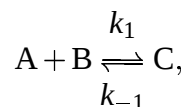


Practice Problems on the Relationship between Kinetics and Equilibrium

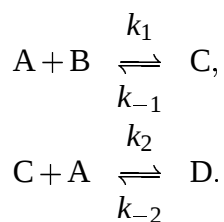
1. Suppose that, for the elementary reaction



$k_1 = 1.4 \times 10^{-3} \text{ L mol}^{-1} \text{ s}^{-1}$ and the equilibrium constant $K = 1.2 \times 10^{15}$. What is k_{-1} ?

Notes: Watch your units. For reasons which we shall see later, equilibrium constants have no units, but for the sake of figuring out the units of k_{-1} , pretend that this one has units of L/mol.

2. Consider the reaction mechanism



- (a) Identify each species appearing in this mechanism as a reactant, product or intermediate.
- (b) What is the overall reaction?
- (c) Write down a complete set of mass-action rate equations for this mechanism.
- (d) Relate the equilibrium constant for the overall reaction to the elementary rate constants.
Hint: You only need two of the mass-action equations. Use the simplest two.