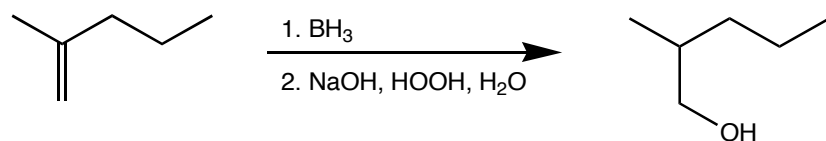


1. Predict the product(s) of the following reaction.



1. _____

2. _____

3. _____

4. _____

2. (3 pts. ea.) The reaction of HBr with 1-hexene forms 2-bromohexane. However, in the presence of a peroxide, the reaction of HBr with 1-hexene forms 1-bromohexane.

a. What is the role of the peroxide in the reaction?

5. _____

The peroxide acts as a radical initiator. It abstracts a hydrogen atom from HBr and generates the electrophilic $\text{Br}\cdot$ radical.

6. _____

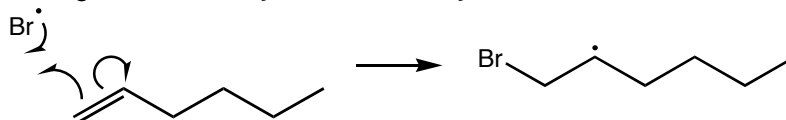
b. Why does the bromine attack the primary carbon in this reaction instead of the secondary carbon as in the reaction without peroxide (you may draw a reaction mechanism to help explain your answer if you wish)?

7. _____

8. _____

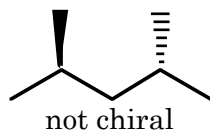
Since the $\text{Br}\cdot$ radical is the electrophile, it adds first, and adding the electrophile to the primary carbon will place the electron deficiency (the carbon radical) on the atom that is more capable of stabilizing the deficiency, the secondary C atom.

9. _____

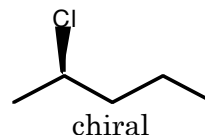


3. (2 pts. ea.) Which of the following molecules is chiral.

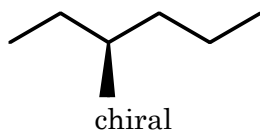
a.



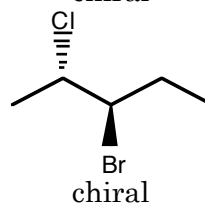
b.



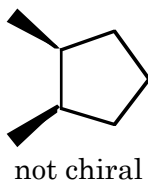
c.



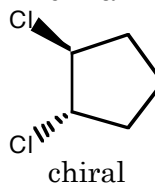
d.



e.

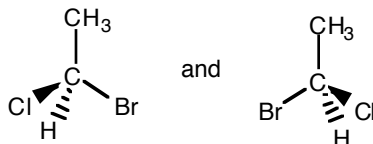


f.



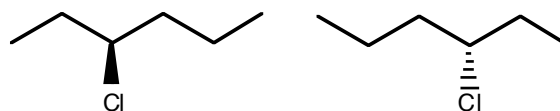
4. (3 pts. ea.) Identify whether the following pairs of molecules are enantiomers, diastereomers, or just different views of the same molecule.

a.



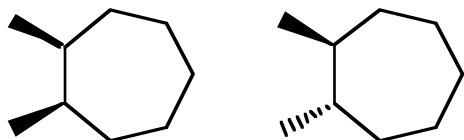
enantiomers

b.



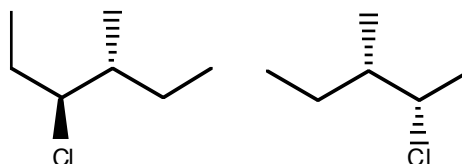
same

c.



diastereomers

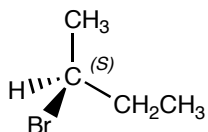
d.



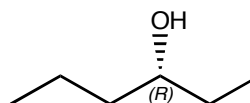
diastereomers

5. (6 pts. ea.) Determine the absolute configuration of the indicated (*) chiral centers.

a.



b.

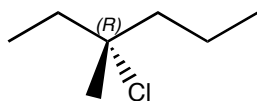


6. (4 pts.) In lab, we saw that a solution of sugar rotates the plane of polarization of polarized light that is passed through the sugar-water solution. Are sugar molecules chiral?

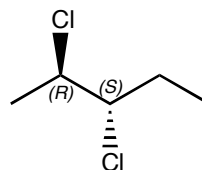
Yes, sugar molecules are chiral. Only chiral molecules are optically active.

7. (6 pts. ea.) Draw perspective drawings for the following molecules.

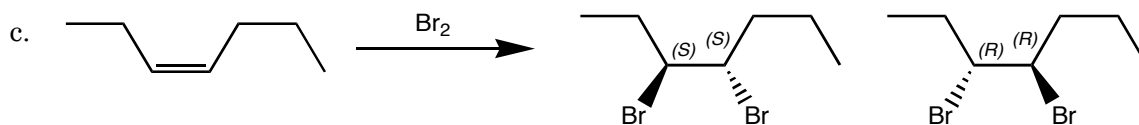
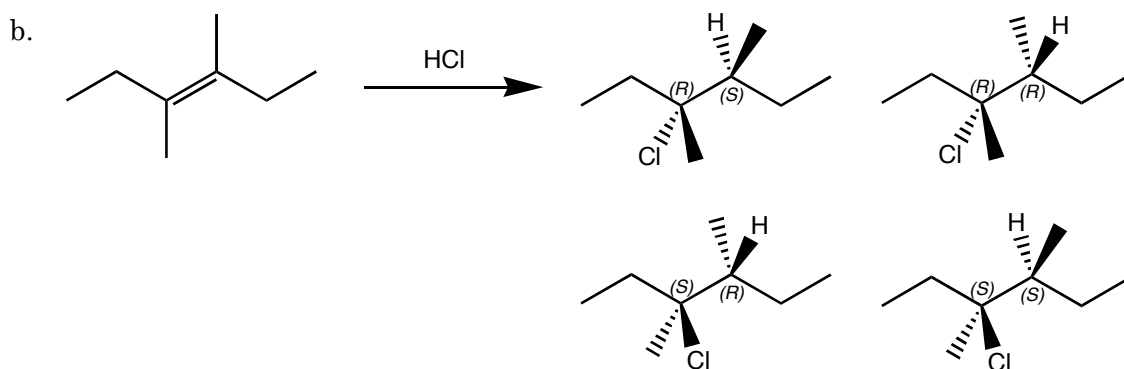
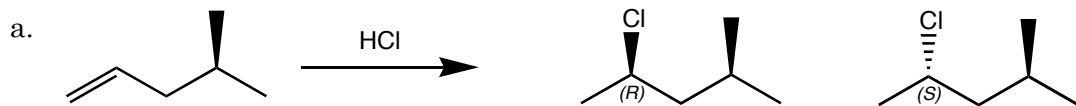
a. (*R*)-3-chloro-3-methyl-hexane



b. (*2R,3S*)-2,3-dichloropentane



8. (6 pts. ea.) Draw the products of the following reactions. Remember to indicate the stereochemistry of the product(s).



9. (5 pts. ea.) From an alkene and any other reagents that are needed, synthesize the following molecules.

