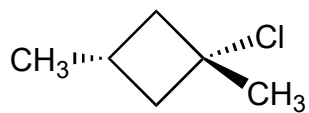
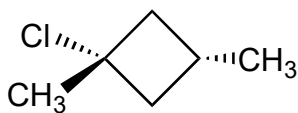


3A) (6 pts) What is the relationship of the following pairs of compounds?

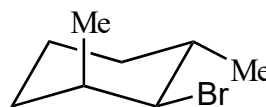
- 1 and 2 \_\_\_\_\_ A) constitutional (structural) isomers B) enantiomers C) diastereomers  
3 and 4 \_\_\_\_\_ D) the same compound E) unrelated



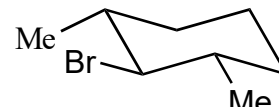
1



2

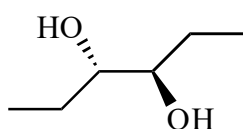


3



4

3B) (5 pts) For the given compound, indicate whether or not it is chiral, whether or not it has an enantiomer, and whether or not it is optically active (will it rotate plane-polarized light?).

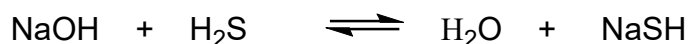


is it chiral? \_\_\_\_\_

has an enantiomer? \_\_\_\_\_

optically active? \_\_\_\_\_

3C) (6 pts) For the given proton transfer reaction, indicate which direction (**forward**, **reverse** or **neither**) is favored and **briefly explain** why. Also, indicate whether  $K_{eq} > 1$ ,  $K_{eq} = 1$ , or  $K_{eq} < 1$ .

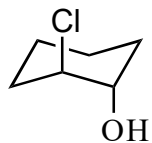


Equil. direction?

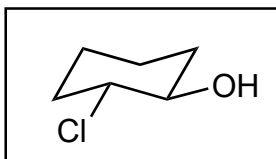
$K_{eq}$   1

Explain equilibrium direction:

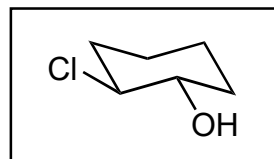
3D) (6 points) Identify which drawing (A, B or C) represents X, the other chair conformation of the given compound. Which direction (**forward**, **reverse** or **neither**) of equilibrium is favored? **Briefly explain** why.



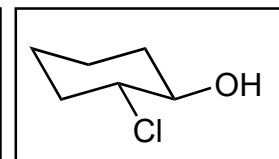
**X**  
(the other chair  
conformation)



A



B



C

chair flip? X =

equil. direction?

Explain equilibrium direction: