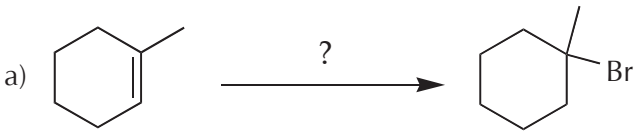
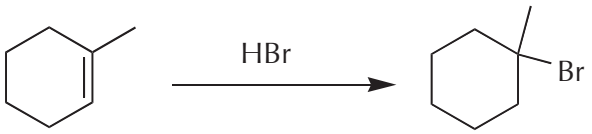
CHAPTER 8 - REACTION EXAMPLES
(Based on the 6th edition of the textbook)

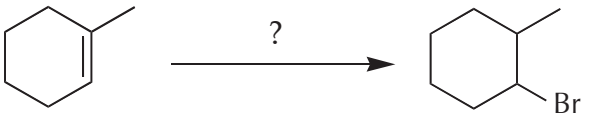
SOLVED PROBLEM 8-1, p. 325

a) 

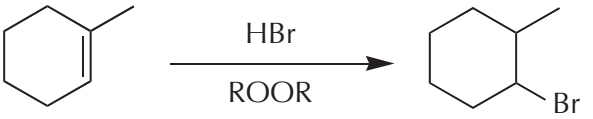
Analysis: Markovnikov addition of HBr to the C=C bond. Use HBr:

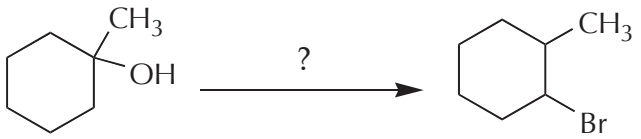


Complement:

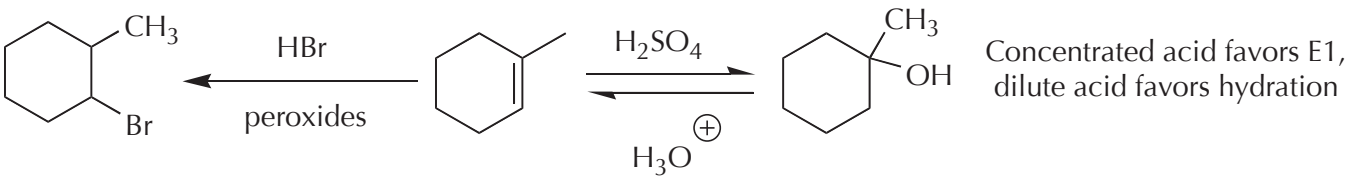


Analysis: Anti-Markovnikov addition of HBr to the C=C bond. Use HBr **in the presence of peroxides** (ROOR)



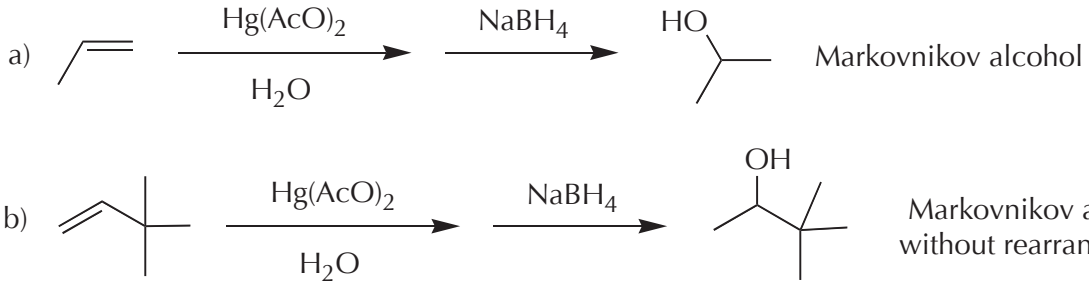
b) 

Retrosynthetic analysis, or retrosynthesis:

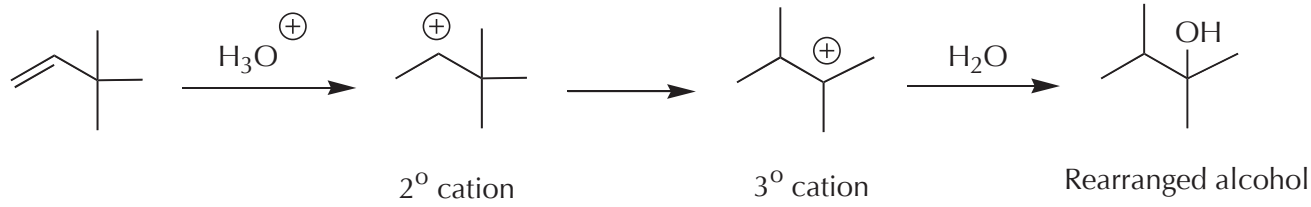


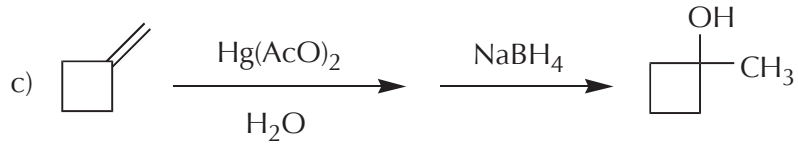
Recommended problem: 8-4, p. 330

OXYMERCURATION - DEMERCURATION, ALSO CALLED OXYMERCURATION - REDUCTION

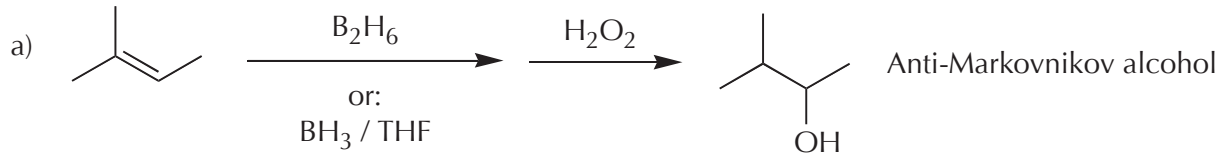


Contrast with addition of water in the presence of strong acid:

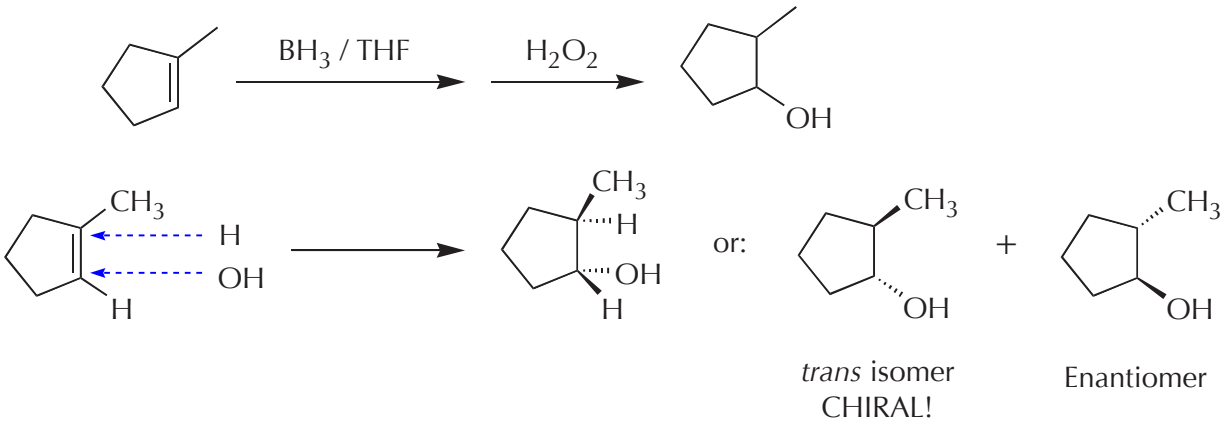




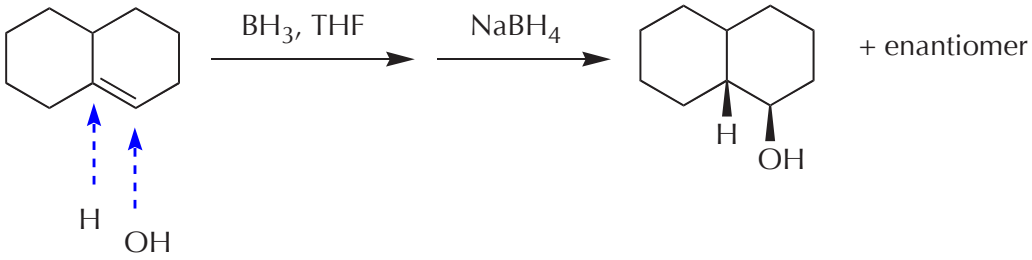
HYDROBORATION - OXIDATION SEQUENCE. An effective way to make Anti-Markovnikov alcohols. Water adds to the double bond with **syn-stereochemistry**.



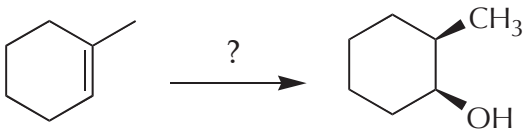
SOLVED PROBLEM 8-3, p. 339



Problem 8-15 (b)

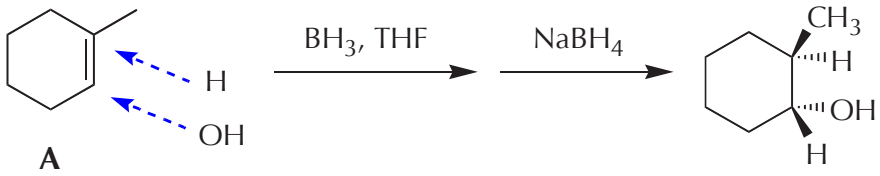


Can I make B from A by hydroboration - oxidation?



A **B**

Analysis:



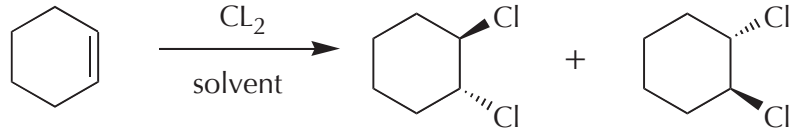
A

or:

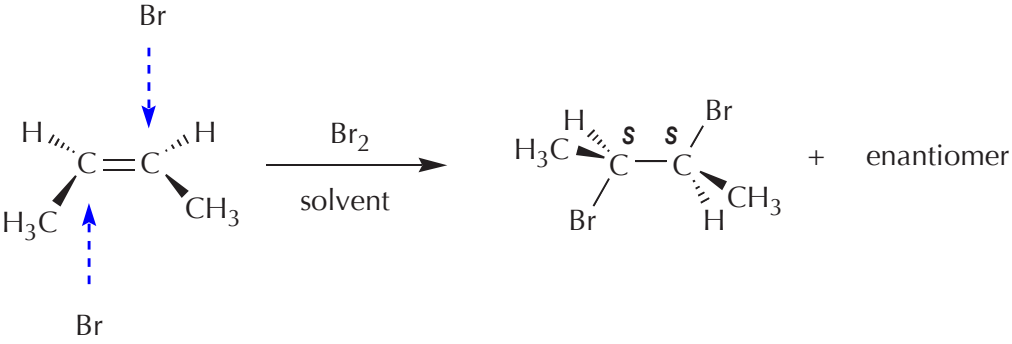
Answer: NO

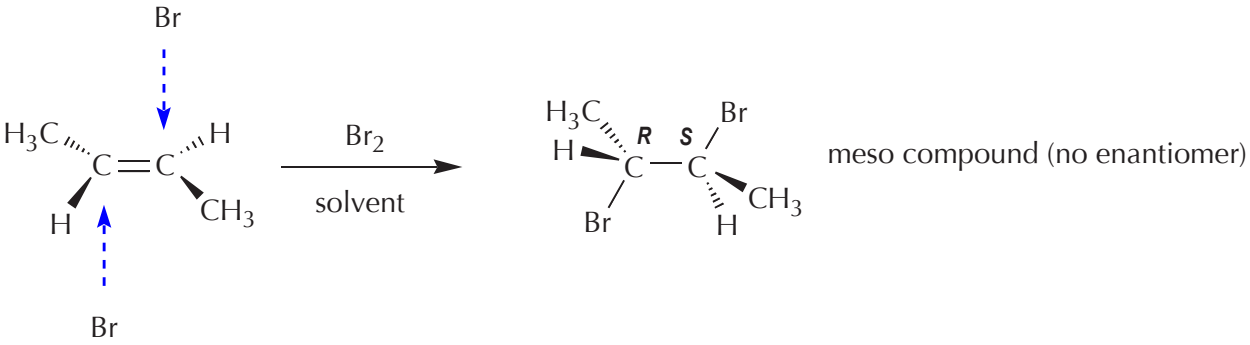
Recommended: 8-15 (c), p. 342

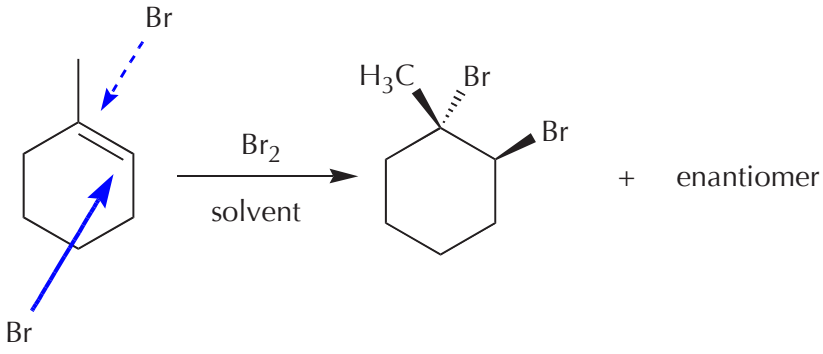
ADDITION OF CHLORINE OR BROMINE TO THE C=C BOND.

a) 

Anti addition yields the *trans* product, which is chiral.
Therefore the enantiomer also forms.

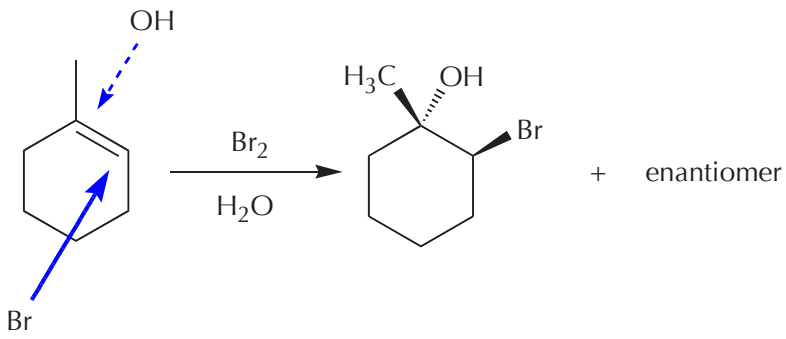
b) 

c) 

d) 

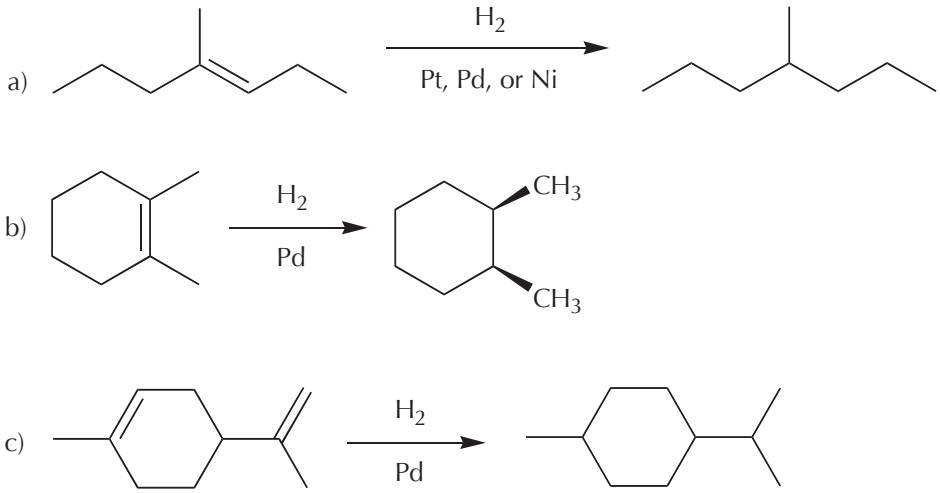
Recommended: 8-17), p. 345

Variation with water:



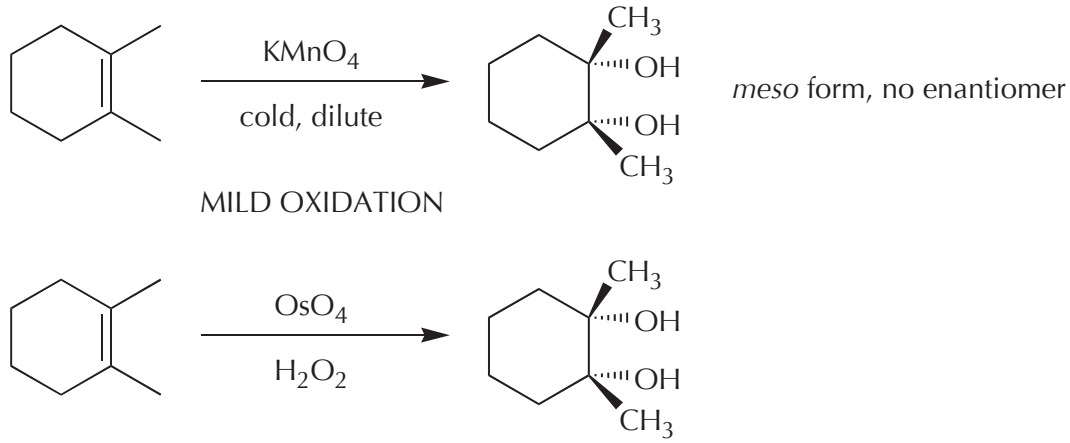
Recommended: 8-5 and 8-6, p. 347

CATALYTIC HYDROGENATION - Transformation of alkenes into alkanes (*syn* addition of hydrogen).

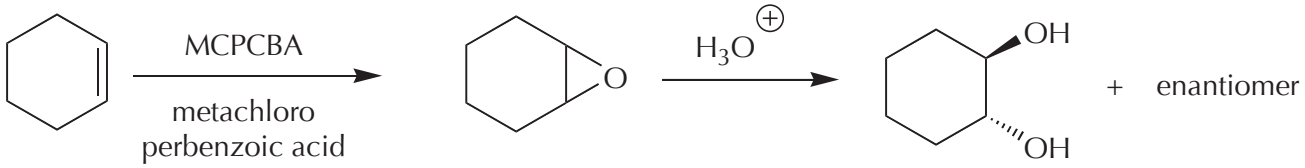


Recommended: 8-23, p. 350

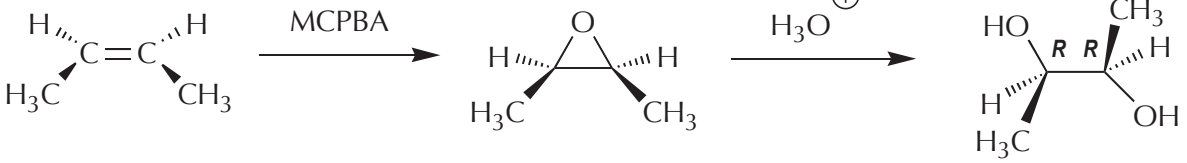
***SYN* HYDROXYLATION - S*yn* addition of OH / OH to the C=C bond.**



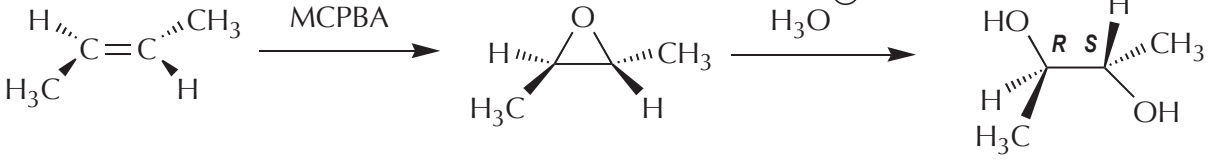
***ANTI* HYDROXYLATION SEQUENCE- *Anti* addition of OH / OH to the C=C bond.**

a) 

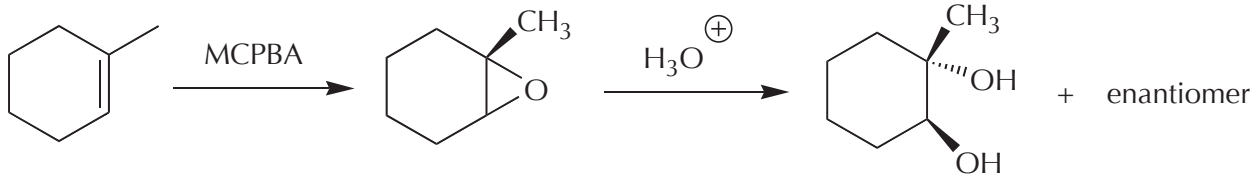
epoxide
(3-membered cyclic ether)

b) 

cis epoxide chiral

c) 

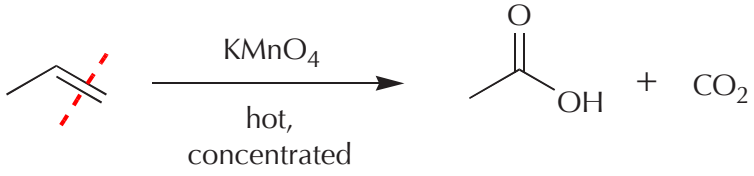
trans epoxide meso

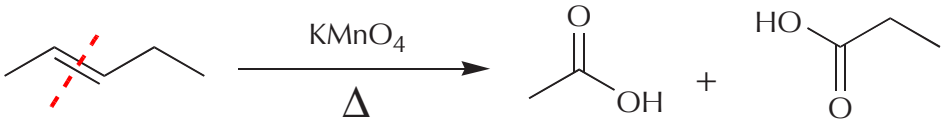
d) 

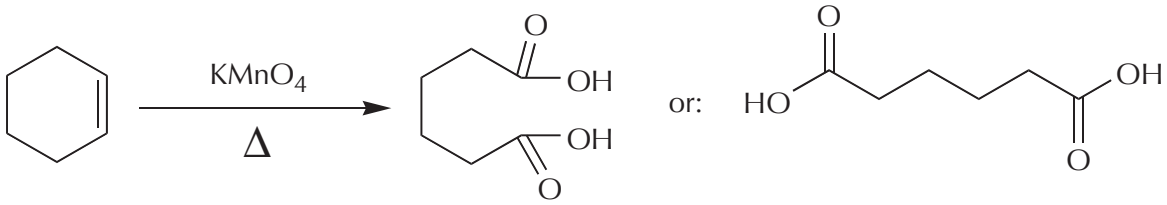
Recommended for *syn* and *anti* hydroxilation: 8-34 (all), p. 359.

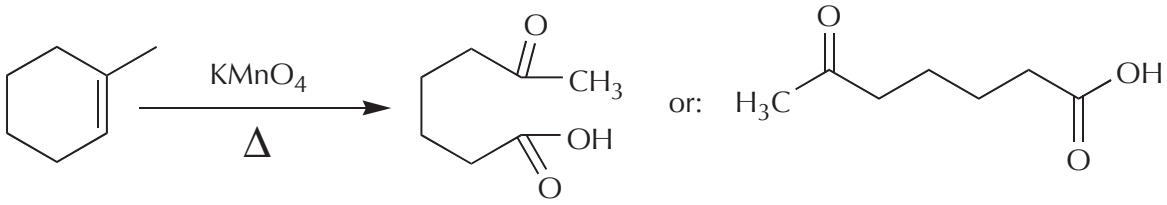
OXIDATIVE CLEAVAGE: Strong oxidation with potassium permanganate.

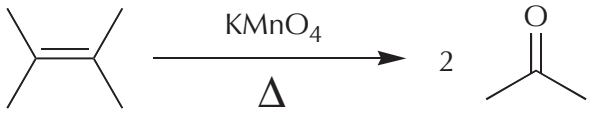
In this reaction each of the sp^2 carbons involved in the pi bond gets oxidized to its maximum possible oxidation state. Refer to notes set # 20 (*Oxidation and Reduction in Organic Chemistry*) to find out what these states are.

a) 

b) 

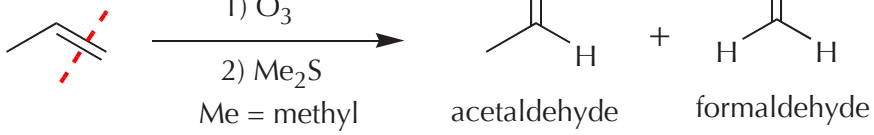
c) 

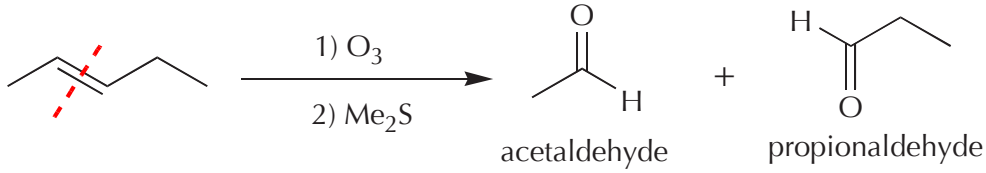
d) 

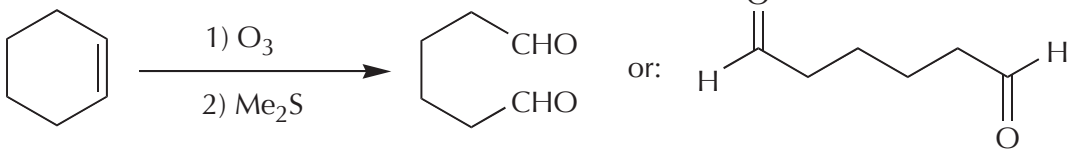
e) 

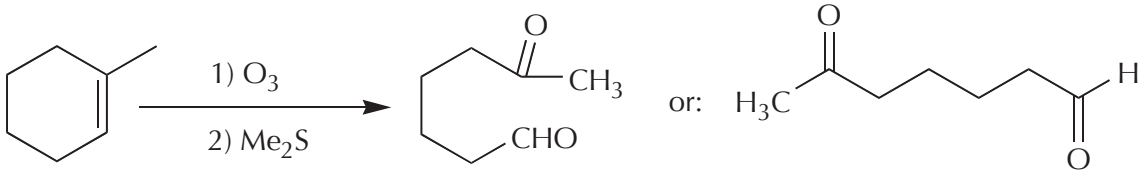
OXIDATIVE CLEAVAGE: Ozonolysis

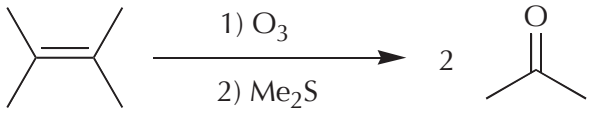
In this reaction each of the sp^2 carbons involved in the pi bond gets oxidized either to aldehyde or ketone, depending on whether it ends up at the end of a carbon chain or in the middle after the pi bond cleaves. If the oxidized carbon ends up at the end of a carbon chain it becomes an aldehyde, otherwise it becomes a ketone.

a) 

b) 

c) 

d) 

e) 

Recommended strong oxidation (oxidative cleavage) with $KMnO_4$ and with ozone: 8-7, 8-36, and 8-37, p. 362-363.

Recommended problems from the end of the chapter: 47 (all), 49 (a-f), 58 (all), 63.