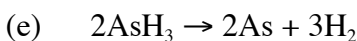
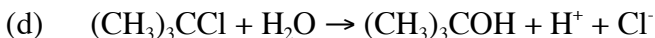
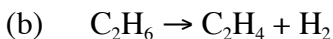
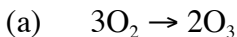


Problem Set 20: Overview of Kinetics, Zero Order Reactions

Due Nov 10, 2009

1. Problem 9.1 (p. 356):
Write the rates for the following reactions in terms of the disappearance of reactants and appearance of products:



2. Problem 9.3 (p. 356)
What are the units of the rate constant for a third order reaction?

3. Many reactions show “zero order” behavior under certain conditions. Consider the following equation for the reaction of an enzyme:

$$v = \frac{d[\text{Product}]}{dt} = \frac{V_{\max}[\text{Substrate}]}{K_M + [\text{Substrate}]}$$

Assume that $V_{\max} = 10 \text{ M/sec}$ and that K_M is 1 mM . Draw a plot with v on the y-axis and $[\text{Substrate}]$ on the x-axis for this equation. Use substrate concentrations from 0.5 mM to 50 mM .

4. What is the maximum value that $d[\text{Product}]/dt$ can have using the numbers from problem 3?
5. For a reaction in which $d[A]/dt = -\text{constant}$, integrate the equation so that you get an equation giving $[A]$ at any time greater than 0. Do not assume that the initial concentration of A is zero.