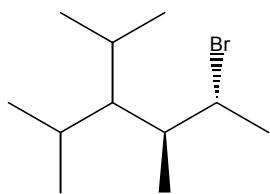




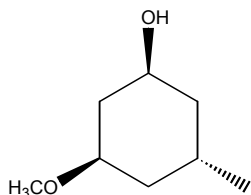
1f. What forces affect the stability of cycloalkanes? Provide examples, drawings and an explanation. (10 points)

2. Name or provide structures for the following molecules (4 @ 5 pts = 20 points)

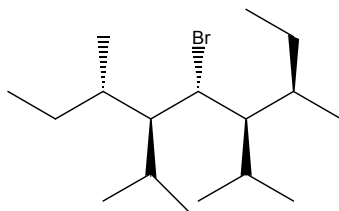
2a.



2b.



2c.



2d. [2S,3R,4S,5R] 2-bromo-4-t-butyl-5-chloro-3,6-diethyloctane

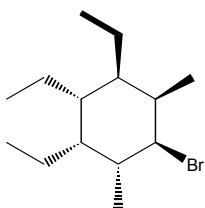
3. Consider the following questions: (2 @ 12 pts = 24 points)

3a. [1R,3S] 1,3-dimethyl-5-isopropylcyclohexane:

3a1. Draw the two most stable conformations (4 points).

3a2. Explain which of the above two conformers is most stable and why? (5 points)

3a3. Is the molecule chiral or achiral? Explain. (3 points)



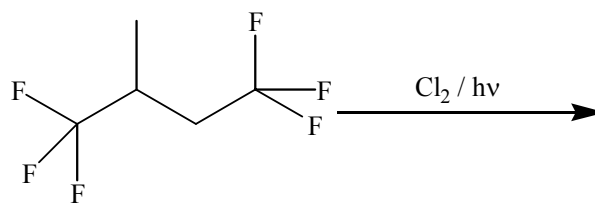
3b.

3b1. Draw the two most stable conformations (4 points).

3b2. Explain which of the above two conformers is most stable and why? (5 points)

3b3. Is the molecule chiral or achiral? Explain. (3 points)

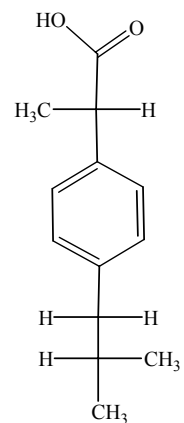
4. Consider the following reaction: (36 points)



- 4a. Provided that the specific optical rotation for pure (2S)-1,1,1,4,4,4-hexafluoro-2-methylbutane is  $- 92^\circ$ , what is the optical purity of the starting material? What does optical purity mean? (6 points)
- 4b. What is(are) the configuration(s) of the starting material(s) If there is more than one starting material, what percentage of each exists? Show your work. (10 points)
- 4c. What is(are) the major product(s) for this reaction? (8 points)
- 4d. What is the enantiomeric excess for each product? Explain. (12 points)

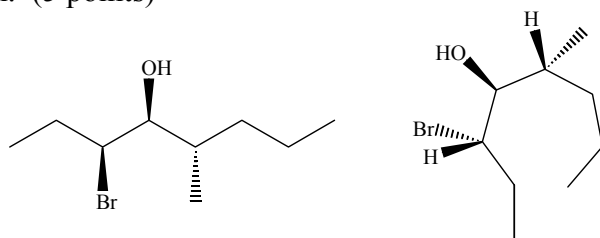
5. Consider the following molecules or sets of molecules: (20 Points)

5a1. Given the Fischer projection of ibuprofen, which enantiomer is depicted. (2 points)



5a2. Redraw the same configurational isomer using bond-line drawings. (3 points)

5b. Given the following two molecules, describe the isomeric relationship that exists between them. Explain. (5 points)



5c. Draw all stereoisomers for 2,5-dicyano-3,4-dimethylhexane. Label the isomeric relationships between each molecule (10 points)