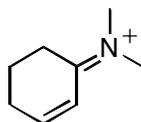


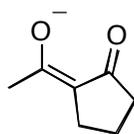
Problem Set #2

Due: February 17, 4:00 pm

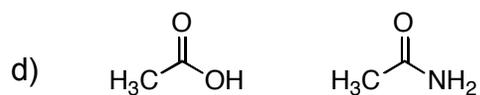
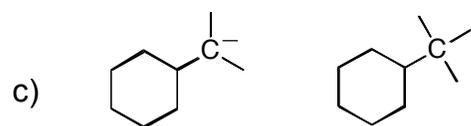
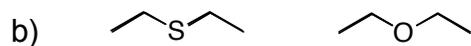
1. Circle all the electrophilic carbon atoms in the following structure. Explain your answer with resonance contributors.



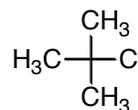
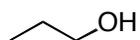
2. Draw in all lone pairs. Circle all the nucleophilic atoms in the following structure. Explain your answer with resonance contributors.



3. Circle the molecule that is more basic and provide an explanation for your choice.

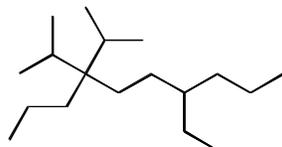


4. Circle each molecule that can function as a Lewis acid. Draw a box around each molecule that can function as a Lewis base.

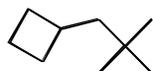


5. Name the following alkanes.

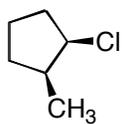
a)



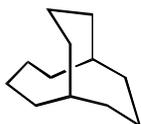
b)



c)



d)



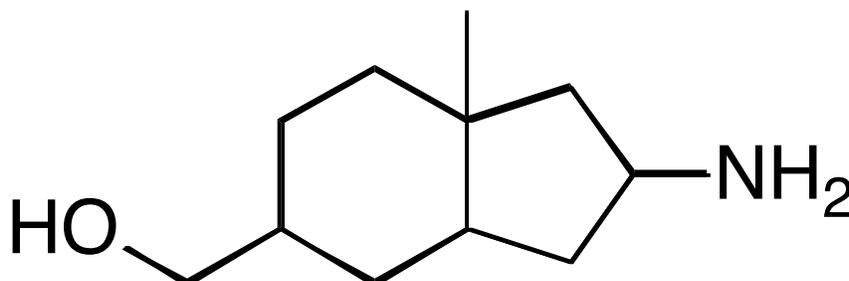
6. Provide structures for the following molecules.

a) *trans*-iodo-4-*sec*-butylcyclooctane

b) 6-*tert*-butyl-4,5-diethyl-3,3-dimethyloctane

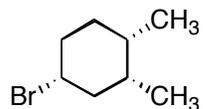
c) The name in b) is actually incorrect. What is proper name of the molecule you drew?

7. Label each carbon atom, nitrogen atom, and hydroxyl group as 1°, 2°, 3°, or 4°. Label each 1°, 2°, 3° carbon atom as methyl (Y), methylene (E), or methine (I).

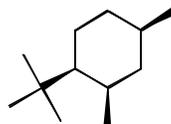


8. Draw 2-methylpentane.
- a) Draw Newman projections for the six energy maxima and minima for rotation around the C2-C3 bond.
 - b) Calculate the energy at each conformation. (Assume the same energies for -Et as you would for -Me.)
 - c) Use these values to make a graph of potential energy versus dihedral angle.
 - d) Label the most stable conformation.
 - e) Label the least stable conformation?
 - f) What is the barrier to rotation around the C2-C3 bond?

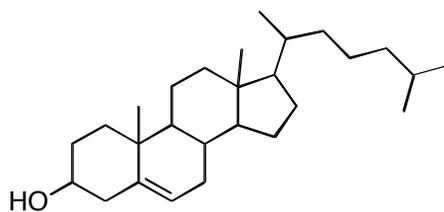
9. Draw the chair conformation and the ring-flipped chair conformation for the following molecule. Draw Newman projections of each conformer, viewing along the C_1-C_6 and C_3-C_4 axes. Which conformation is more stable? Why?



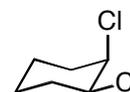
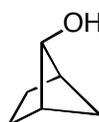
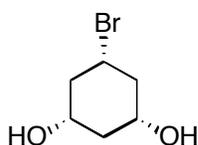
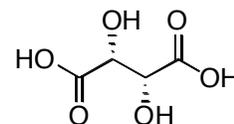
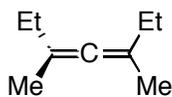
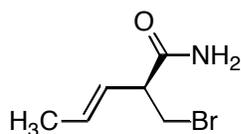
10. Indicate the gauche interactions that each methyl group experiences with the cyclohexane ring by drawing Newman projections.



11. Place an asterisk next to each stereogenic center in cholesterol.



12. Label each molecule as chiral, achiral, or achiral/meso. Label each stereocenter as R or S.



13. Indicate if the pair of molecules are enantiomers, diastereomers, or the same molecule.

