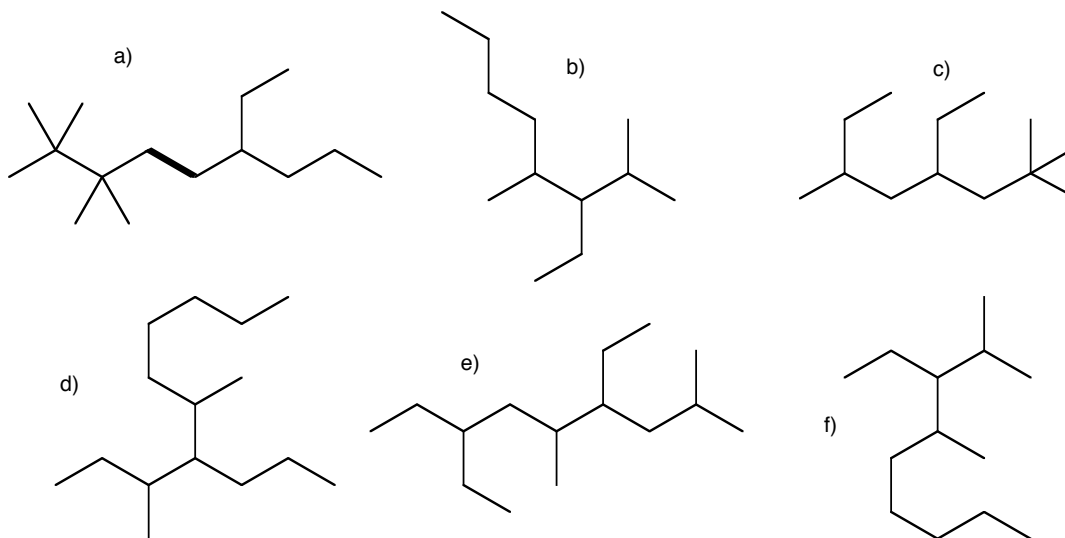


Chemistry 211 – Problem Set 3 – Due October 1<sup>st</sup> at 5:00 PM

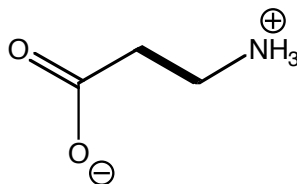
1) (20 points) Name the compounds shown below using the IUPAC rules:



2) (15 points) Draw the potential energy diagram for compound (a) in **Problem 1** as a function of the dihedral angle around the highlighted single bond in 60° intervals. Use Newman projections and name all the conformers appropriately.

Hint: The biggest groups can be considered as a 'unit'...

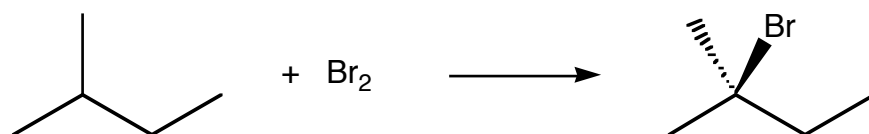
3) The following compound is known as a  $\beta$ -aminoacid, because it has amino and carboxylic acid functionalities separated by two carbons. In aqueous solution, this compound exists as drawn, with a positive charge on nitrogen and a negative charge on the oxygen.



- a) (5 points) Draw Newman projections of the **eclipsed**, **anti-staggered** and **gauche-staggered** conformers of this molecule around the highlighted bond (5 points).  
b) (10 points) Which of the three conformers you think will be lower in energy? Explain clearly.

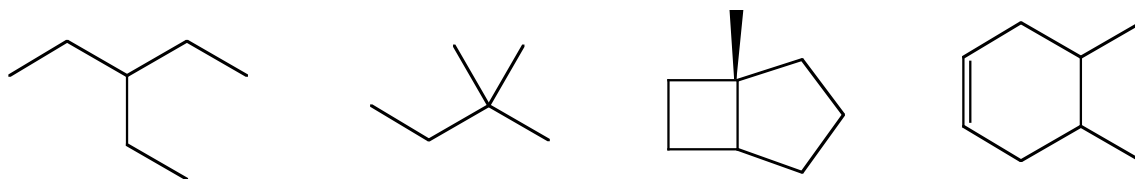
OVER

4) (15 points) Consider the following bromination reaction:



Working by analogy to the chlorination examples that were discussed in class, write detailed mechanisms for the **initiation**, **propagation**, and **termination** reactions involved in this halogenation reaction. Remember to use curly arrows to show how electrons move.

5) (15 points) For each of the following alkanes, predict what will be the most likely mono-chlorination product. Draw the structure of the proposed product, and explain how you got to this conclusion.



6) (20 points) For the first compound listed in **Problem 5**, consider all the possible mono-chlorination products that can be obtained. Taking into account the different types of carbon/hydrogen atoms in the molecule and their different reactivity towards chlorination, predict the theoretical % yield of the different products.