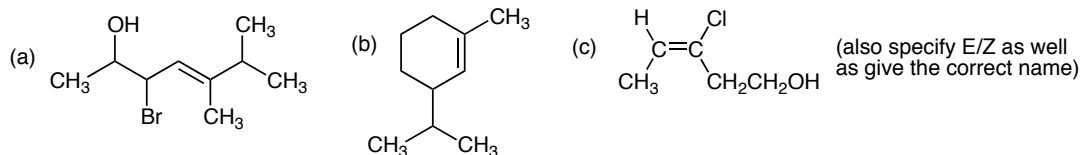


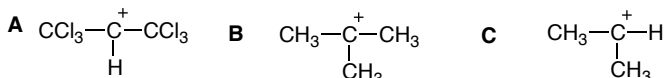
1. Name the following compounds. (15 pts)



2. Draw the following molecules. (a) The Neumann projection looking down the C3-C4 bond for 2,5-dimethylhexane. (b) (E)-3-bromo-2-chloro-2-pentene. (10 pts)

3. Answer the following questions and in each case briefly justify your answer.

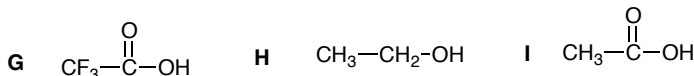
(a) Which carbocation is most stable? Least stable? (10 pts)



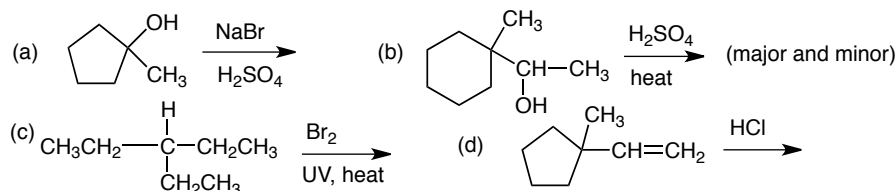
(b) Which molecule would have the highest heat of combustion? The lowest? (10 pts)



(c) Which molecule is the strong acid? Weakest? (10 pts)



4. Give the product for each of the following reactions and show all of the steps of the mechanism. (60 pts)

5. (a) Draw both chair conformations of *cis*- and *trans*-1-chloro-3-isopropylcyclohexane and indicate which is lower in energy. Briefly explain why. (b) Which molecule would react faster with sodium ethoxide in ethanol ($\text{NaOCH}_2\text{CH}_3/\text{HOCH}_2\text{CH}_3$)? Explain by showing the complete reaction that occurs for each molecule, giving the reaction mechanism and the products that are formed. (20 pts).6. Which molecule would react faster in an acid catalyzed hydration reaction using H_3O^+ , H_2O ? Briefly explain your choice and show the reaction that occurs, including the full reaction mechanism, for the molecule that you choose. (15 pts)

BONUS: show how the following transformation occurs. (10 pts)

