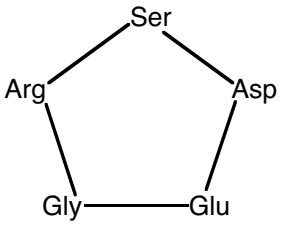
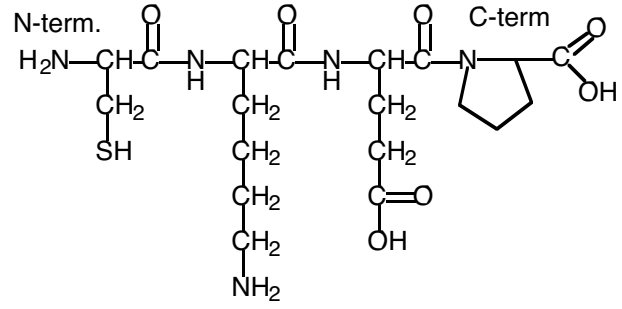
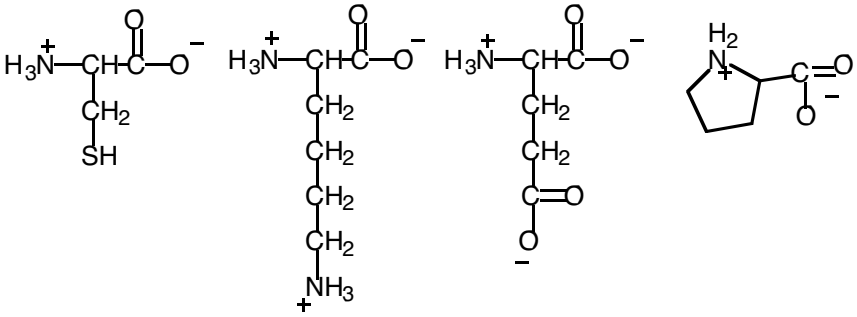
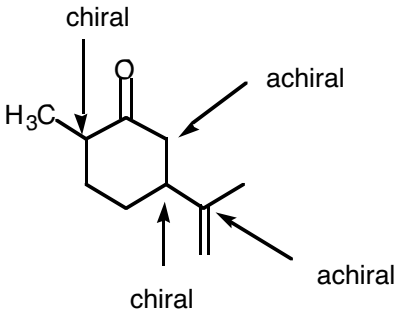
Quiz 1 Answer Key

1. 

2. Recall that an amino acid with a pI of less than 4 is negatively charged at physiological pH and can act as a base, and an amino acid with a pI of greater than 7 is positively charged at physiological pH and can act as an acid. Thus, at physiological pH, glutamate and aspartate can accept H^+, and lysine and arginine can donate H^+. Histidine (pI = 7.6) can both accept H^+ and donate H^+. You could also consider that glutamate and aspartate have pK_a values of 3.9 – 4.5 and would be deprotonated at pH= 7.4. Histidinem with a pK_a of 6.0 – 7.0 would be both in its protonated and deprotonated forms. Lys and Arg have pK_a values above 9 and will be protonated.

3. 



4. 

5. Increasing enzyme concentration at a high, fixed substrate concentration always increases the rate of reaction because more sites are available for catalysis. Increasing substrate concentration at a constant enzyme concentration increases the reaction rate until all catalytic sites are occupied, and the reaction rate levels off.