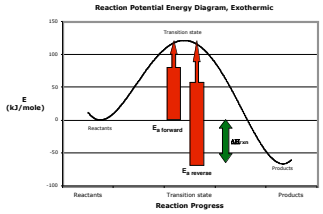
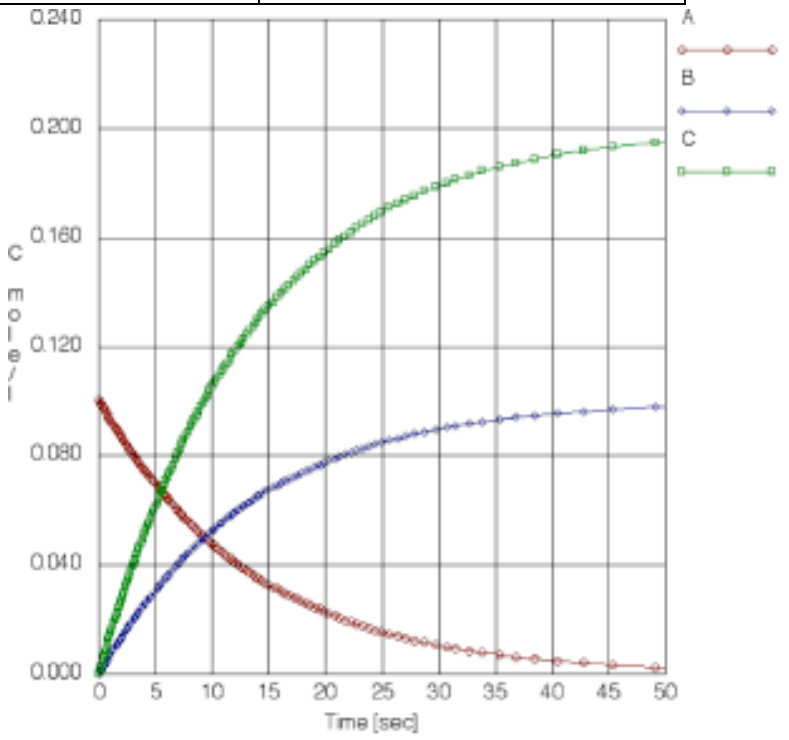
Chemistry 106 Fundamental Chemistry II	**Kinetics Practice**  	R = 8.314 X 10^{-3} kJ/mole•K 0.0 °C = 273.2 K

1) Using the graph on the right: Determine the reaction stoichiometry. The reaction is first order in A only. Calculate the average initial rate of reaction for the first 5 seconds. Now use the rate law to calculate k.

2) A first order reaction (a = 1) has k = 0.440 min^{-1} and the initial concentration of reactant is 0.840 M. What is the concentration of the reactant after 1.00 minute?

3) A second order reaction (a = 2) has k = 7.35 X 10^{-3} M^{-1}•sec^{-1} and the initial concentration of reactant is 0.120 M. What is the concentration of the reactant after 10.0 minutes?



4) a) A reaction has ΔH^{o}_{rxn} = -120. kJ/mol and a forward activation energy, E_a = 80. kJ/mol. What is the activation energy for the reverse reaction? Describe the reaction as endothermic or exothermic, and reversible or irreversible.
b) A reaction has ΔH^{o}_{rxn} = 5.0 kJ/mol and a forward activation energy, E_a = 55 kJ/mol. What is the activation energy for the reverse reaction? Describe the reaction as endothermic or exothermic, and reversible or irreversible.

A reaction has k = 42.0 sec^{-1} at 75.0°C and k = 90.0 sec^{-1} at 90.0°C.

5) Calculate E_a for this reaction.

6) Calculate the value of the preexponential factor for the reaction.

7) Calculate the value of the rate constant at 5.0°C.

8) A catalyst lowers the activation energy of a reaction from 164 kJ/mole to 121 kJ/mole at 37.0 °C. Calculate the ratio k_{cat}/k_{uncat}.