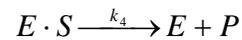
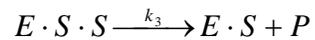
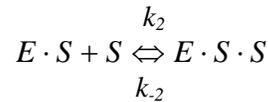
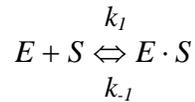


10.542 – Biochemical Engineering
Spring 2005

Problem Set #1

Solutions should be written and submitted on your own paper. All pages should be stapled together.

- 1) Suppose that an enzyme has two active sites so that substrate is converted to product via the following reaction sequence:



Derive a rate expression for product (P) formation assuming quasi-steady for E·S and for E·S·S.

- 2) An enzyme with a K_M of 1×10^{-3} M was assayed using an initial substrate concentration of 3×10^{-5} M. After 2 min, 5 percent of the substrate was converted. How much substrate will be converted after 10 min, 30 min, 60 min? How long must the reaction be run to achieve 99% conversion? (Assume that the enzyme follows Michaelis-Menten kinetics.)
- 3) Shuler & Kargi, Problem 3.3
- 4) Shuler & Kargi, Problem 3.4
- 5) Shuler & Kargi, Problem 3.7