

CHEM 220 – Problem Set 7

1. For the reaction  $P \rightarrow Q$ , write the forward rate equation.
2. For the reaction  $P \rightarrow Q$ , write the backwards rate equation.
3. For the overall rate equation, write the two above rate equations as equivalent statements.
4. What is the order of a reaction defined in terms of?
5. How much faster would a reaction go at  $150^{\circ}\text{C}$  than at  $10^{\circ}\text{C}$ ?
6. Draw the curve for a reaction where the rate increases with increasing temperature.
7. Draw the curve for a reaction where the rate increases to a point with increasing temperature, then reduces as temperature increases more.
8. Draw the curve for a reaction where the rate decreases with increasing temperature.
9. Draw the curve for a reaction where the rate increases with increasing temperature, then shoots up as temperature increases more.
10. For the reaction  $E + X \rightleftharpoons EX \rightarrow E + Z$ , draw the Cleland plot for this reaction.
11. For the reaction  $E + X + Y \rightarrow EX + Y \rightarrow EXY \rightarrow EWZ \rightarrow EW + Z \rightarrow E + W$ , draw the Cleland plot for this reaction.
12. Assume that the reaction in #11 can be run with either EX or EY forming first, but Z is always released before W. Draw the Cleland plot for this reaction.
13. Now assume that the conditions of #11 are that EX or EY can form first and that it doesn't matter if Z or W comes off first. Draw the Cleland plot for this reaction.
14. For the reaction  $E + X + Y \rightarrow E + Z + W$ , X must react first, then Z must be released so that Y can react next for W to be released. Draw the Cleland plot for this reaction.
15. What is the function of kinetics?