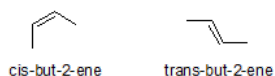


## 8.10: ADDITIONAL EXERCISES

### PHYSICAL PROPERTIES OF ALKENES

**8-1** Explain why *cis*-2-butene is less stable than *trans*-2-butene.

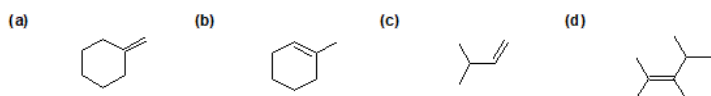


**8-2** Order the following alkenes in increasing order of stability.

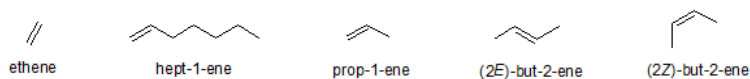


**8-3** Why do more substituted alkenes experience more stability compared to less substituted alkenes?

**8-4** Identify whether the following alkenes are mono-, di-, tri-, or tetra-substituted.



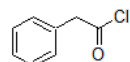
**8-5** Place the following alkenes in order of increasing boiling points.



### ELEMENTS OF UNSATURATION AND THE ORBITAL DESCRIPTION OF ALKENES

**8-6** Using the following equation, calculate the degrees of unsaturation for the following compounds.

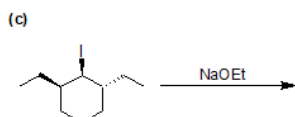
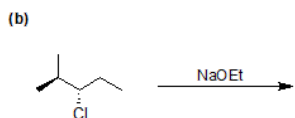
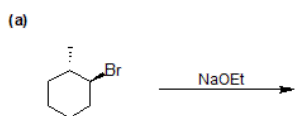
$$\text{Degrees of Unsaturation} = \frac{2C + 2 + N - H - X}{2}$$



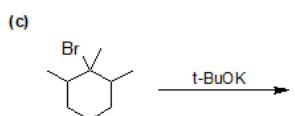
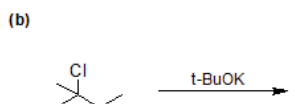
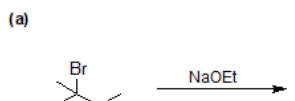
**8-7** How many of each type of bonds (sigma/pi) make up a double bond?

### ALKENE SYNTHESIS BY ELIMINATION OF ALKYL HALIDES

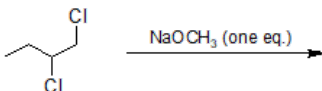
**8-8** Identify the major product(s) of the following reactions. Include stereochemistry.



8-9 Identify the major products of the following reactions.



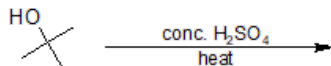
8-10 Give the product of the following reaction.



8-11 What is the IUPAC name of the product formed by the reaction in the previous problem (8-10)?

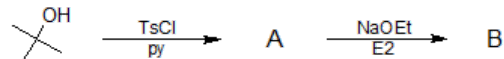
## ALKENE SYNTHESIS BY DEHYDRATION OF ALCOHOLS

8-12 Identify the product of the following reaction.

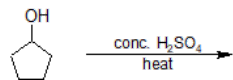


8-13 Draw the mechanism for the reaction in previous problem (8-12).

8-14 Draw the intermediate compounds for the following reaction.



8-15 Identify the product of the following reaction.



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