Spring 2022 Organic Chemistry 1
Exam 1

Name (print): Key

Name (sign):

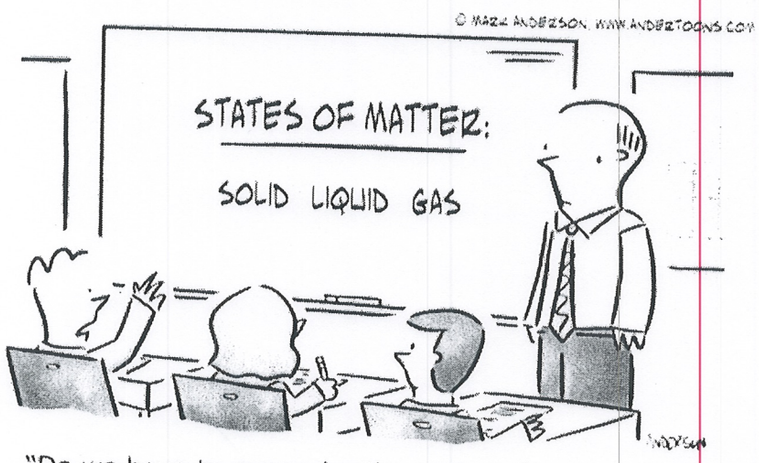
Recitation Instructor:
(so we can get it back to you)

Instructions. The following exam will begin at 9:30, and last until 10:45. Please keep the exam closed until you are instructed to begin. You can write your name and place your signature and recitation instructor name now. Once exam starts, you are required to stay in your seat until you are finished (**no bathroom breaks!**). If you have any questions during the exam, raise your hand and one of us will be with you.

1. **IUPAC** _____ **(15 points)**
2. **Line-Angle Notation** _____ **(10 points)**
3. **Stereochemistry** _____ **(30 points)**
4. **Newman Projections** _____ **(30 points)**
5. **Chair Conformations.** _____ **(25 points)**

Total _____ **(~~100~~ points)**

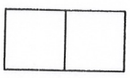
110



"Do we have to memorize the capitals for these too?"

1. IUPAC (3 questions, 15 points total).

1a. Provide the IUPAC name for the following molecule (5 points).



bicyclo[2.2.0]hexane

1b. Draw (*Z*)-hept-2-ene using line-angle notation (5 points).

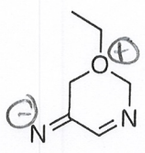
1c. Draw (S)-3-methylhexane using line-angle notation (5 points).

2. Line-Angle Notation (2 questions, 10 points total)

2a. Provide the molecular formula of the following molecule (5 points).

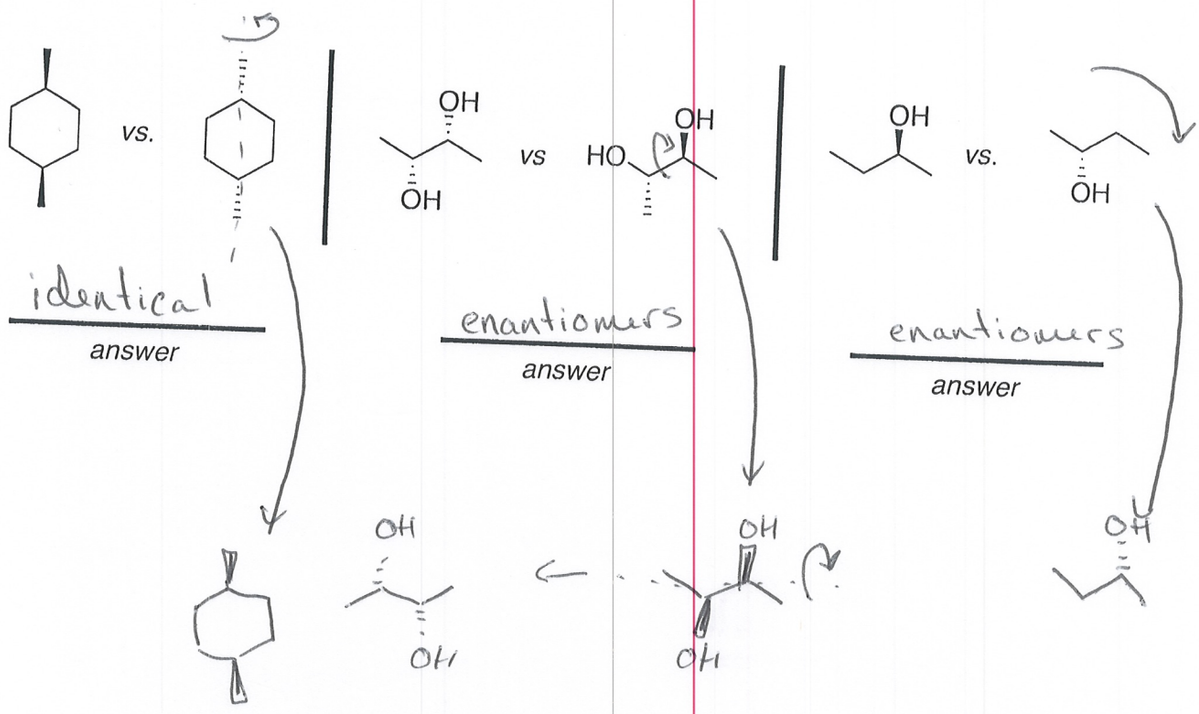
$C_7H_{10}O$

2b. Assuming full octet, add any missing charge(s) to the heteroatoms on the following structure.

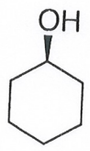


3. Stereochemistry (6 questions, 30 points total)

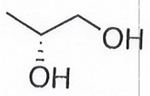
3a. What is the relationship between the following molecules? Enantiomers, Diastereomers, or Identical? (5 points each)



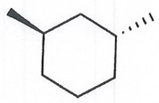
3b. For each of the following, is the molecule chiral or achiral? If achiral, is it meso? (5 points each)



achiral
answer



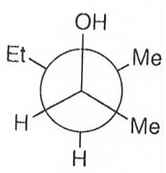
chiral
answer



chiral
answer

4. Newman Projections (3 questions, 30 points total)

4a. Which of the molecules on the right are the same molecule as the Newman projection on the left? Chose all that apply. (Me = CH_3, Et = CH_2CH_3) (10 points)



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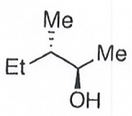
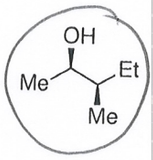
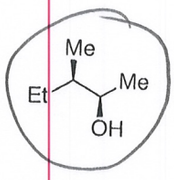
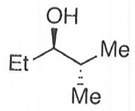




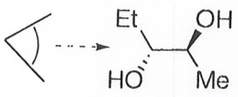


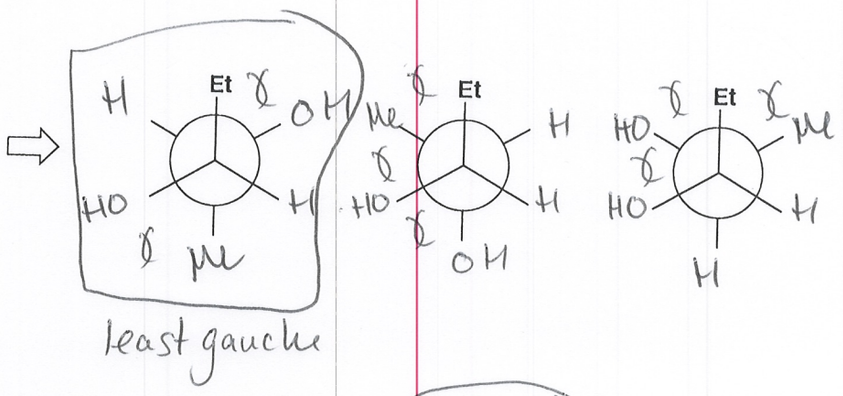


circle all that apply

4b/c. Using the templates, complate all 3 staggered Newman Projections of the first molecule shown, and circle the one that is LOWEST in Energy (10 points each, 20 points total)

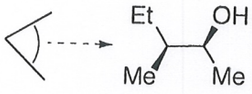
4b.

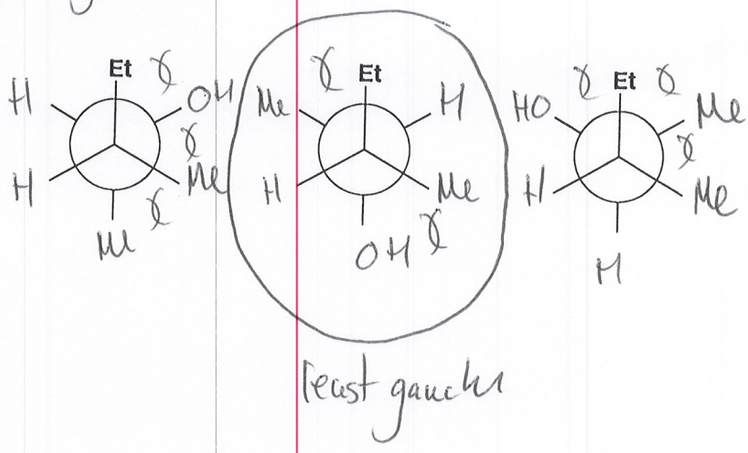




least gauche

4c.



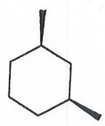


least gauche

5. Chair Conformations (4 questions, 25 points total)

5a-c. Circle the chair conformation that is consistent with the first structure shown (5 points each)

5a.



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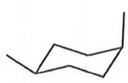
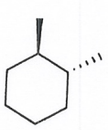


circle only one

5b.



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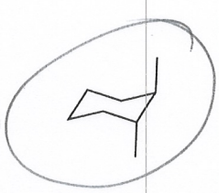
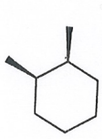


circle only one

5c.



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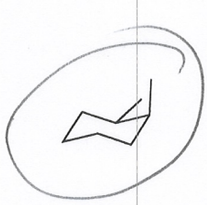

circle only one

5d. Complete the following chair conformations based on the first structure shows. Circle the one you think is lowest in energy. (10 points)