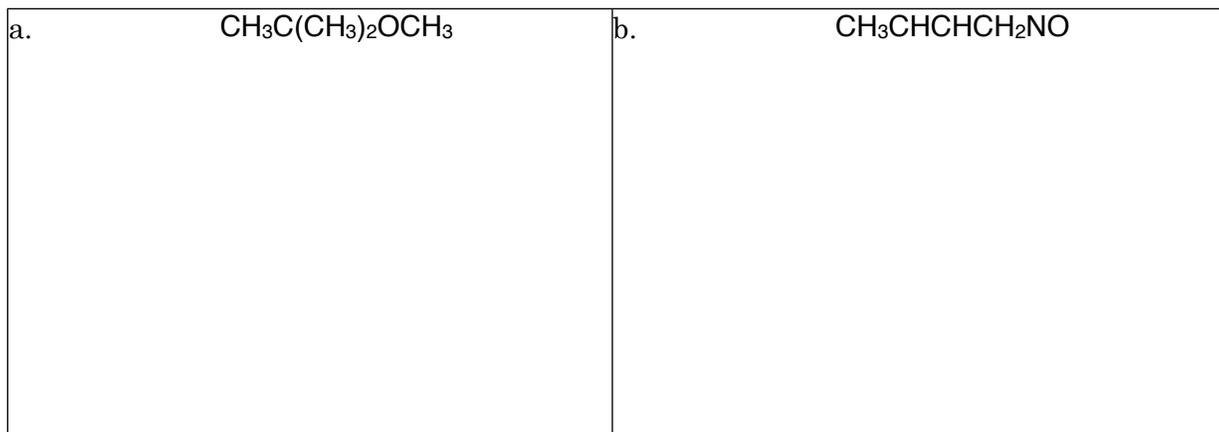


1. (8 pts.) Draw Lewis structures for the following structural formulas.



1. _____

2. _____

3. _____

4. _____

5. _____

2. a. (4 pts. ea.) Convert the following skeletal structures to condensed structures; that is, add CH, CH₂, CH₃, or C as appropriate.

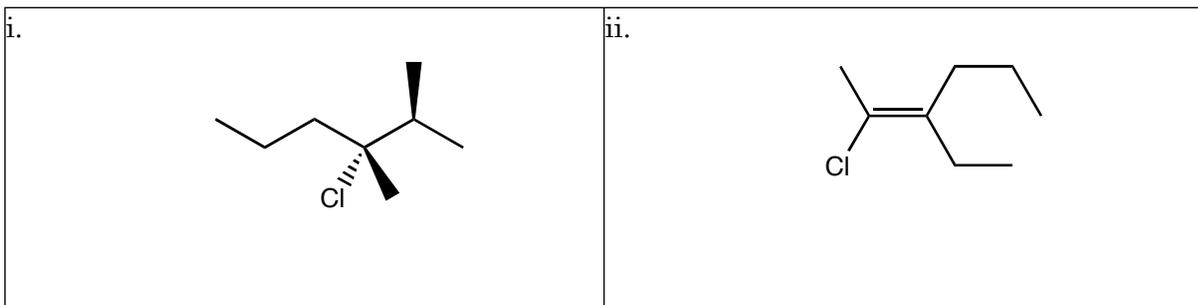
6. _____

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

7. _____

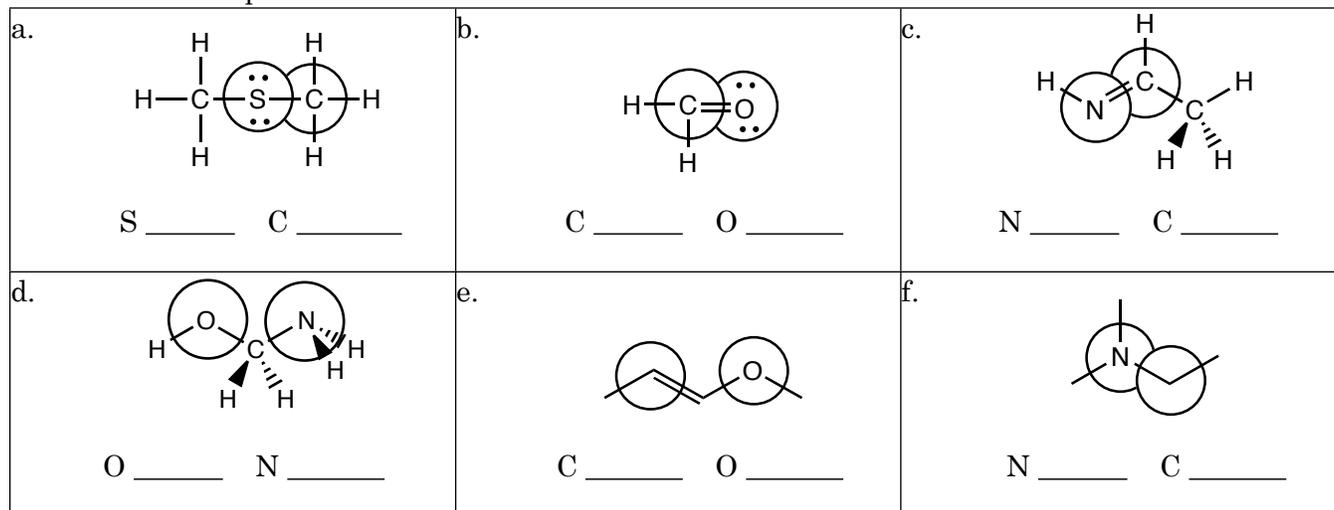
c. (6 pts.) Indicate whether the *Z/E* nomenclature is needed and indicate whether the *Z* or *E* isomer is drawn.

8. _____

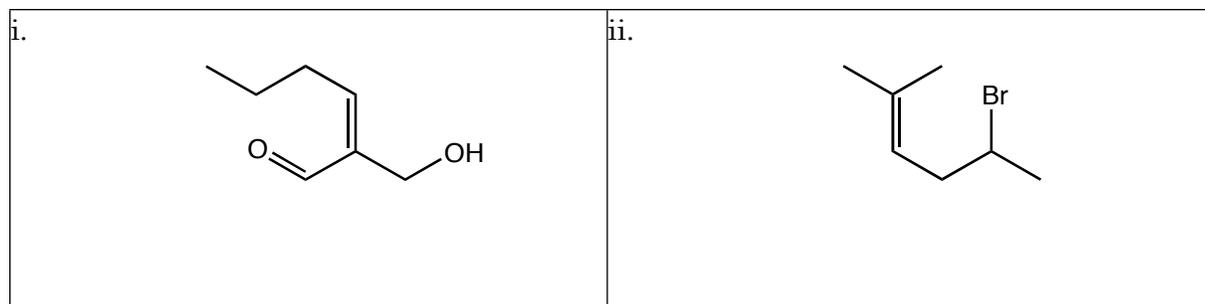


9. _____

3. (12 pts.) Determine the hybridization of the circled atoms. Lewis, Kekulé, and skeletal structures are provided.

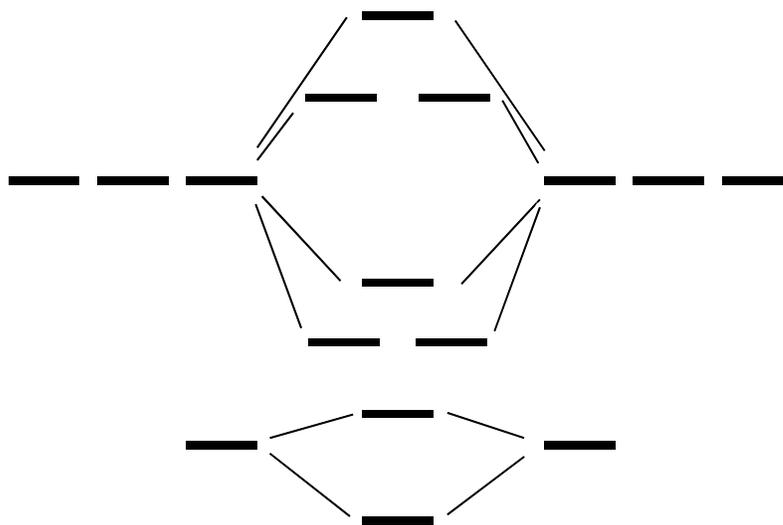


4. a. (3 pts. ea.) Indicate whether the following molecules require the *Z/E* nomenclature and
 b. (3 pts. ea.) if needed label the molecules as *Z* or *E*.



5. An incomplete MO diagram for N_2 is drawn below. Complete the diagram.

- 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 N_2 .



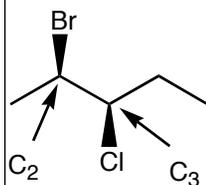
- f. (4 pts.) What happens to the strength of the N to N bond if the N_2 molecule is ionized to N_2^+ . Explain your response.

6. (10 pts.) Describe the bonding in ethylene. That is, using our hybridization model, describe the orbitals that are used to form the two bonds that form the double bond between the carbon atoms of ethylene.

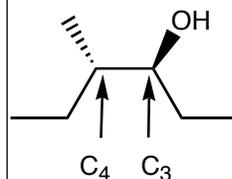
7. (10 pts.) Sulfur is less electronegative than oxygen and chlorine is less electronegative than fluorine. Explain this trend, the trend that as one goes down the periodic table, the electronegativity of the atoms decreases.

8. (12 pts.) Draw Newman projections along the indicated bonds for the following molecules.

a. Draw a Newman projection along the C₂ to C₃ bond.



b. Draw a Newman projection along the C₃ to C₄ bond.



9. (10 pts.) H₂O is a weaker acid than HF. Explain this observation.