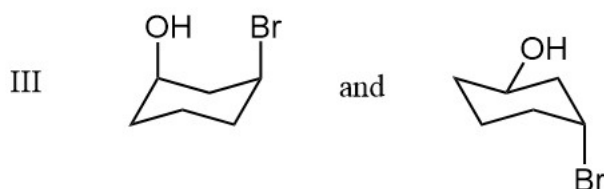
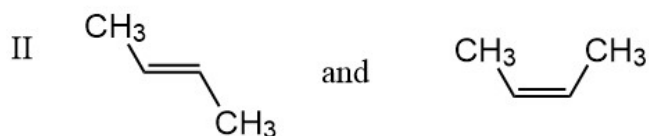
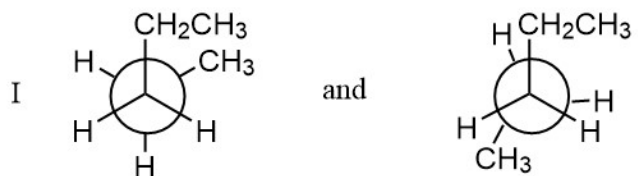




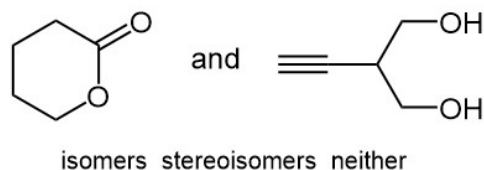
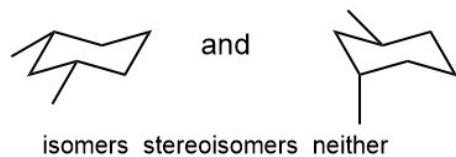
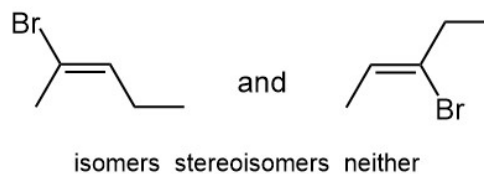
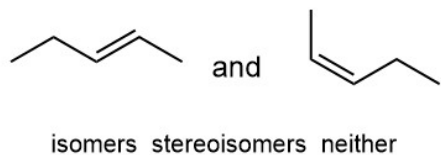
1

Which of the following pairs are examples of **conformers**?



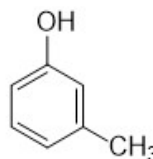
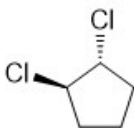
2

Group Work: categorize each pair of compounds (circle one: isomers, stereoisomers or neither).



3

Determine whether each of the given compounds is chiral or achiral.



All **chiral** objects have non-superimposable mirror images. (e.g., a student desk)

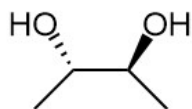
Every chiral molecule has an _____

All **achiral** objects are exactly the same as their mirror images. (e.g., a chair without arms)

An achiral molecule does / does not have an enantiomer.

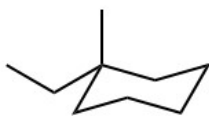
4

Determine whether each molecule is *chiral* or *achiral*, and determine whether or not it has an enantiomer. Consider redrawing chairs as hexagons.



Chiral? _____

Has an _____
enantiomer?



Chiral? _____

Has an _____
enantiomer?

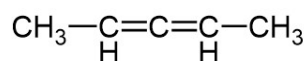


Chiral? _____

Has an _____
enantiomer?

5

Use drawings to explain why the following compound is chiral.
(hint: draw a 3D sketch and look for planes of symmetry) (Klein 5.9)



<https://www.chemtube3d.com/orbitalsallene/>

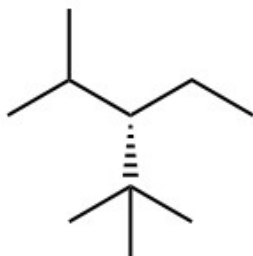
6

Give a complete name for the given compound (include stereochemistry).



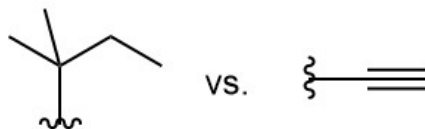
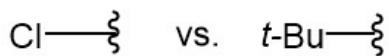
Draw the enantiomer of this molecule:

7



Group activity: which substituent would have the higher priority?

8



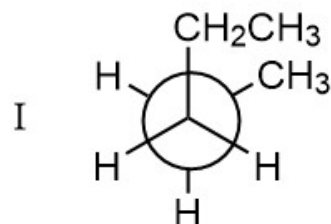
9

Provide a drawing for the following name:

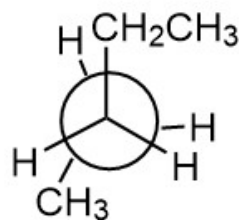
(3*S*, 4*R*)-1,3,4-trichloro-2-(chloromethyl)heptane

1

Which of the following pairs are examples of **conformers**?



and



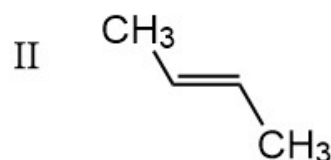
A) I only

B) III only

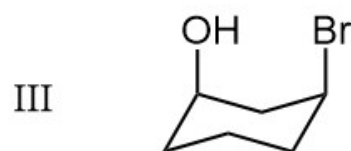
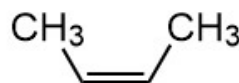
C) I and II only

D) I and III only

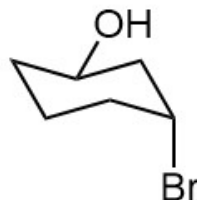
E) I, II and III



and



and



3

Determine whether each of the given compounds is chiral or achiral.



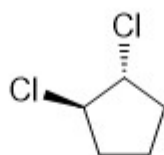
A) chiral

B) chiral

C) achiral

D) achiral

E) achiral



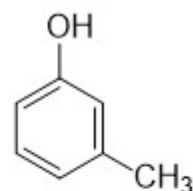
achiral

chiral

achiral

chiral

achiral



chiral

achiral

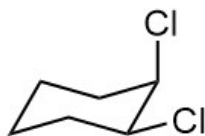
chiral

achiral

achiral

4

Is the following molecule chiral? Does it have an enantiomer?



- A) It is chiral and it does have an enantiomer.
- B) It is NOT chiral but it does have an enantiomer.
- C) It is chiral but it does NOT have an enantiomer.
- D) It is NOT chiral and it does NOT have an enantiomer.

II. *R/S* Nomenclature of Chiral Centers (5.3, Cahn-Ingold-Prelog Rules)

5-2

The stereochemistry of each chirality center (tetrahedral carbon with four different groups attached) is designated as either *R* or *S* configuration.

- Assign priorities to the four groups: #1 has highest atomic number, #4 has lowest atomic number
 - if there is a tie, move away one atom at a time until you find a difference
 - a double bond can be treated as two single bonds
- With the lowest priority group (#4) pointing **away** from you, move from #1 → #2 → #3
- if rotation is **clockwise**, then (*R*) (Latin rectus/right-handed)
if rotation is **counterclockwise**, then (*S*) (Latin sinister/left)

6

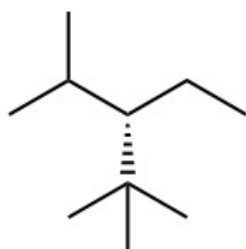
Which is the correct IUPAC name for the given compound?



- A) (*S*)-1-chloro-1-methylpropane
- B) (*R*)-1-chloro-1-methylpropane
- C) (*S*)-2-chlorobutane
- D) (*R*)-2-chlorobutane

7

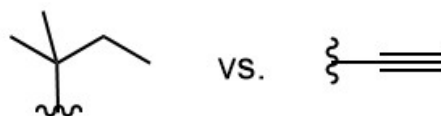
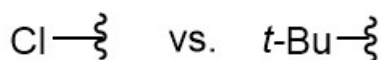
Which is the correct IUPAC name for the given compound?


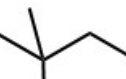


- A) 3-ethyl-2,2,4-trimethylpentane A) (*S*)
B) 3-ethyl-2,4,4-trimethylpentane B) (*R*)
C) 2-methyl-3-(trimethylmethyl)pentane C) neither
D) 2-methyl-3-(1,1-dimethylethyl)pentane

8

For each pair, which substituent would have the higher priority?



- A) higher priority groups are: $\text{Cl}-\xi$ and 
- B) higher priority groups are: $t\text{-Bu}-\xi$ and 
- C) higher priority groups are: $\text{Cl}-\xi$ and $\xi-\equiv$
- D) higher priority groups are: $t\text{-Bu}-\xi$ and $\xi-\equiv$

Provide a drawing for the following name:

(3*S*,4*R*)-1,3,4-trichloro-2-(chloromethyl)heptane

