

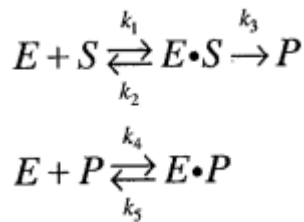
Assignment 5

- For the enzyme catalyzed reaction: $A \rightarrow B + C$, the concentration A in a Batch reactor is given as a function of time below.

t(min)	0	10	100
C _A (mol/L)	0.04	0.035	0.005

Determine the Michaelis-Menten constants V_{\max} and K_M from the slope and intercept of a relevant plot. Please upload the plots with your solutions too.

- Derive the rate law for the following enzymatic reaction as a function of observable concentrations and given rate constants (k_i 's).



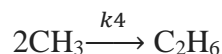
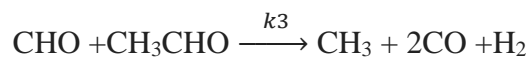
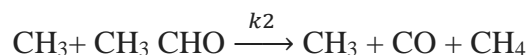
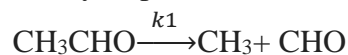
- Determine the reaction mechanism of a non-elementary reaction :

Overall observed reaction: $2NO + O_2 \rightarrow 2NO_2$.

Overall observed rate expression: $-r_{NO} = \frac{k_A C_{NO}^2 C_{O_2}}{1 + k_B C_{NO}}$

Assume pseudo steady state hypothesis and show expressions for k_A and k_B in terms of the elementary steps you have proposed.

- The pyrolysis of acetaldehyde is believed to take place according to the following set of elementary steps:



Derive the rate expression for the rate of disappearance of acetaldehyde as a function of observable concentrations and rate constants (k_i 's).