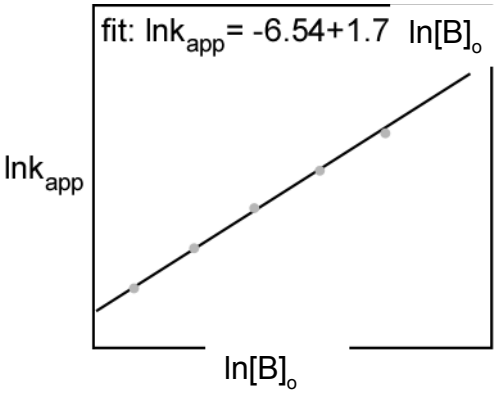
Announcements

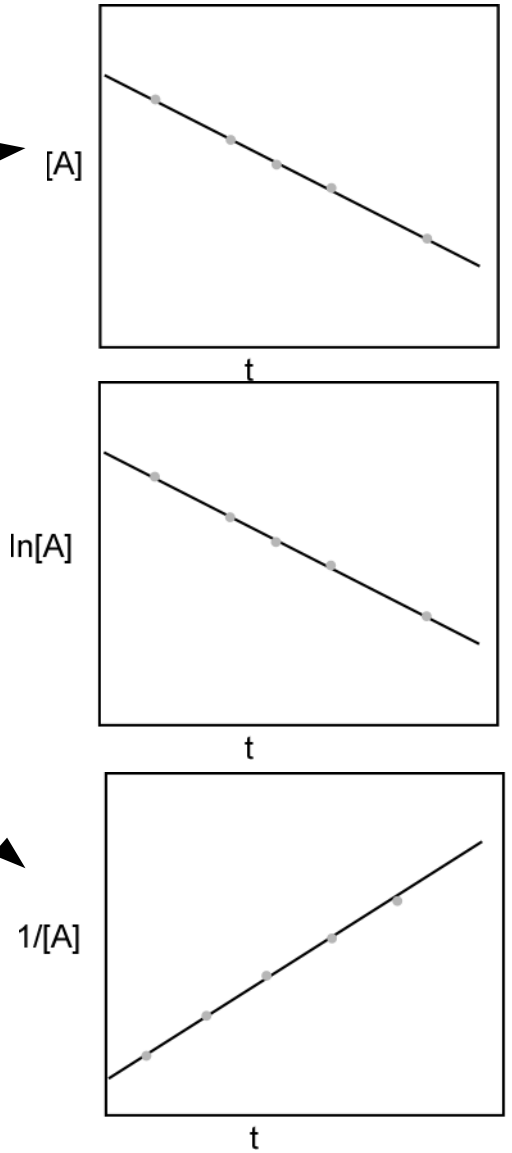
- Turn on the Clicker (the red LED comes on).
- Push “Join” button followed by “20” followed by the “Send” button (switches to flashing green LED if successful).
- Next exam on Chapters 13 and 14 one week from Today.

- Sample Exam 2 has been posted on web site in the Study Aids section.
- You should have received an e-mail with the suggested Chapter 15 reading. We will probably get an introduction to that material today.

Review
Pseudo-order (Swamping) method

- Uses large excess of all but one reactant, so concentration of only the limiting reactant (A) changes significantly.
  - $-d[A]/dt = (k[B]_o^{\,b})[A]^a \approx k_{app}[A]^a$
  - 0^{th} order a = 0: $[A]_t = [A]_o - k_{app}t$
  - 1^{st} order a = 1: $[A]_t = [A]_o \exp\{-k_{app}t\}$
    - Linear: $\ln[A]_t = \ln[A]_o - k_{app}t$
  - 2^{nd} order a = 2: $1/[A]_t = 1/[A]_o + kt$
- Can determine k and b by varying $[B]_o$
  - $\ln k_{app} = \ln k + b \ln[B]_o$





Review: Reaction Mechanisms

- Elementary Steps
  - Unimolecular: A --> P
    - Rate Law: -d[A]/dt=d[P]/dt = k[A]
  - Bimolecular: A + B --> P
    - Rate Law: -d[A]/dt=-d[B]/dt = d[P]/dt = k[A][B]
    - Also 2 A --> P has rate law -d[A]/dt = $k[A]^2$
- Mechanism consists of sequence of elementary steps.
  - Rate limiting or rate determining steps (overall rate is determined by slow step)
  - Steady state approximation (an intermediate product concentration stays the same during the reaction)

Table 14.6

$$\ln(k(T)) = \ln A - (E_a/R)\,(1/T)$$

Fig 14.18

Heterogeneous Catalysis (Catalytic Converter)

Figure 14.22