

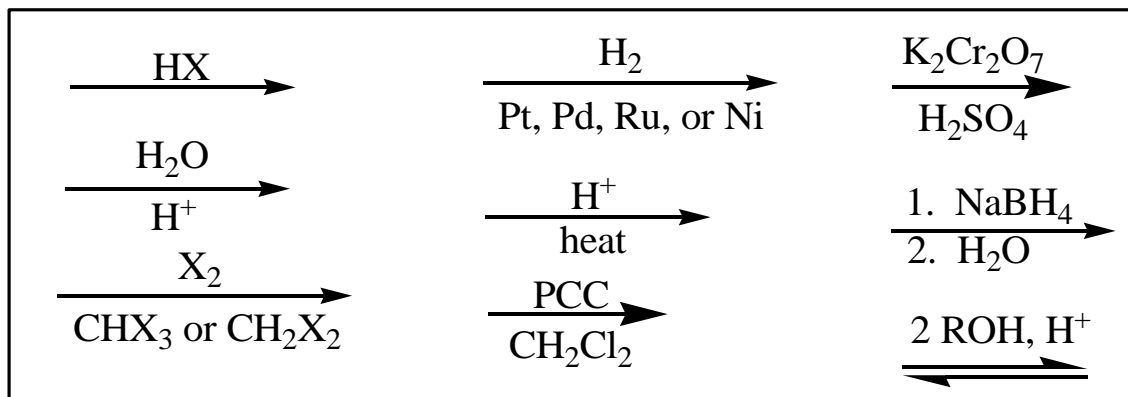
Moorpark College Chemistry 11
Fall 2009

Instructor: Professor Torres

Examination #4: Section Four
November 10, 2009

Name: _____ (print)

Name: _____ (sign)

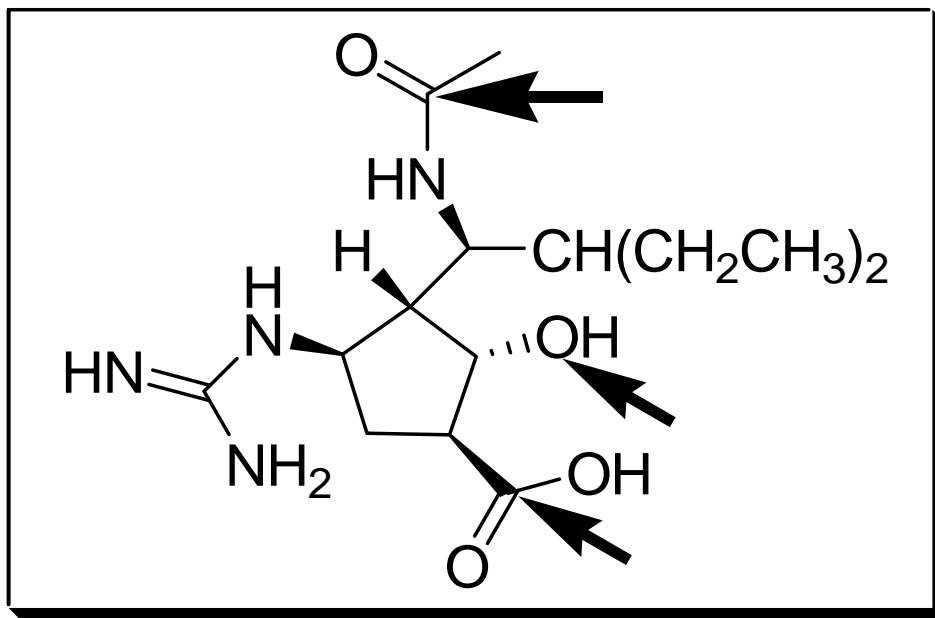


Directions: Make sure your examination contains NINE total pages (including this cover sheet) when instructed to do so. Answer all the questions in the spaces provided.

Question	Points
1. (50 pts.)	
2. (5 pts.)	
3. (16 pts.)	
4. (18 pts.)	
5. (6 pts.)	
6. (5 pts.)	
TOTAL (100 points)	

Chemistry 11 Fall 2009
Examination #4

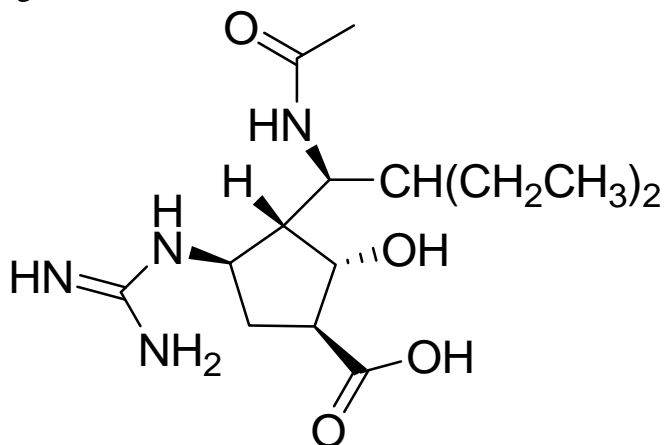
1. (50 pts. total) For the first portion of this examination, consider the experimental antiviral drug *Peramivir* shown below, a neuraminidase inhibitor recently supported by the US Department of Health and Human Services to prepare against the threat of Influenza A (H1N1) “Swine Flu”.



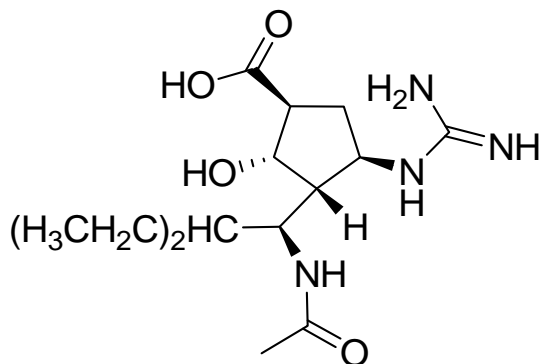
Answer the questions below that relate to this drug (or its derivative) as noted below:

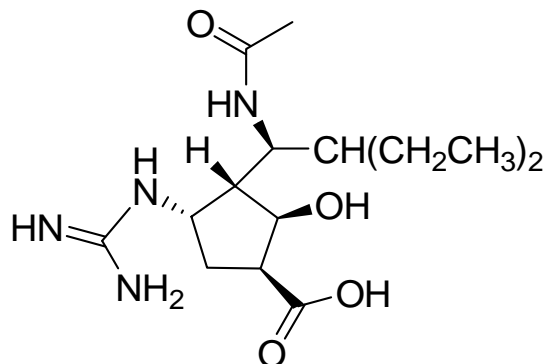
- A. (4 pts.) The molecular formula of *Peramivir* is _____.
- B. (6 pts.) Identify the functional groups labeled with arrows in the structure above. If any alcohols or amines are present, determine if they are primary, secondary, or tertiary.
- C. (2 pts.) How many total stereocenters (if any) are present in *Peramivir*? Clearly label them in the structure above with an asterisk (*).
- D. (1 pt.) What is the maximum number of possible stereoisomers for this molecule? *Formula is sufficient; no need to calculate!*
- E. (4 pts.) Fill-in-the-blanks: There is/are _____ enantiomer(s) and _____ diastereomer(s) of *Peramivir*.

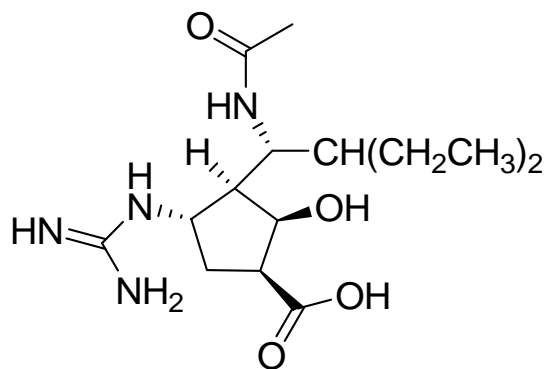
- F. (2 pts.) One of the stereocenters in *Peramivir* is known to have the R-configuration. Label this stereocenter in the structure below.

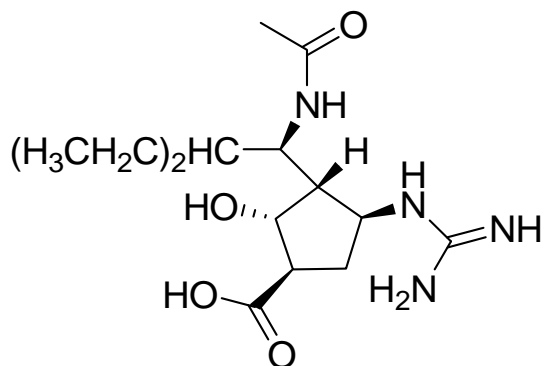


- G. (8 pts.) Compare each molecule below with *Peramivir* (above). In the box below each molecule, write “identical”, “enantiomer”, “diastereomer”, or “none of these”.

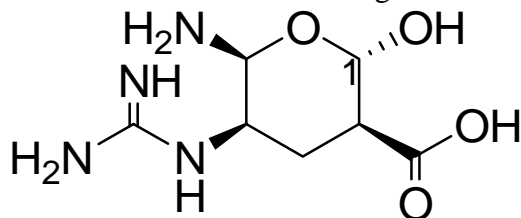




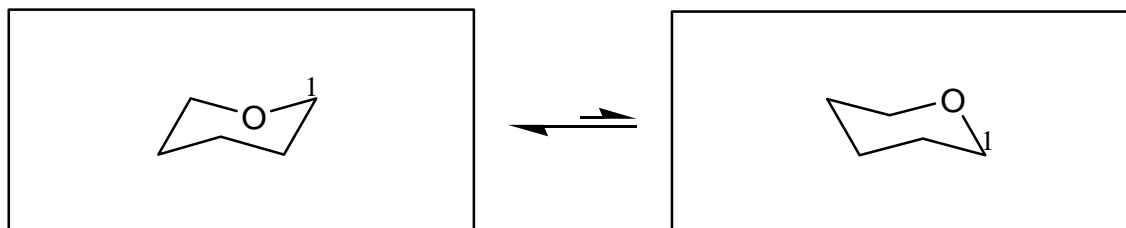




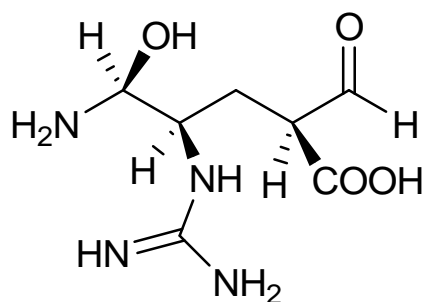
- H. (8 pts.) In pharmaceutical research, structural analogs (or derivatives) of drugs are often made in order to see if they have similar biological properties. Below is a structural analog of *Peramivir* called **Molecule A**.



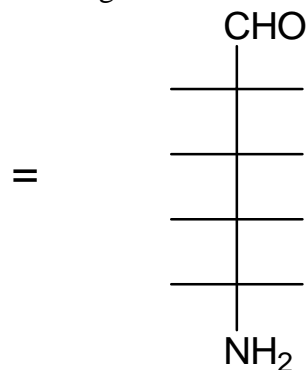
In the boxes below, complete the drawings of the most stable and less stable conformations of **Molecule A**, making sure to note the numbering of the ring atoms.



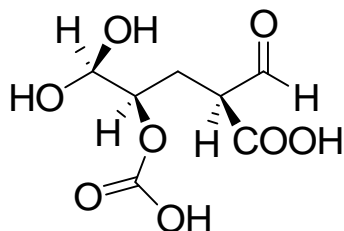
- I. (4 pts.) In section five, we will learn that **Molecule A** can be formed from the cyclization of an aldehyde with an alcohol. Consider the acyclic **Molecule B** below, which can be cyclized to form **Molecule A**. Complete the Fischer projection of **Molecule B** on the right:



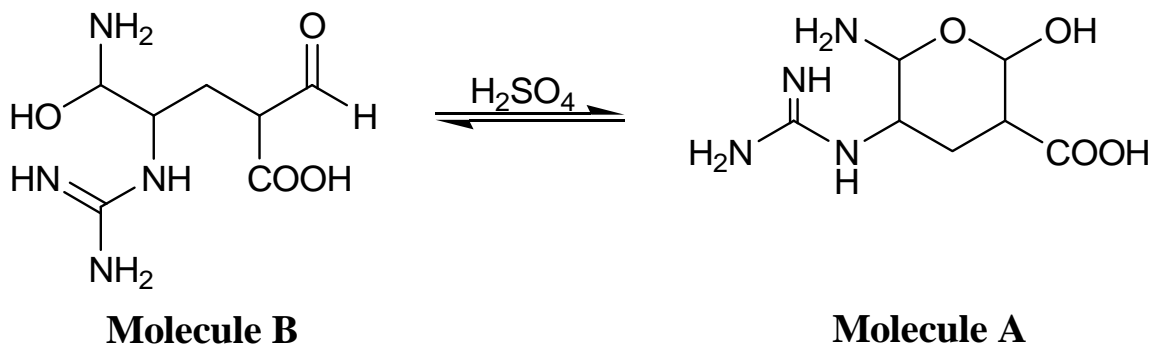
Molecule B



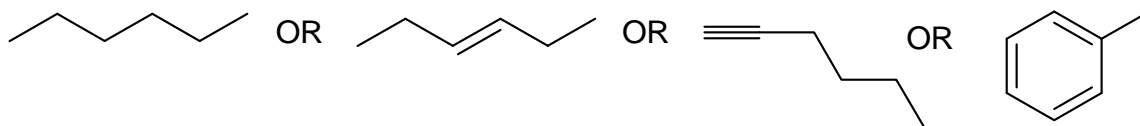
- J. (2 pts.) If all of the nitrogen atoms in **Molecule B** are replaced with oxygen atoms as shown below, what effect (if any) would this substitution have on the water solubility of the new compound? Briefly explain.



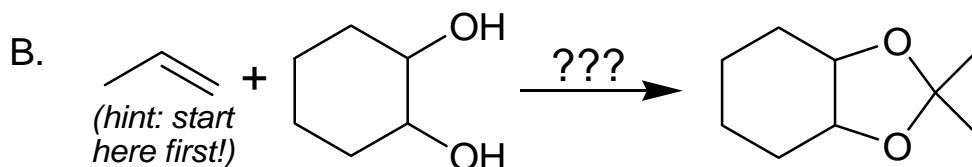
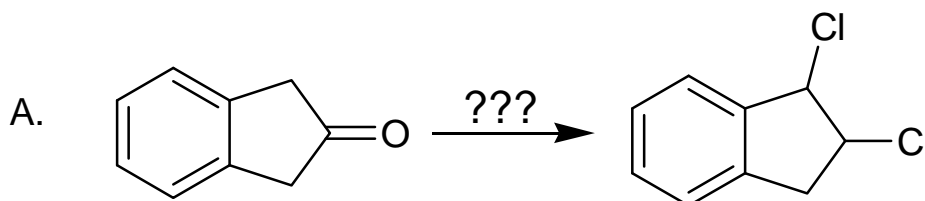
K. (9 pts.) Finally, provide the appropriate curved arrow notation for the possible formation of **Molecule A** from **Molecule B** as depicted below.



2. (5 pts.) An unknown compound, believed to be a hydrocarbon, showed the following behavior: no heat or color appeared when sulfuric acid was added; permanganate solution remained purple; and the red color of bromine solution was lost only after a catalyst was added. From the compounds below, circle the ONE that fits the observations and briefly explain your identification.



3. (16 pts. total; 8 pts. each) **SYNTHESIS!** Design a synthetic sequence using your knowledge of organic chemistry to date as well as the appropriate reagents on the cover page of this examination to account for the following chemical transformations:



6. (5 pts.) **LAST CHALLENGE!** Based on your knowledge of organic mechanisms, account for the following mechanism using the appropriate curved arrow notation:

