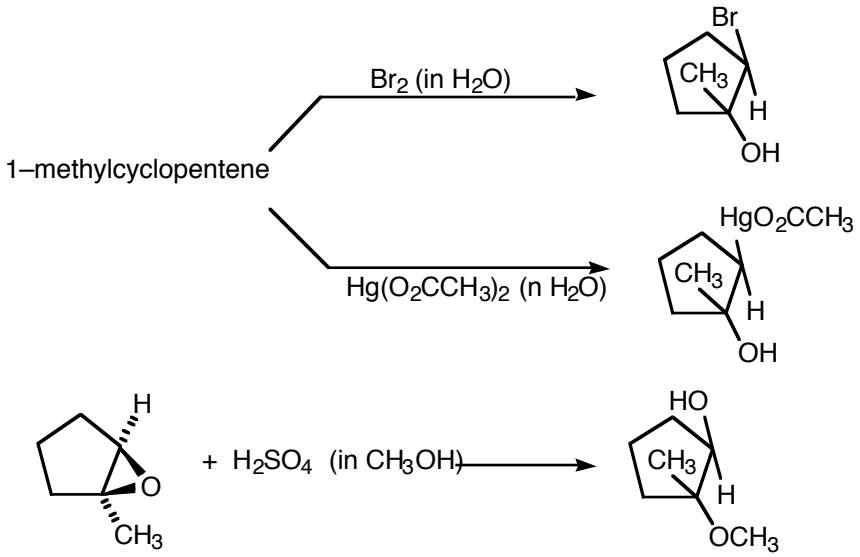
WORKSHOP

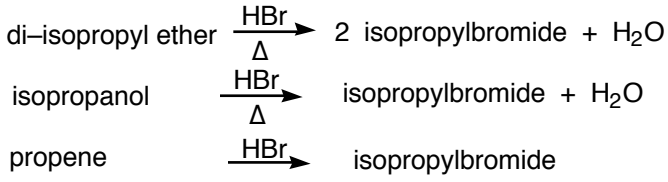
Partial Review

1. The following reactions occur by analogous mechanisms. Explain how they are closely related. Also, identify the electrophile and nucleophile for each mechanistic step.

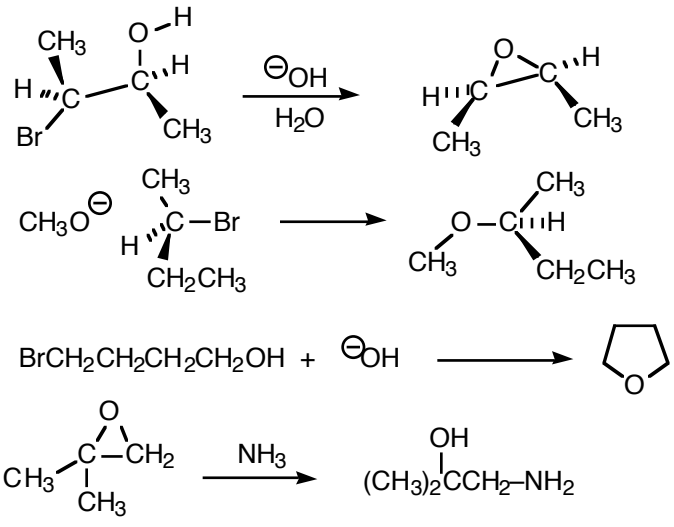
a.



b.

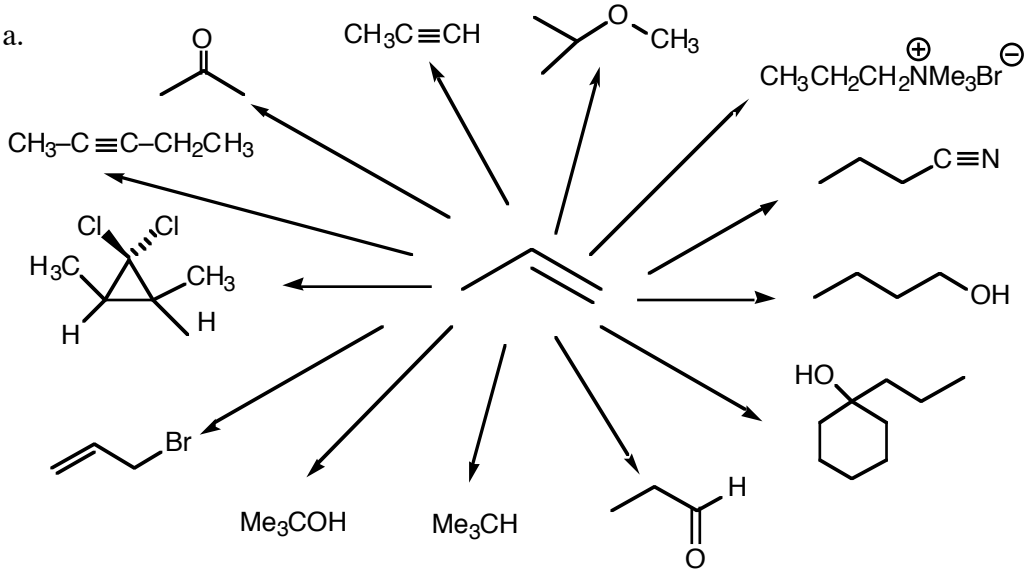


c.

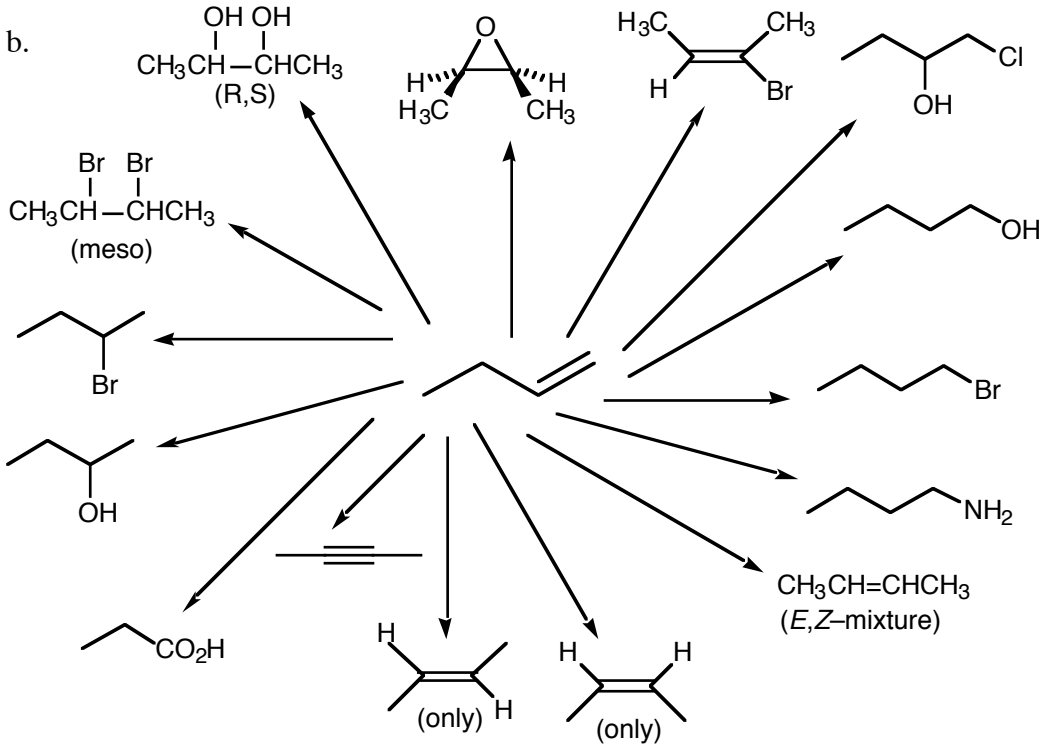


2. Show how to carry out the synthetic conversions indicated in an efficient manner. Find as many other interconversions as you can. If more than one step is required, show the products for each step.

a.



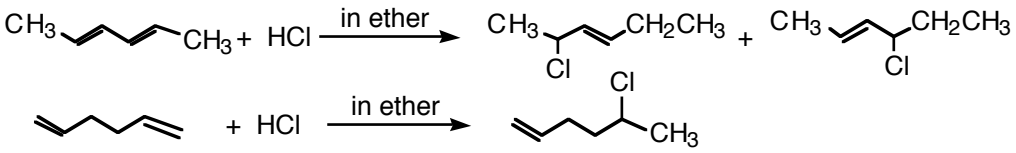
b.



3. For each of the following reaction pairs, tell which would occur at a faster rate. Clearly justify your answer. (*Hint*: what is the mechanism?)

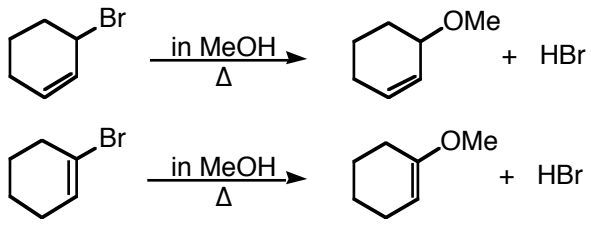
a. 2–butyne + Br_2 $\xrightarrow{\text{in ether}}$ *trans*–2,3–dibromo–2–butene

trans–2–butene + Br_2 $\xrightarrow{\text{in ether}}$ *meso*–2,3–dibromobutane

b. 

c. 2–chloropentane + $Na^{\oplus}I^{\ominus}$ $\xrightarrow{\text{in acetone}}$ NaCl↓

2–methyl–2–chlorobutane + $Na^{\oplus}I^{\ominus}$ $\xrightarrow{\text{in acetone}}$ NaCl↓

d. 

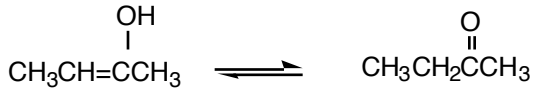
e. *trans*–2–methylcyclohexyl chloride $\xrightarrow[(CH_3)_3COH]{(CH_3)_3CO^{\ominus}K^{\oplus}}$ 1–methylcyclohexene + 3–methylcyclohexene

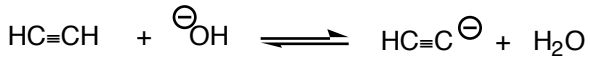
f. *t*–butanol $\xrightarrow[ZnCl_2]{\text{conc. HCl}}$ *t*–butyl chloride

2–methyl–1–propanol $\xrightarrow[ZnCl_2]{\text{conc. HCl}}$ *t*–butyl chloride

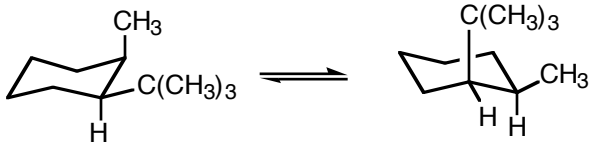
4. For each of the following interconversions, circle the compounds that would predominate at equilibrium. Clearly justify your choice.

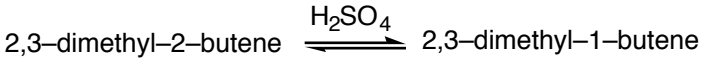
a. $CH_3CH_2CH_2–MgBr + CH_3C{\equiv}CH \rightleftharpoons CH_3CH_2CH_3 + CH_3C{\equiv}C–MgBr$

b. 

c. 

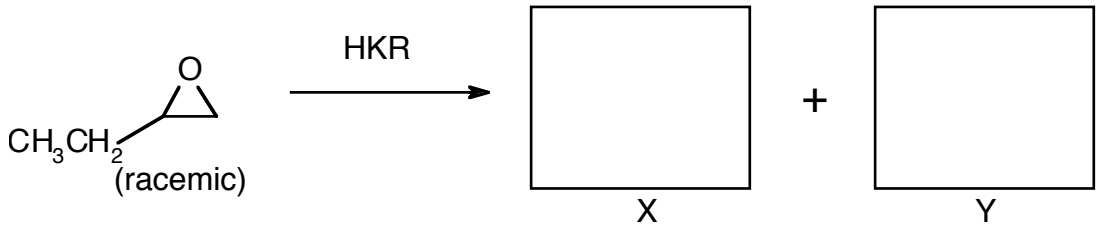
d. 

e. 

f. 

5. Consult the experimental reaction data and schemes:
http://ep.llnl.gov/msds/orgchem/Chem226/epox-resol.html

For the following reaction provide a clear 3-dimensional drawing indicating the stereochemistry of each of the major products formed and assigned their absolute configuration: R- or S-.



If there were respectively a 98% enantiomeric excess for each of the major products formed above, what would be the total percent of the opposite enantiomer in the product mixture?

Enantiomer of X: _____% Enantiomer of Y: _____%