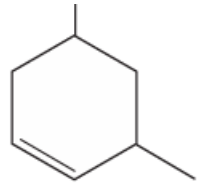
Problems CH-3

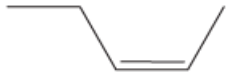
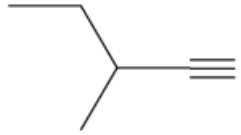
(1) For the following compounds, write structural formulas and IUPAC names for all possible isomers having the indicated number of multiple bonds:

a. C_5H_{10} (one double bond) b. C_5H_8 (two double bonds) c. C_4H_6 (one triple bond)

(2) Name the following compounds by the IUPAC system:

a. $CH_3CH{=}C(CH_2CH_2CH_3)_2$ **b.** $(CH_3)_2CHCH{=}CHCH_3$ **c.** 

d. $CH_3C{\equiv}CCH(Cl)CH_2CH_3$ **e.** $CH_3{-}C{\equiv}C{-}CH_2{-}CH{=}CHCH_3$ **f.** $CH_2{=}CH{-}C(Br){=}CH_2$

g. $CH_3{-}C{\equiv}C{-}CH{=}CH_2$ **h.**  **i.** 

(3) Write a structural formula for each of the following compounds:

a. 1-bromo-3-heptane b. 3-methylcyclopentene c. vinyl bromide d. vinylcyclohexane

e. 1,3-difluoro-2-butane f. 4,5-dimethyl-2-heptyne g. 3-ethyl-1,4-cyclohexadiene h. allyl chloride

(4) Explain why the following names are incorrect and give a correct name in each case:

a. 5-octyne b. 3-pentene c. 3-buten-1-yne d. 1-methyl-2-pentene

e. 2-methylcyclopentene f. 3-pentyne-1-ene g. 3-ethyl-1,3-butadiene

(5) Which of the following compounds can exist as *cis–trans* isomers? If such isomerism is possible, draw the structures in a way that clearly illustrates the geometry.

a. 3-octane b. 3-chloropropene c. 4-methylcyclohexene d. 1,3,5,7-octatetraene

(6) Write an equation for the reaction of CH_2= $CHCH_2CH_2CH_3$ with each of the following reagents:

a. hydrogen chloride b. bromine c. hydrogen (Pt catalyst) d. H_2O, H^+

e. ozone, followed by Zn, H^+ f. $KMnO_4$, OH^- g. BH_3 followed by H_2O_2, OH^-

(7) Write equations for the following reactions:

a. 2-octyne + H_2 (1 mole, Lindlar's catalyst) b. 3-hexyne + Br_2 (2 moles) c. 1-butyne + H_2O (H^+, Hg^{2+} catalyst)

(8) Give the structural formulas of the alkenes that, on ozonolysis, give:

a. $(CH_3)_2C$=O and CH_2=O b. CH_3CH=O and CH_3CH_2CH=O

(9) Starting with ethyne, outline syntheses of each of the following. You may use any other needed reagents:

a. Propyne b. 1-Butyne c. 2-Butyne d. 2-Hexyne