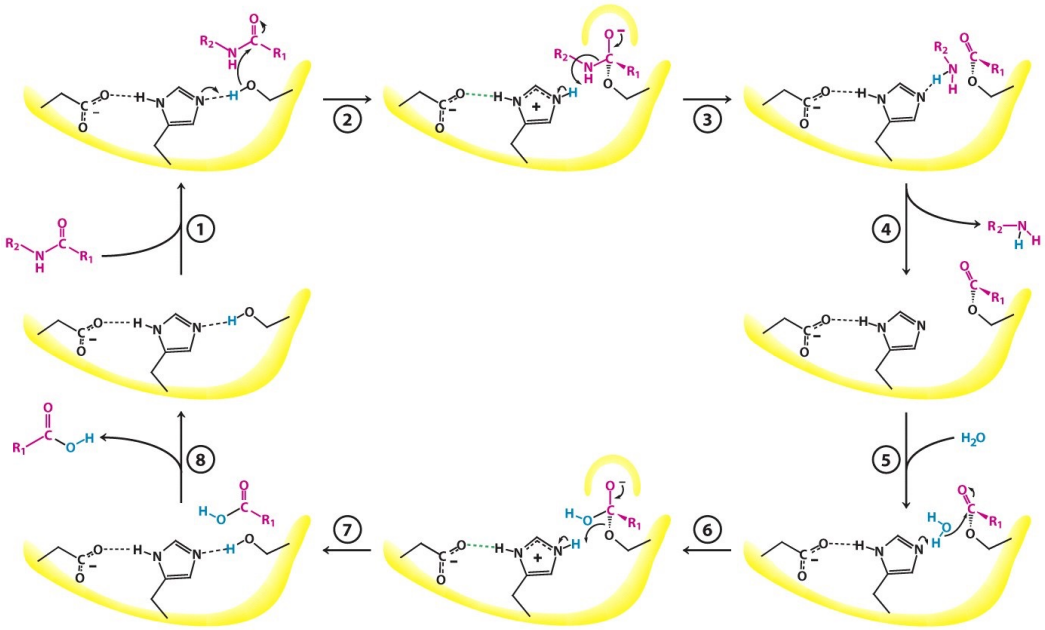
Name _____

Chem 352 - Spring 2018
Quiz 3

1. Below is a figure illustrating the catalytic cycle for bacterial protease *subtilisin* .



   a. Write a balanced chemical equation for the reaction carried out by this enzyme. (Hint: In → Out)

   b. What enzyme class does this enzyme belong to? _____

   c. What type of substrate ordering is observed in this catalytic cycle, random, ping-pong, or sequential? _____

   d. This enzyme catalyzed reaction illustrates a number of the catalytic and binding modes of catalysis that we discussed in class. Describe four of these below and in the figure above label one example of each mode. (Label figure with *Mode1*, *Mode 2*, *etc*.)

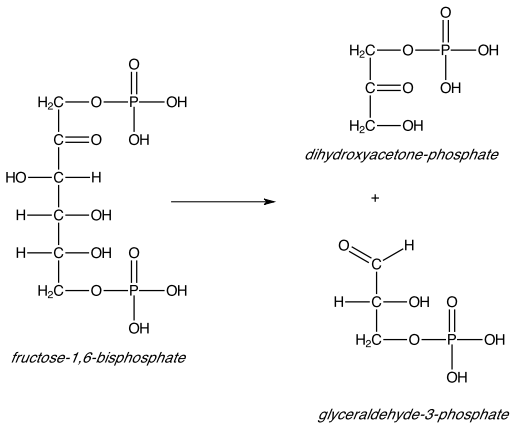
      i. Mode 1

      ii. Mode 2

      iii. Mode 3

      iv. Mode 4

2. The following reaction is from the glycolytic pathway?



a. What class of enzyme catalyzes this reaction? _____

b. All three of the molecules involved in this reaction are derivatives of monosaccharides. Based on their number of carbons and carbonyl-containing functional groups, what group of monosaccharide does each belong to, *e.g.*, are they derivatives of an *aldohexose,* a *ketotetrose*, *etc.*?

   i. fructose 1,6-bisphosphate_____

   ii. glyceraldehyde 3-phosphate_____

   iii. dihydroxyacetone phosphate _____

c. What type of sugar derivative do these molecules represent? _____

d. On the Fischer projections shown above, circle all of the chiral carbons for each molecule.

e. How many stereoisomers does *fructose 1,6-bisphosphate* have? _____

f. Draw the Haworth projection for the *a-anomer* of the furganose ring form of *fructose 1,6-bisphosphate*.