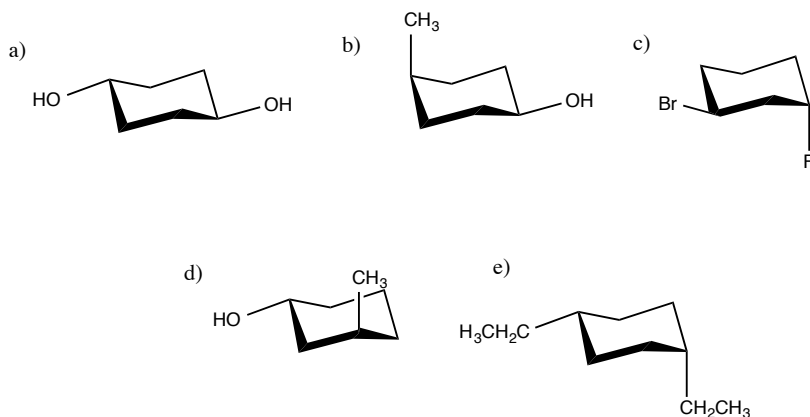


Cycloalkanes and Conformations

1. Which of the following compounds has the **same** energy after undergoing a chair flip?

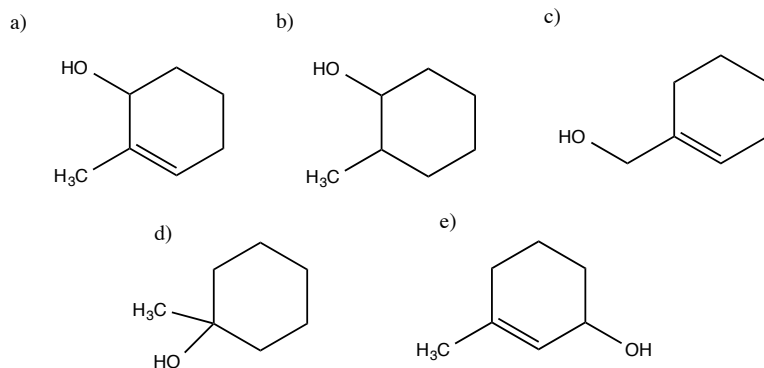


2. The molecules shown are:

- a) Identical
- b) Enantiomers
- c) Diastereomers
- d) The same *meso* compound.
- e) Not identical and not isomers.

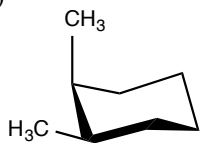


3. Treating 1-methylcyclohexene with $\text{H}_2\text{O} / \text{H}_2\text{SO}_4$ will yield which compound, shown below, as the major product?



4. Which of the following dimethylcyclohexane stereoisomers has enantiomeric conformers?

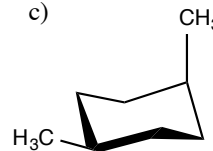
a)



b)



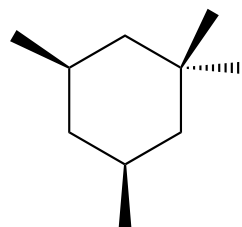
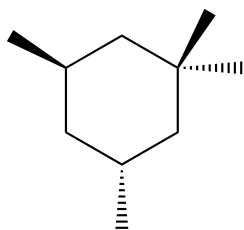
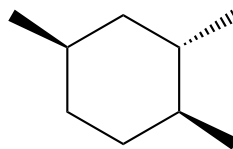
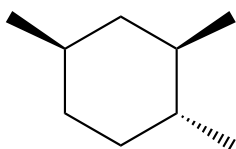
c)



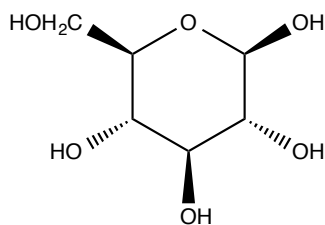
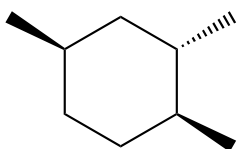
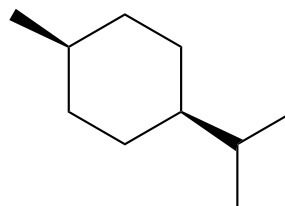
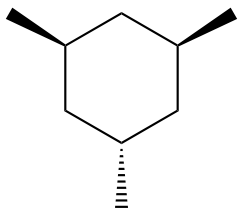
d) Answers a and b.

e) All of the stereoisomers have enantiomeric conformers.

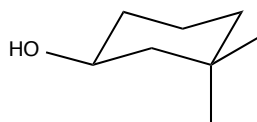
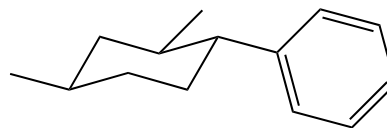
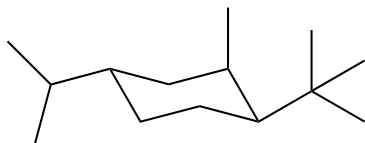
5. In each horizontal pair of compounds circle the most stable stereoisomer.



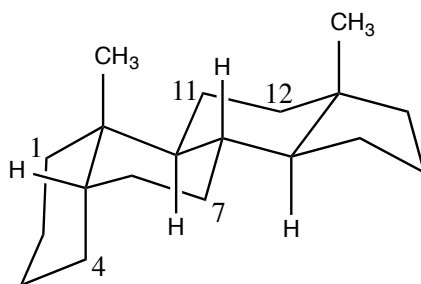
6. For each of the compounds shown below draw the most stable chair conformation.



7. For each of the following chair conformations draw the ring structure.



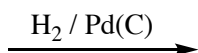
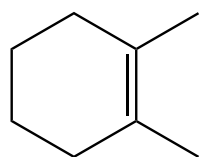
8. Below is shown the carbon skeleton of a steroid with its numbering system. In each case specify if the substituent is either **axial** or **equatorial**.



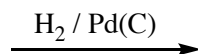
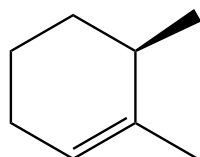
- | | |
|---|-------|
| a) A hydroxyl group at C-1 <i>cis</i> to the methyl groups. | _____ |
| b) A chlorine substituent at C-4 <i>cis</i> to the methyl groups. | _____ |
| c) A bromine substituent at C-7 <i>trans</i> to the methyl groups. | _____ |
| d) An -NO ₂ substituent at C-11 <i>trans</i> to the methyl groups. | _____ |
| e) An ethyl substituent at C-12 <i>cis</i> to the methyl groups. | _____ |

9. For each of the following syntheses draw the structure of the product(s) expected, showing all stereochemistry. If the product is a mixture of enantiomers draw one enantiomer and write + *enantiomer*. If the product is a mixture of diastereomers in approximately the same amounts draw them all.

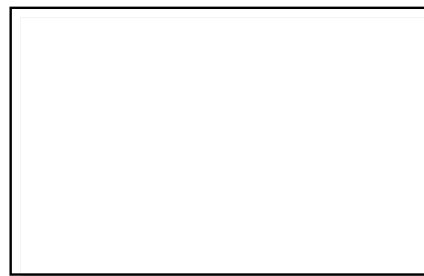
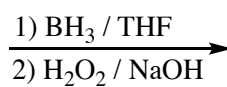
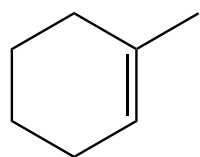
a)



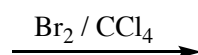
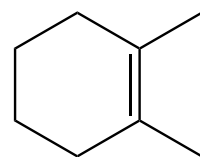
b)



c)



d)



continue...

