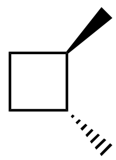
Name ____________________________ Test 3 (11/19)
PHYS 0201 (Organic) Fall 2007

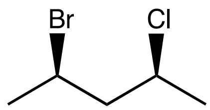
1. a. (8 pts.) Mark the chiral centers on the following molecules with a star.

b. (8 pts.) Determine whether the molecules are chiral.

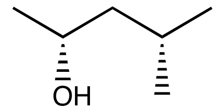
i.



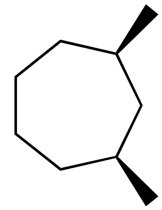
ii.



iii.



iv.



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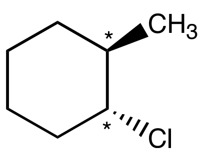
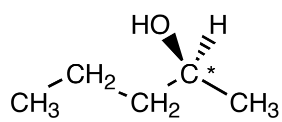
2. (12 pts.) Determine the configuration of the chiral centers, which are marked with an asterisk, on the following molecules.

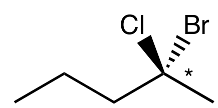
a.



b.

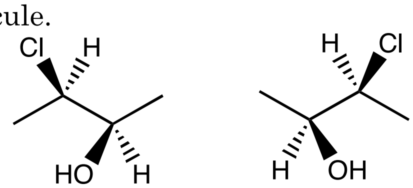


c.

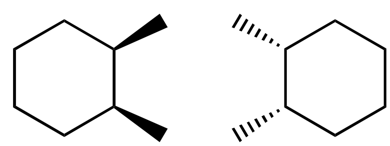


3. (12 pts.) For each of the following pairs of molecules determine whether the molecules are diastereomers of each other, enantiomers of each other, or different views of the same molecule.

a.



b.



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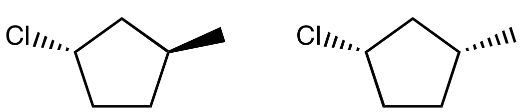
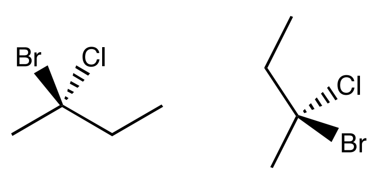
c.



d.



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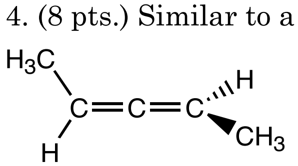
4. (8 pts.) Similar to a solution of sugar, the following molecule rotates the plane of polarized light.

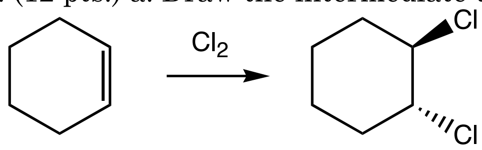


a. Is the molecule chiral?

b. Does the molecule have a nonsuperimposable mirror image?

1. ________
2. ________
3. ________
4. ________
5. ________
6. ________
7. ________
8. ________
9. ________

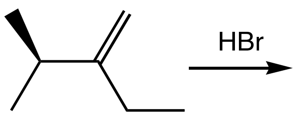
5. (12 pts.) a. Draw the intermediate that forms during the reaction of chlorine with cyclohexene.



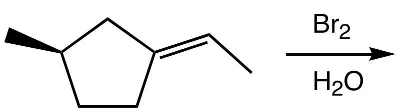
b. Can the reaction pictured in part a. produce any other products? If it can, draw the products.

6. (24 pts.) Draw the organic product(s) of the following reactions. Where appropriate, indicate the stereochemistry of the products using wedge ( ) and dashed ( ) bonds as needed.

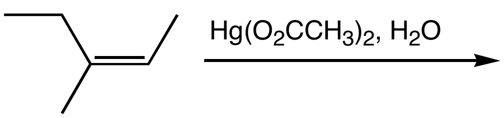
a.



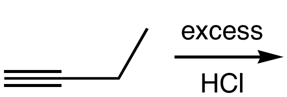
b.



c.

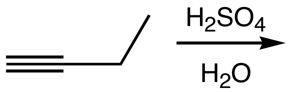


d.

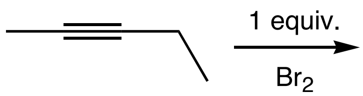


7. (12 pts.) Determine the major product(s) for the following reactions. Where appropriate, indicate the stereochemistry of the products using wedge ( ) and dashed ( ) bonds as needed.

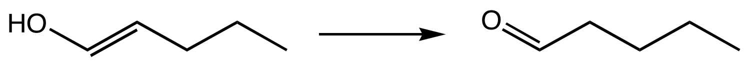
a.



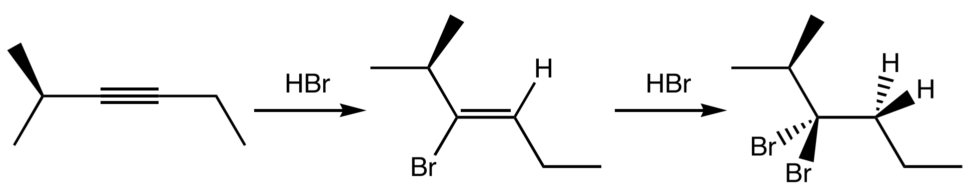
b.



8. (12 pts.) Most enols are not stable molecules and they spontaneously convert to their carbonyl tautomers. Draw a mechanism for the acid, H^+, catalyzed tautomerization drawn below.



9. Two equivalents of an electrophile can be added to an alkyne.



a. (6 pts.) Draw the intermediate for the second electrophilic addition.

b. (6 pts.) Explain why both bromine atoms bond to the same carbon atom.