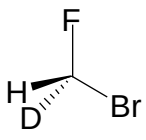
Problem Set #4, 5.12 Spring 2003

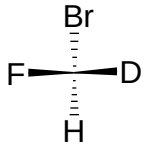
Due Monday, March 10, 4pm

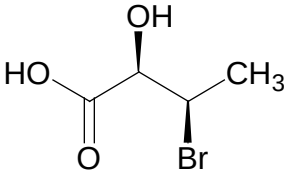
1. **a)** Label each pair as **enantiomers**, **diastereomers**, or **same molecule.**

b) Label each stereocenter with its **R** or **S** configuration.



and





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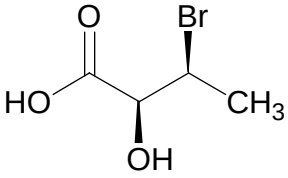

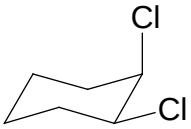

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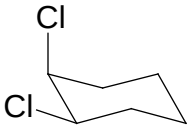

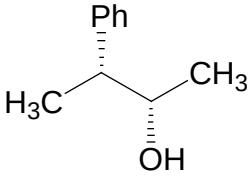

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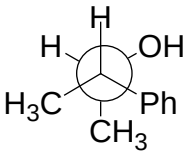
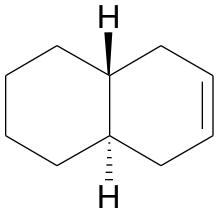
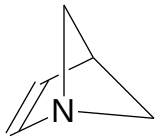
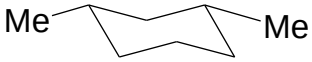
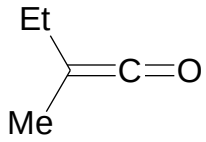


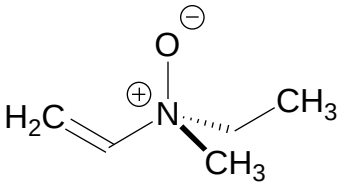
2. a) Label each molecule as **chiral** or **achiral**.
b) Label each stereocenter with its **R** or **S** configuration.
c) Label all of the **meso compounds**.

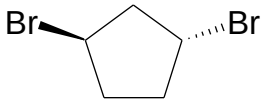










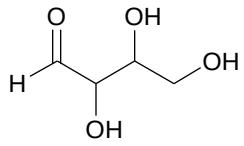


3. a) There are three different constitutional isomers of dichlorocyclopentane. Draw them.

b) There are seven different stereoisomers of dichlorocyclopentane. Draw all of them.
c) Label each stereocenter as **R** or **S**.
d) Label each structure as **chiral** or **achiral**.
e) Label any meso compounds.

4. The following molecule **A** is drawn in such a way that the 3-D structure is ambiguous.

a) Circle the atoms that are stereocenters.

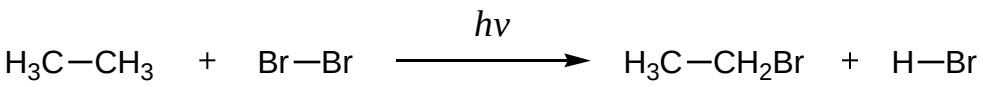


b) Based on the number of atoms you circled in part **a**, what is the maximum number of stereoisomers possible for **A**?

c) Draw all of the possible stereoisomers of **A** and label their stereoisomeric relationships (diastereomers, enantiomers).

d) Label each stereocenter with its **R** or **S** configuration.

5. a) Provide a **complete detailed** mechanism for the following reaction (including initiation, propagation, and termination steps).
Remember to use fishhook arrows!



b) Using the BDE table on p. 134 in Wade, calculate ΔH for each of the propagation steps.

c) Draw a reaction-energy diagram for the propagation steps from part **a.**
d) Label Δ**H°** for each step, Δ**H°**$_{\textbf{overall}}$, and the **rate-determining step**.
e) Is the overall reaction endothermic or exothermic?