S2018 Organic Chemistry I
Mid-Term Exam 1

Name (print): KD

Name (Sign) :

Recitation Instructor Name (so we can get it back to you):

Instructions

1. Keep the exam closed until you are instructed to begin.

2. The exam consists of 8 questions. The first thing you should do is make sure that no pages are missing. If a page is missing, notify a proctor immediately.

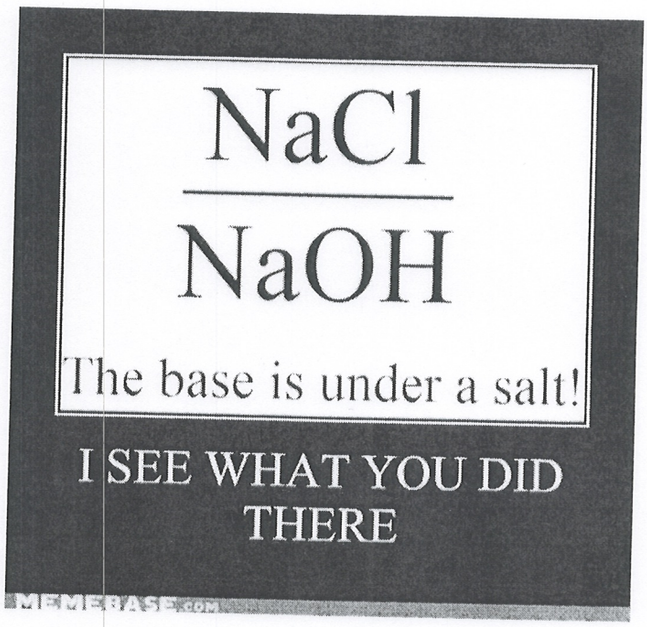
3. You will have 1 hr and 15 minutes to complete the exam, at which time pencils must be put down. Budget your time wisely.

4. Make sure to show all of your work, and make it clear what your thought process was. Answers should fit in the space provided. If you need to use the back of the sheet of paper, you must make note of it in the space allotted for credit.

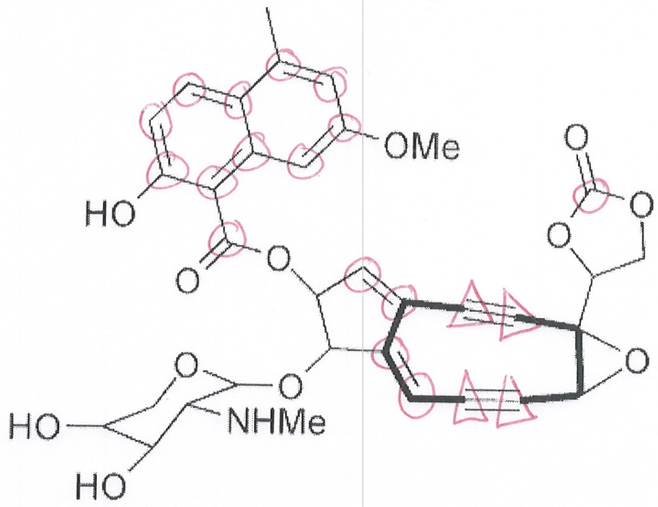
Breakdown

1. ___ / 10
2. ___ /10
3. ___ / 20
4. ___ / 15
5. ___ / 15*Challenge
6. ___ / 10
7. ___ / 10
8. ____/10

total ____ / 100

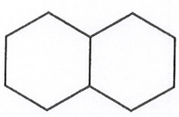


1) **Hybridization.** For the following molecule neocarzinostatin, draw a **circle** around <u>all</u> of the **sp2-hybridized <u>carbon</u> atoms**, and a **triagle** around <u>all</u> of the **sp-hybridized <u>carbon</u> atoms**. Do nothing for **sp3-hybridized carbon atoms** (10 points)

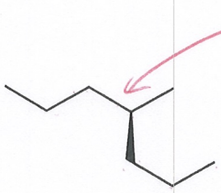


Neocarzinostatin

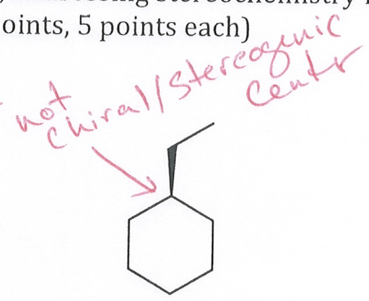
2). **IUPAC.** Provide a name for 2 of the following 3 molecules, addressing stereochemistry if appropriate. If you try all 3, I will only grade the first 2. (10 points, 5 points each)



bicyclo[4.4.0]decane



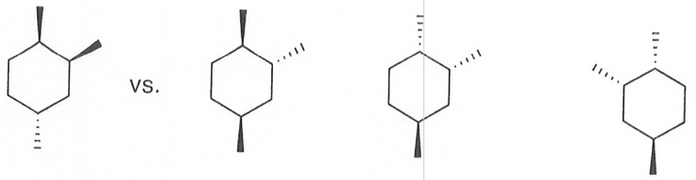
4-methylheptane



ethylcyclohexane

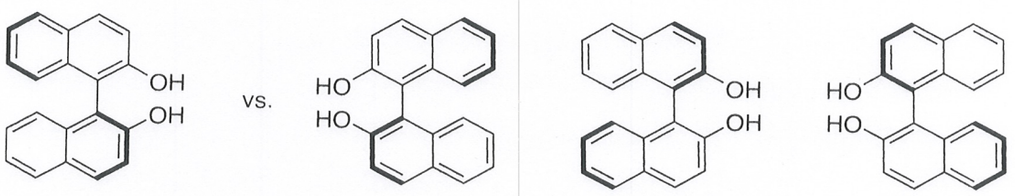
3) **Stereochemistry.** In the space indicated, write what the relationship is between each the following 3 molecules versus the first molecule shown. The options are enantiomers, diastereomers, or identical (20 points)

(A) (10 points, 3 each, 1 extra point for complete set correct)



diast. enant identical

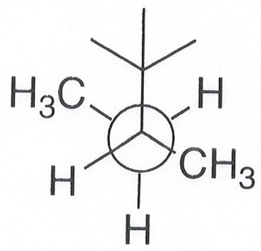
(B) (10 points, 3 each, 1 extra point for complete set)



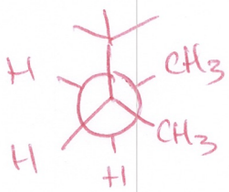
enant. enant. identical

4) **Newman Projections.**

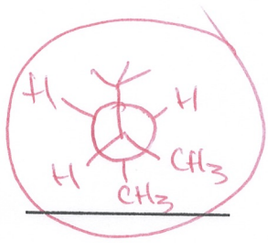
(a) Draw the 2 other staggered Newman projection of the molecule shown, and circle the one that is lowest in energy (10 points)



A _____

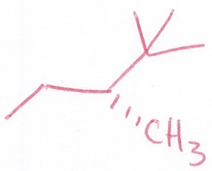


B _____

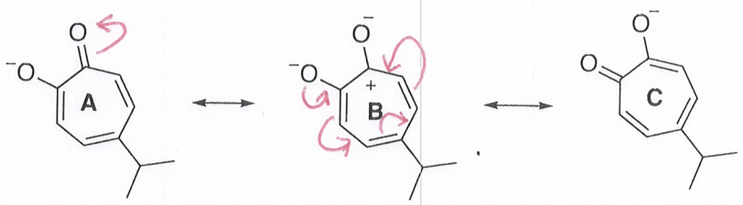


C _____

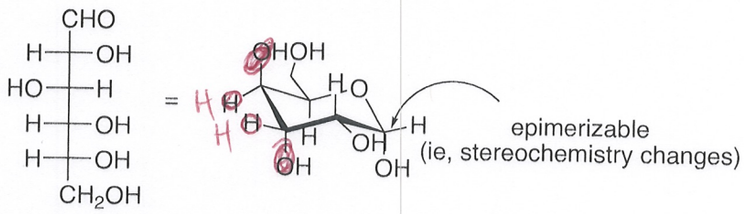
(b) Draw the lowest in energy in ling-angle notataion (5 points).



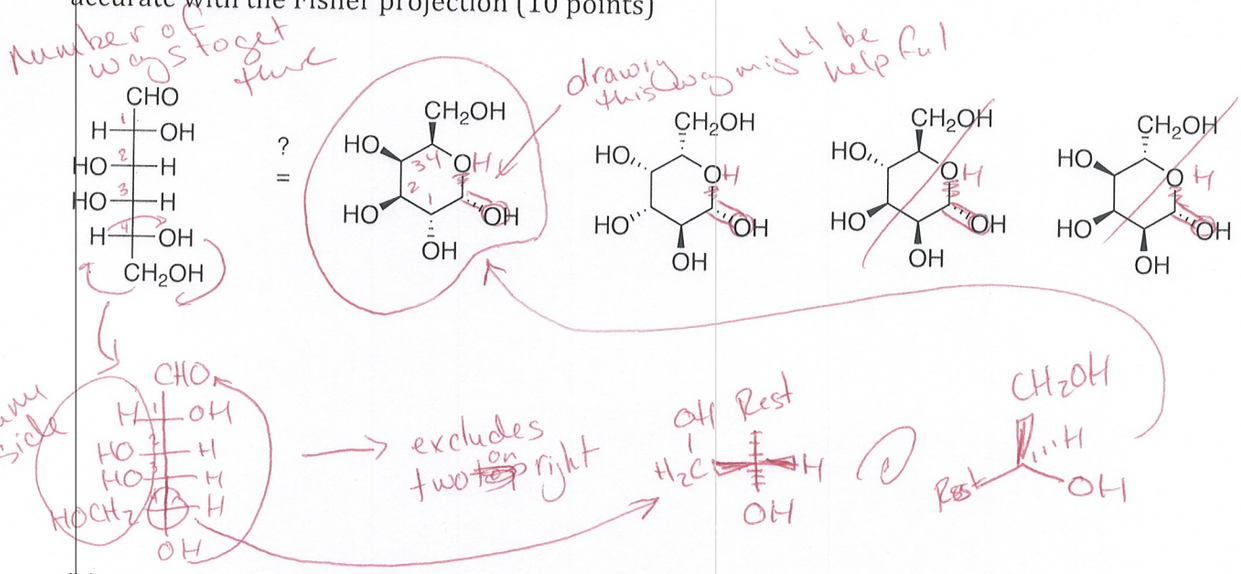
5) **Resonance Structure.** Illustrate electron arrow pushing that for the conversion of resonance form A → B, and B→ C. (10 points)



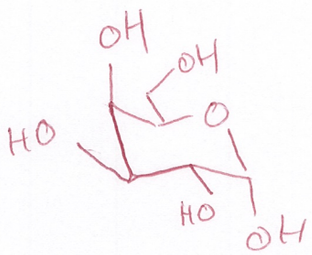
6). **Fisher and Chair Conformations. (Challenge)** Fisher projections are most commonly found in the carbohydrate literature, which will be covered in Organic II. As an example, below is glucose in its Fisher projection as well as in its cyclic form, which is a chair conformation.



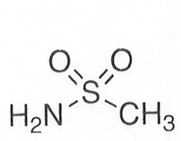
(a) The following is a Fisher projection of another sugar. Which of the cyclic forms are most accurate with the Fisher projection (10 points)



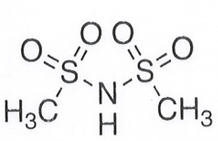
(b) Draw the molecule you circled above in a chair conformation (5 points).



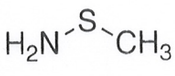
7) **Acid/Base.** Rank the following molecules from most acidic (1) to least acidic (4), and briefly explain your answer (10 points)



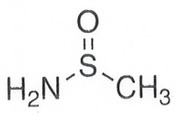
2



1



4



3

brief explaination acidity increases w/ number of resonance forms that stabilize anion / conjugate base

8) **Electron Arrow Pushing.** One of the next reactions you will learn about is a substitution reaction, one of which is called 'SN1'. The following is an example of one of them. Show the electron arrow pushing that explains each step in this mechanism (10 points)