

Study Guide  
Chapter 8  
Enzymes

1. What is: an enzyme, a coenzyme, a cofactor, a prosthetic group, a holoenzyme, an apoenzyme, an apoprotein, a vitamin?
2. Draw a reaction coordinate of a chemical reaction, then describe how this diagram would change for an enzyme catalyzed reaction. In this discussion include such terms as ground state, standard free energy,  $\Delta G^\circ$ ,  $\Delta G^\ddagger$ , transition state, activation energy, reaction intermediates, rate limiting step.
3. Describe several ways that an enzyme can enhance a reaction rate by simply binding to the substrate?
4. Why would an enzyme be designed to bind to a transition state, rather than to bind either a substrate or a product?
5. Describe several way an enzyme can enhance a reaction rate by providing interaction with specific catalytic groups.
6. Give an diagram of a reaction mechanism, like figure 22-48 page 865, pick out steps involving specific acid catalysis, specific base catalysis, covalent catalysis, metal catalysis, general acid catalysis or general base catalysis.
7. Given a plot of  $V_o$  vs  $[S]$  find  $V_{max}$  and  $K_m$ . What is the “steady state” approximation?  $K_m$ ?
8. What is a Lineweaver Burk Plot. Given some data be able to make a Lineweaver Burk plot and find  $V_{max}$  and  $K_m$  using this plot.
9. What is the  $k_{cat}$  of a reaction? And what does it tell us about a reaction? What is a specificity constant and what does it tell us about an enzyme?
10. Briefly discuss enzyme mechanisms for enzymes that work with more than one substrate.
11. Discuss competitive, uncompetitive, and mixed enzyme inhibition. How are these types of inhibition distinguished using a Lineweaver Burk Plot?
12. What are irreversible inhibitors? Suicide inactivators? Mechanism based inactivators?
13. What are regulatory enzymes, allosteric enzymes, allosteric modulators, feedback inhibition?
14. Give several different examples of how enzyme activity can be modulated through covalent modification

**There may be more questions in this area after I have given my lectures and reminded myself about additional important points.**