Describe the most important features of your sketch and the reasons why the system behaves as you sketched it.