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Chapter 4

1. Give the IUPAC name for each compound.

![Chemical structure](image)

a.

b. \((\text{CH}_2\text{CH}_2)_3\text{CCH(CH}_3\text{)}\text{CH}_2\text{CH}_2\text{CH}_3\)

![Chemical structure](image)

c.
2. Rank the group of alkenes in order of increasing boiling point. Explain your choice of order.
   a. CH$_3$CH$_2$CH$_2$CH(CH$_3$)$_2$, CH$_3$(CH$_2$)$_4$CH$_3$, (CH$_3$)$_2$CHCH(CH$_3$)$_2$

3. Consider rotation around the carbon-carbon bond in 1,2-dichloroethane (ClCH$_2$CH$_2$Cl).
   a. Using Newman projections, draw all of the staggered and eclipsed conformations that result from rotation around this bond.
   b. Graph energy versus dihedral angle for rotation around this bond.
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4. For each compound drawn below:

   ![Chemical Structures]

   a. Draw the two possible chair conformations for the cis isomer. Which conformation, if either is more stable?
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b. Draw the two possible chair conformations for the trans isomer. Which conformation, if either, is more stable?

c. Which isomer, cis or trans, is more stable and why?
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5. Classify each pair of compounds as constitutional isomers, stereoisomers, identical isomers, or not isomers of each other.

a. 

b. 

c.
6. Classify each pair of compounds as constitutional isomers or identical molecules.

a.  

b.  

and

and

and

and

and

and
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Chapter 5

1. Give the IUPAC name for each compound, including the R,S designation for each stereogenic center.
   a. 
   ![Image]
   b. 
   ![Image]

2. Locate the stereogenic centers.

![Image] amoxicillin (an antibiotic)
3. How are the compounds in each pair related to each other? Are they identical, enantiomers, diastereomers, constitutional isomers, or not isomers of each other?

| ![Compound 1](image1) and ![Compound 2](image2) | ![Compound 3](image3) and ![Compound 4](image4) | ![Compound 5](image5) and ![Compound 6](image6) |