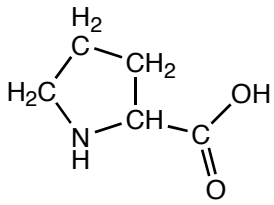
Name _____ Test 2 (3/9)
PHYS 0313 (Biochem) Spring 2007

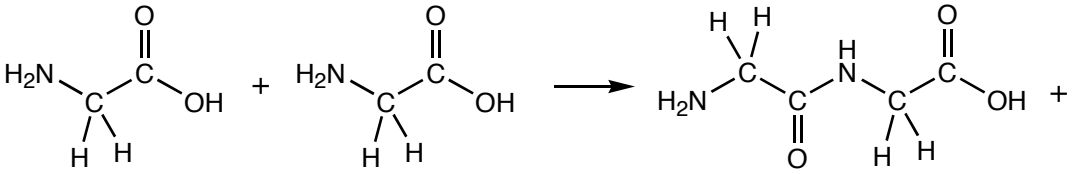
1. a. (6 pts.) Classify the amino acid drawn to the right as non-polar, neutral polar, acidic, or basic.



b. (3 pts.) How is this amino acid different than the other amino acids that have been classified the same way?

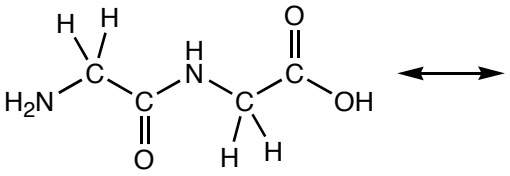
c. (3 pts.) What is significant about the difference described in part b?

2. a. (4 pts.) Complete the chemical equation draw below.



b. (6 pts.) This chemical reaction is used to make what class of biomolecules?

c. (6 pts.) Draw a resonance structure for the amide in the molecule drawn below.



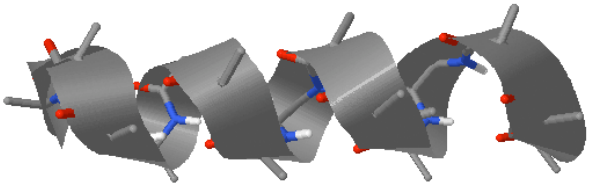
d. (6 pts.) Consider the resonance structure that you drew above. Can rotation around the carbonyl carbon to amide nitrogen bond occur freely? Explain.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

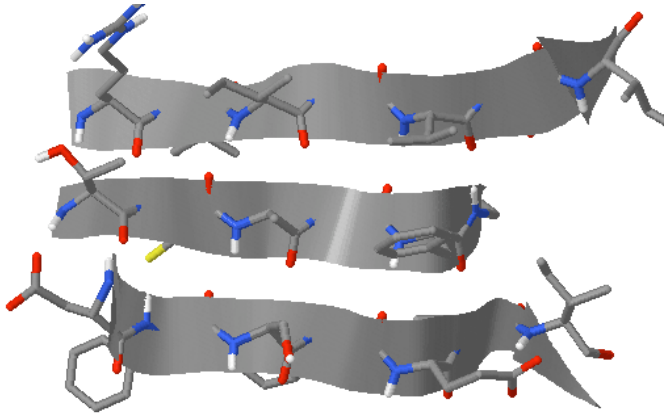
3. a. (4 pts.) Drawn below are examples of the primary structure, secondary structure, tertiary structure, or quaternary structure of a protein?

b. (8 pts.) Provide the names of the structures drawn below.

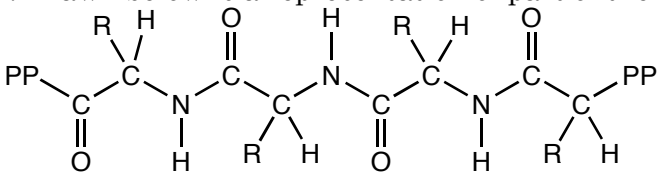
i.



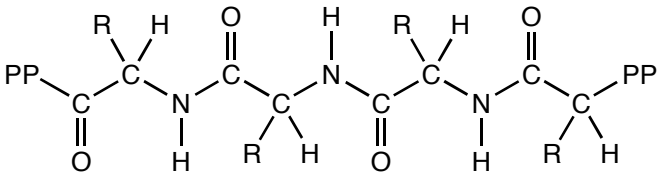
ii.



4. Drawn below is a representation of part of the structure depicted in 3. ii.



a. (6 pts.) What non-covalent interaction is primarily responsible for keeping this structure together.



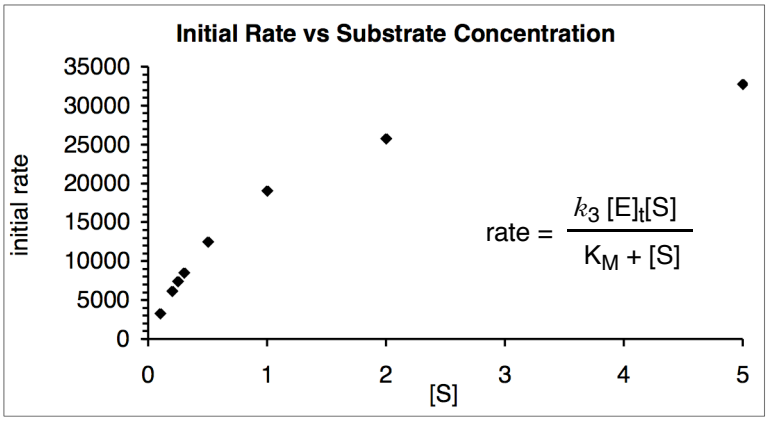
b. (6 pts.) On the drawing to the left, indicate where the interactions will form.

PP = more polypeptide, R = sidechain

5. a. (8 pts) Draw amino acids that are representative of the following classes.
b. (4 pts) Provide names and three letter abbreviations for the amino acids drawn below.

i. neutral polar	ii. basic

6. The graph below is a plot of the rate of an enzyme catalyzed reaction versus the concentration of the substrate.



a. (6 pts.) What does it mean to say that a reaction is 0 order with respect to the substrate concentration?

b. (12 pts.) Explain (non-mathematically) why the rate of the reaction does not increase much as the concentration of the substrate increases from 3 M to 5 M.

7. (12 pts.) Explain, mathematically, how the Michalis-Menten model can account for the kinetics of the reaction at low substrate concentrations. (Refer to the rate law included with the graph.)

8. (12 pts.) Explain, mathematically, how the Michalis-Menten model can account for the kinetics of the reaction at high substrate concentrations. (Refer to the rate law included with the graph)

9. A hallmark of competitive inhibition is that the V_{max} of the enzyme isn't affected by the inhibitor.

a. (6 pts) Explain why the V_{max} of the enzyme isn't changed by competitive inhibition.

b. (6 pts.) Our proposed mechanism for enzyme catalyzed reactions appears below. At what step does the inhibitor inhibit the enzyme in competitive inhibition?

Add the inhibitor (I) to the appropriate step and use the correct type or reaction arrow to indicate the formation of the inactivated complex.