

Assigned Chapter 4 Practice Problems (regardless the number of pages, upload combined pages a single pdf document).

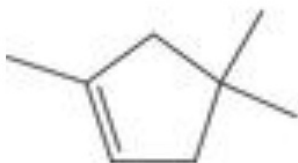
4.12a-d, 4.13a-d, 4.15a-h, 4.18a-h, 4.20a-f, 4.23a-d, 4.25, 4.28a-d, 4.32a-d, 4.36a-d

4.18 Write the IUPAC name for each compound:
(See [Examples 4.1](#), [4.5](#))

a.



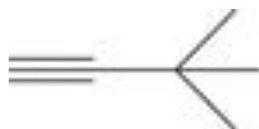
b.



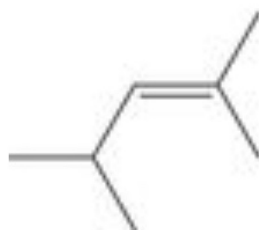
c.



d.



e.



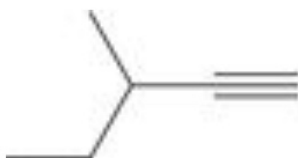
f.



g.



h.



8:20



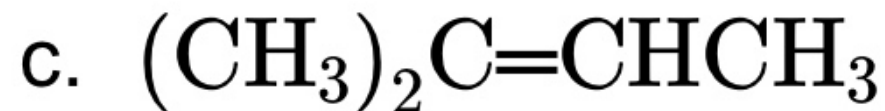
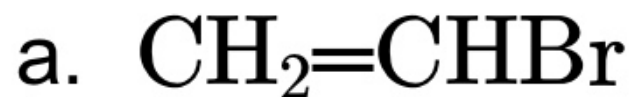
4.20 Explain why each name is incorrect, and then write a correct name for the intended compound: (**See [Examples 4.1](#), [4.5](#)**)

- a. 2-Ethyl-1-propene
- b. 5-Isopropylcyclohexene
- c. 4-Methyl-4-hexene
- d. 2-sec-Butyl-1-butene
- e. 6,6-Dimethylcyclohexene
- f. 2-Ethyl-2-hexene

8:20



4.23 Which alkenes can exist as pairs of E/Z isomers? For each alkene that does, draw both isomers. (See [Examples 4.3](#), [4.4](#))



8:21

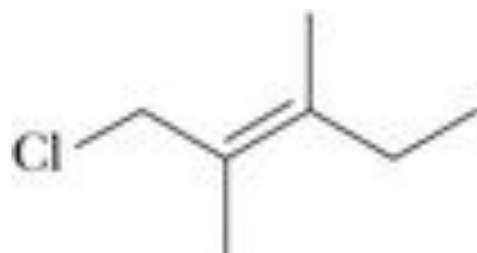


4.25 Name and draw structural formulas for all alkenes with the molecular formula C_5H_{10} . As you draw these alkenes, remember that *cis* and *trans* isomers are different compounds and must be counted separately.

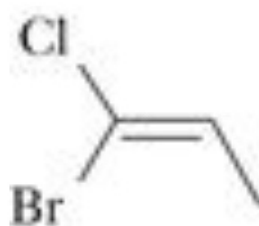


4.28 Name each alkene and specify its configuration using the E,Z system. (See [Examples 4.3](#), [4.4](#))

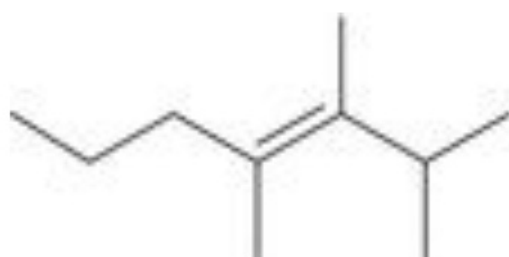
a.



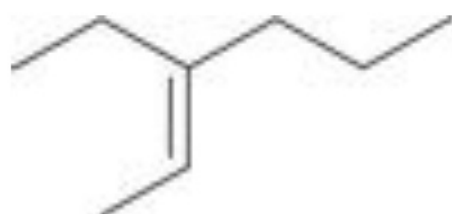
b.



c.



d.





4.32 Explain why each name is incorrect or incomplete, and then write a correct name: (**See [Examples 4.3](#), [4.4](#)**)

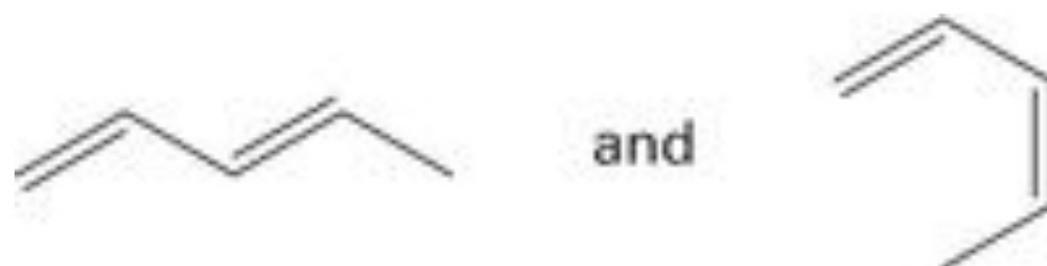
- (Z)-2-Methyl-1-pentene
- (E)-3,4-Diethyl-3-hexene
- trans*-2,3-Dimethyl-2-hexene
- (1Z,3Z)-2,3-Dimethyl-1,3-butadiene

4.33 Draw structural formulas for all compounds with the molecular formula C_5H_{10} that are

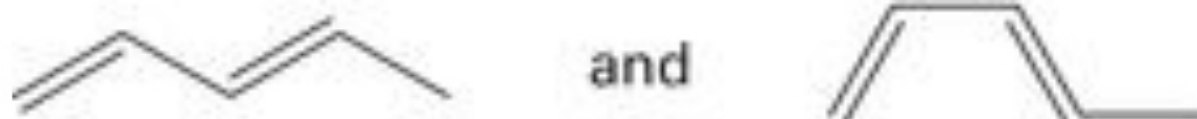
- Alkenes that do not show *cis-trans* isomerism.
- Alkenes that do show *cis-trans* isomerism.
- Cycloalkanes that do not show *cis-trans* isomerism.
- Cycloalkanes that do show *cis-trans* isomerism.

*4.34 β -Ocimene, a triene found in the fragrance of cotton blossoms and several essential oils, has the IUPAC name (3Z)-3,7-dimethyl-1,3,6-octatriene. Draw a structural formula for β -ocimene.

4.36 Determine whether the structures in each set represent the same molecule, *cis-trans* isomers, or constitutional isomers. If they are the same molecule, determine whether they are in the same or different conformations as a result of rotation about a carbon-carbon single bond. (See [Examples 4.6, 4.7](#))



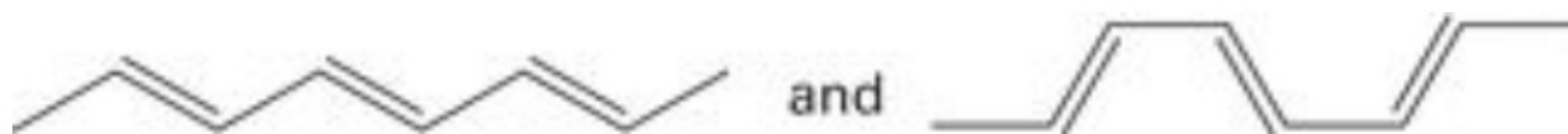
a.



b.



c.

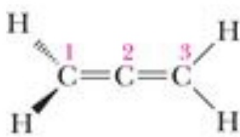


d.



4.13 For each highlighted carbon atom in [Problem 4.12](#), identify which orbitals are used to form each sigma bond and which are used to form each pi bond.

4.14 Following is the structure of 1,2-propadiene (allene). In it, the plane created by H–C–H of carbon 1 is perpendicular to that created by H–C–H of carbon 3.



1,2-Propadiene
(Allene)



Ball-and-stick model

- State the orbital hybridization of each carbon in allene.
- Account for the molecular geometry of allene in terms of the orbital overlap model. Specifically, explain why all four hydrogen atoms are not in the same plane.

[SECTION 4.2](#) Nomenclature of Alkenes and Alkynes

4.15 Draw a structural formula for each compound: (See [Examples 4.1](#), [4.5](#))

- trans*-2-Methyl-3-hexene
- 2-Methyl-3-hexyne
- 2-Methyl-1-butene
- 3-Ethyl-3-methyl-1-pentyne
- 2,3-Dimethyl-2-butene

