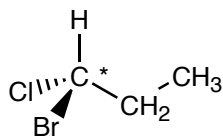


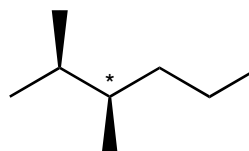
1. (12 pts.) Determine the configuration of the starred (*) carbon atoms on the molecules drawn below.

1. _____

a.



b.



2. _____

3. _____

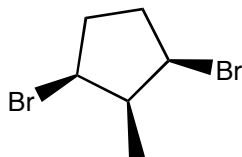
4. _____

2. a. (3 pts. ea.) Place a star next to the chiral atoms on the molecules drawn below.

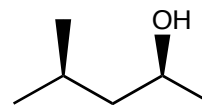
b. (2 pts. ea.) Label the molecules chiral or achiral. If a molecule is a meso complex write "meso".

5. _____

i.



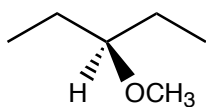
ii.



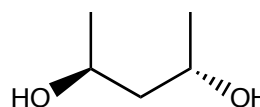
6. _____

7. _____

iii.



iv.

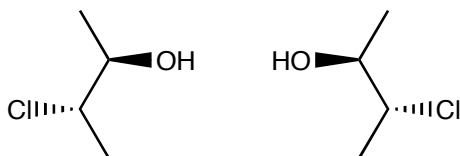


8. _____

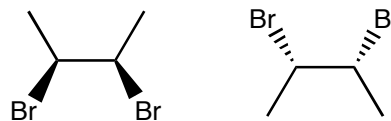
9. _____

3. (3 pts. ea.) Determine the relationship between the following molecules; that is, determine whether the molecules are enantiomers, diastereomers, or different views of the same molecule.

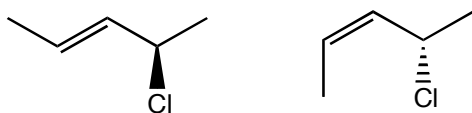
a.



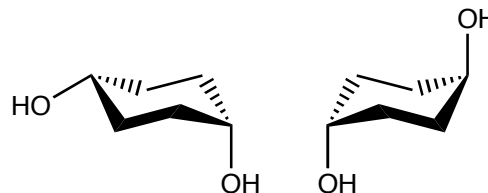
b.



c.



d.



4. (6 pts. ea.) Draw skeletal structures for the following molecules. Remember to use wedge (▴) and dash (▾) bonds, where appropriate, to indicate the stereochemistry of the molecules.

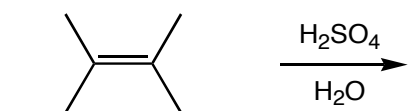
a. *S*-3-chloro-1-butene

b. (2*R*,3*R*)-2-chloro-3-iodo-3-methylpentane

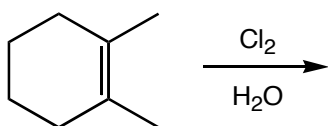
5. a. (4 pts. ea) Predict the organic products for the following reactions. Remember to use wedge (▴) and dash (▾) bonds, where appropriate, to indicate the stereochemistry of the products.

b. (1 pt. ea.) Indicate whether the reactions occur via syn, anti, or syn and anti additions.

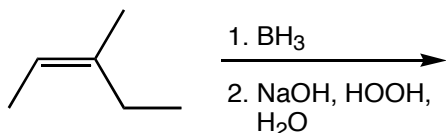
i.



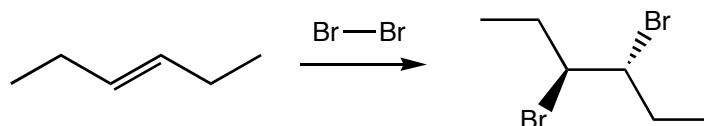
ii.



iii.



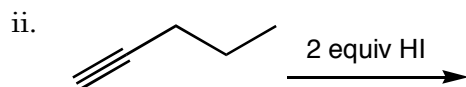
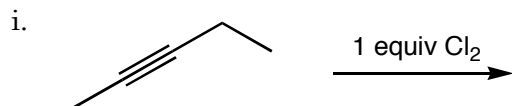
6. a. (8 pts.) Suggest(draw) a mechanism for the following reaction.



b. (4 pts.) The product of this reaction, 3,4-dibromohexane, exists as how many stereoisomers?

c. (4 pts.) Can the reaction in part a make all of the stereoisomers of 3,4-dibromohexane? Explain your answer.

7. (6 pts. ea.) Predict the organic products for the following reactions. Remember to use wedge (▴) and dash (▾) bonds, where appropriate, to indicate the stereochemistry of the products.



8. (10 pts.) Describe (name) the orbitals used to form a triple bond and explain why alkynes react in a way that is similar to alkenes.

9. Often, when one equivalent of an acid like HCl reacts with an alkyne only one stereochemical outcome, a product or products formed by an anti addition, is observed.

a. (6 pts.) Explain how this result makes the production of a carbocation as an intermediate an impossibility.

b. (4 pts.) Draw a reaction that you could use to test the assertion made above.