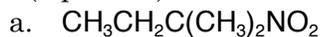


1. (6 pts. ea.) Draw Lewis structures for the following condensed structures



1. _____

2. _____

3. _____

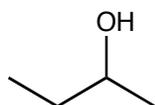
4. _____

2. a. (6 pts. ea.) Draw condensed structures for the following skeletal structures. In other words, add C's, CH's, CH_2 , and CH_3 's to the skeletal structures as necessary.

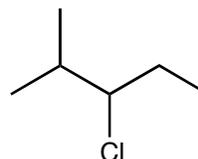
5. _____

b. (6 pts. ea.) Provide IUPAC names for the following molecules.

a.



b.



7. _____

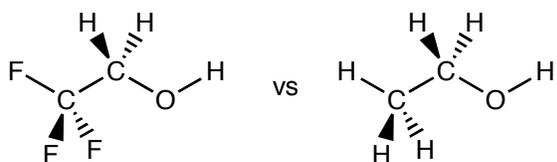
8. _____

9. _____

3. For each molecule, (a. 4 pts.) circle the acidic proton, (b. 4 pts.) for each pair of molecules identify the stronger acid, and (c. 4 pts.) for **one** pair of molecules explain your choice.

10. _____

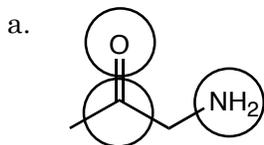
i.



ii.



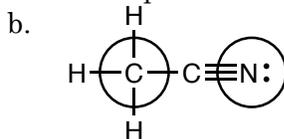
4. (2 pts. each) Determine the hybridization of the circled atoms on the molecules drawn below. Skeletal and Lewis structures have been provided.



C _____

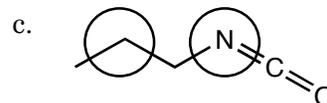
O _____

N _____



C _____

N _____



C _____

N _____

5. An empty MO diagram for Cl_2 is provided below.

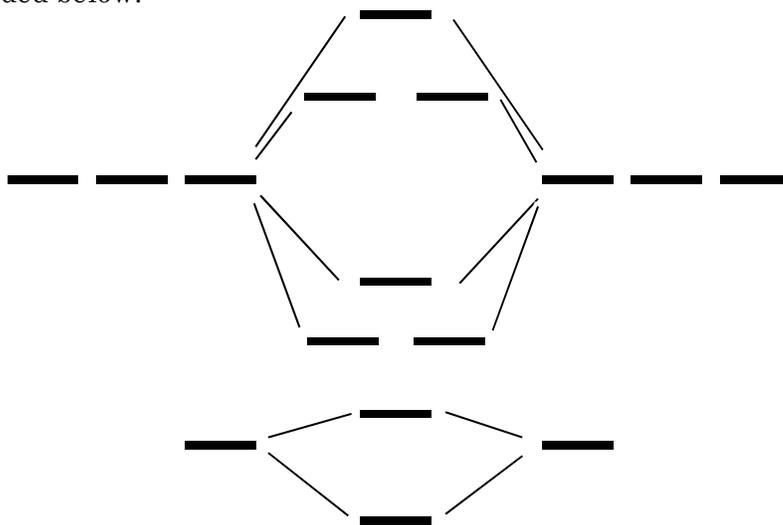
a. (2 pts) Label the atomic orbitals.

b. (2 pts) Label the molecular orbitals.

c. (2 pts.) Populate the atomic orbitals with the appropriate number of electrons.

d. (2 pts.) Populate the molecular orbitals with the appropriate number of electrons.

e. (2 pts.) Determine the bond order for Cl_2 .

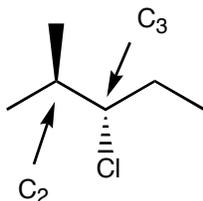


f. (4 pts.) When UV light is shined on Cl_2 an electron is excited to a higher energy orbital and the Cl to Cl bond is broken. Explain this using the ideas of MO Theory

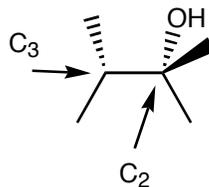
6. a. (6 pts. each) Draw a Newman projection down the indicated bonds for the following molecules.

b. (2 pts.) On the projections that you have drawn, indicate whether any gauche interactions are occurring.

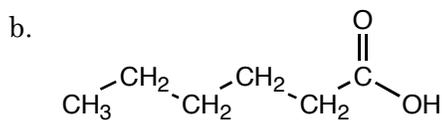
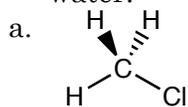
i. down the C_2 to C_3 bond



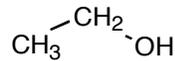
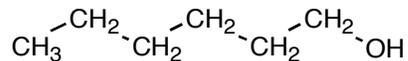
ii. down the C_2 to C_3 bond



7. (12 pts.) List the intermolecular forces would be used when the following molecules interact with water.



8. (10 pts.) Which of the following molecules would be more likely to dissolve in water? Explain.



9. (10 pts.) A carbon to carbon double bond is formed using a σ bond and a π bond. Which bond is stronger, the σ or the π bond? Consider the orbitals that are used to form σ and π bonds and explain your response.

10. a. (6 pts.) For each of the following pairs of “ring flipped” cyclohexanes, circle the lower energy form.

b. (2 pts.) The molecules in a least one pair of cyclohexanes drawn below cannot actually be interconverted by a ring flip. Draw an X through the arrow of any such pair.

