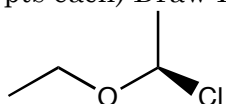
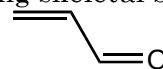


1. (8 pts each) Draw Lewis structures for the following skeletal structures

a.



b.



1. _____

2. _____

3. _____

4. _____

2. (8 pts each) Draw Lewis structures for the following condensed structures.

a. $\text{CH}_3\text{C(S)H}$

b. $\text{CH}_3\text{CH}_2\text{N(CH}_3)_2$

5. _____

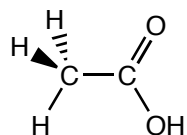
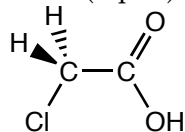
6. _____

7. _____

8. _____

9. _____

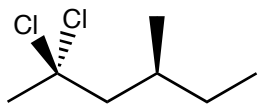
2. a. (8 pts.) Explain why chloroacetic acid is a stronger acid than acetic acid.



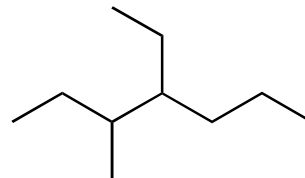
b. (8 pts.) Explain why CH_3SH is a better acid than CH_3OH .

3. (12 pts.) Provide IUPAC names for the following molecules.

a.

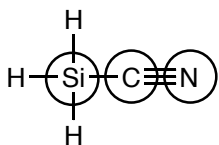


b.



4. (2 pts each) Determine the hybridization of the atoms that have been circled on the molecules drawn below. (Kekulé structures are provided)

a.



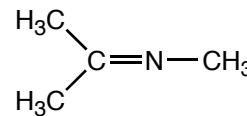
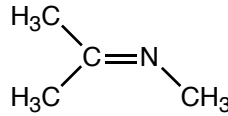
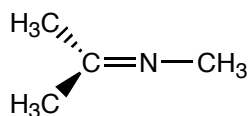
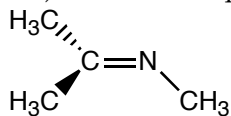
Si _____ C _____ N _____

b.



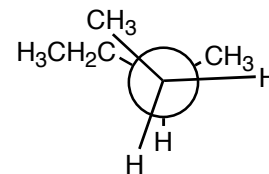
S _____ C _____ N _____

5. (12 pts.) Which structure drawn below is the best three-dimensional representation of $(\text{CH}_3)_2\text{CNCH}_3$? Explain your choice.



6. A high-energy conformation of 3-methylpentane is drawn to the right.

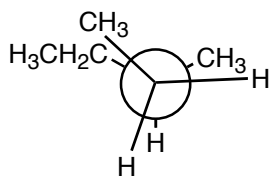
a. (8 pts.) Explain why this conformation is a high-energy conformation.



b. (6 pts) Is this the highest energy conformation of 3-methylpentane?

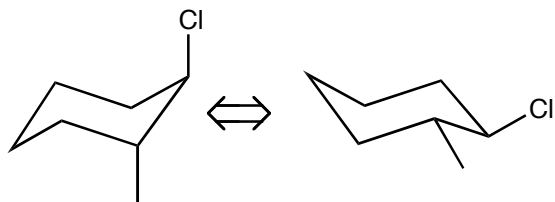
Explain.

7. (6 pts.) A high-energy conformation of 3-methylpentane is drawn to the right. Draw a Newman projection down the C₂-C₃ of the lowest energy conformation.

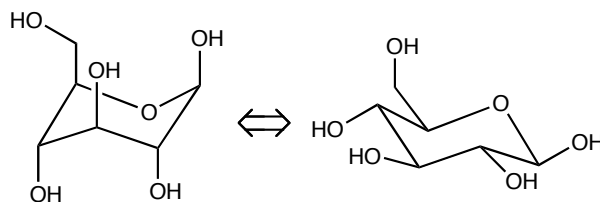


8. a. (6 pts.) Which of the following ring-flips are possible?
 b. (6 pts.) For diagrams that show possible ring flips, indicate which structure is the lower energy structure.

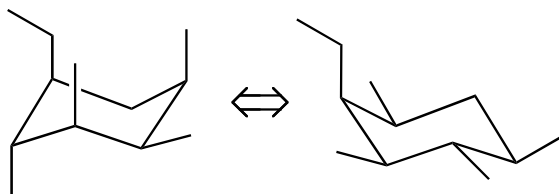
i.



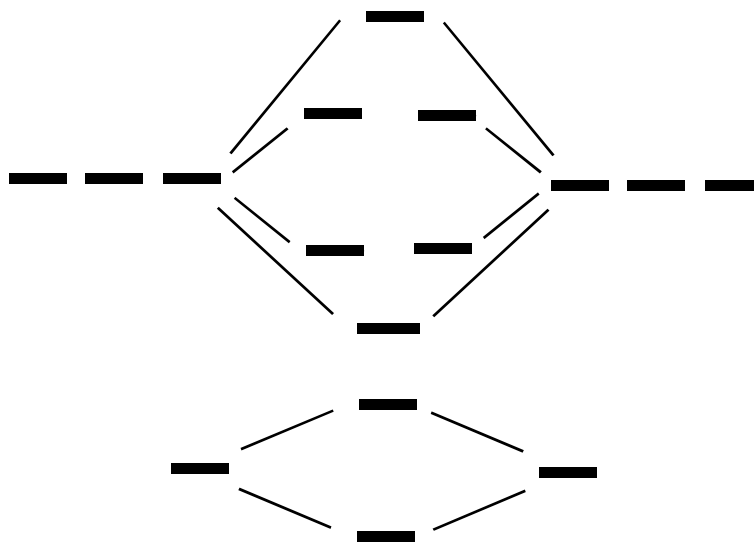
ii.



iii.



9. a. (8 pts.) Complete the MO diagram for Br₂ by labeling the atomic orbitals, the molecular orbitals, and adding electrons to the appropriate orbitals.



- b. (6 pts.) Determine the bond order of the neutral molecule and the bond order for Br₂⁺ (assume that the e⁻ with the highest energy is lost).