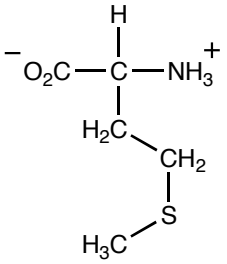
Name _____ Test 2
PHYS 0213 Spring 2004

1. a. (6 pts.) Draw one basic amino acid.

b. (6 pts.)Draw one polar amino acid.

2. The following questions refer to the amino acid drawn below.

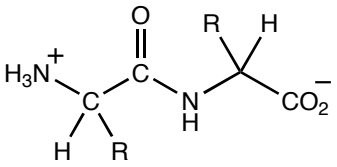


a. (3 points) Classify this amino acid as polar, nonpolar, acidic, or basic.

b. (3 pts) Can this amino acid form disulfide bonds?

c. (3 pts) Are there any nucleophilic elements on the side chain of this acid.

3. a. (8 pts.) Explain why rotation around the carbonyl carbon to nitrogen bond in a polypeptide is not possible, whereas rotation around the C_α to carbonyl-C bond is not restricted. Draw resonance structures if necessary.



b. (4 pts.) Why are these two structural details important?

4. (4 pts. each) Identify the following secondary structures.

a. _____

b. _____

c. _____

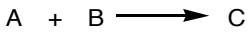
d. _____

5. (8 pts.) When considering the primary structure of a family of related protein, invariant and variable residues help researchers identify what parts of the molecules.

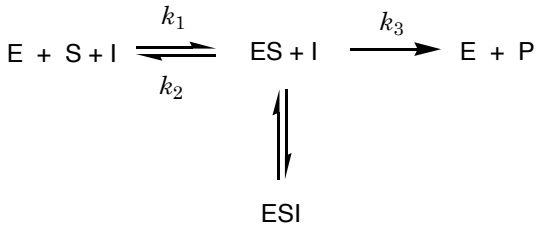
6. a. (4 pts.) What non-covalent interaction is primarily responsible for creating the structures in question 4?

b. (4 pts.) Are the interactions between the side chains, or the backbone?

7. (6 pts.) Write the rate law for the following reaction, which is second order in B and zero order in A.

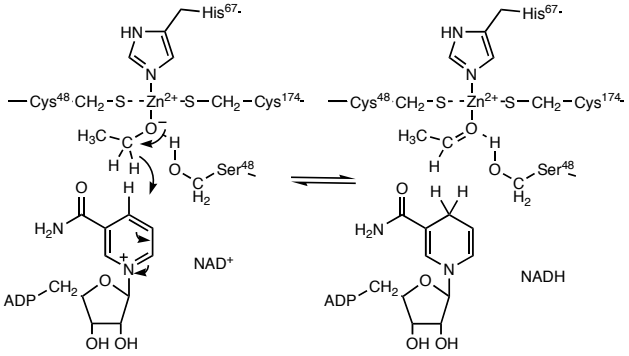


8. (8 pts.) The following scheme depicts uncompetitive inhibition.



Why is this type of inhibition termed uncompetitive (contrast this form of inhibition with competitive inhibition)?

9.

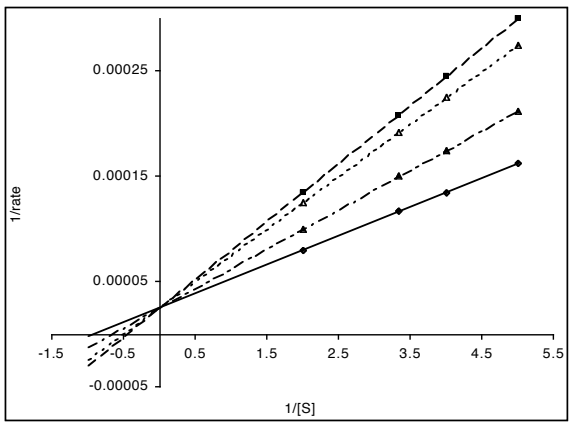


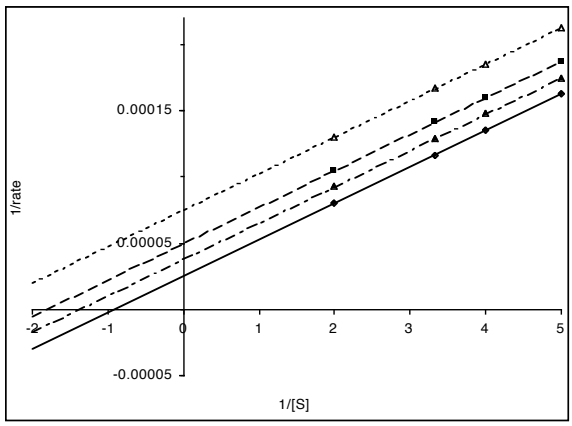
a. (4 pts) The role of the NAD^+ is what?

b. (2 pts.) The NAD^+ is a co_____.

c. (2 pts) The Zn^{2+} is a co_____.

10. The graphs below show the rate of a reaction under increasing inhibitor concentration.





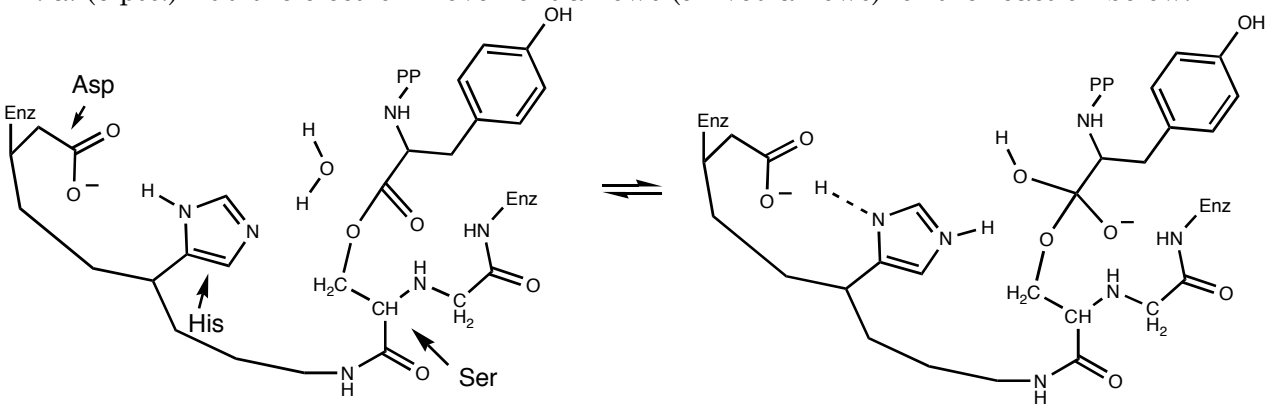
a. (2 pts.) For both graphs, which line represents the uninhibited reaction (point to it with an arrow)?

b. (2 pts.) For both graphs, which line represents the experiment with the highest concentration of inhibitor?

c. (4 pts.) The graphs reveal what about V_{max} for each reaction?

d. (4 pts.) The graph on the left is consistent with what form of inhibition?

11. a. (6 pts.) Add the electron movement arrows (curved arrows) for the reaction below.



b. (6 pts.) What are the roles of the histidine and aspartate residues.