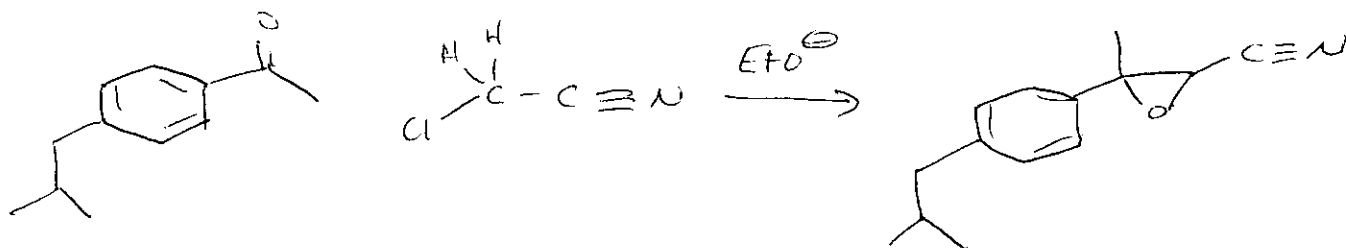


# Problem Set 10

Five points. Due Wednesday, May 21, by the start of class.

Provide answers on a separate sheet(s) of paper, stapling together multiple pages.

1. Provide a mechanism for the following reaction, used in the synthesis of ibuprofen. In writing the mechanism, recall (a) that nitriles are carbonyl derivatives and thus have acidic hydrogens at the alpha carbon and (b) epoxides may be prepared by intramolecular SN2 reactions of alkoxides with alkyl halides.

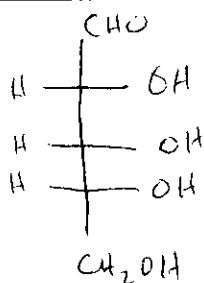


2. The Fischer determination of the stereochemistry of D-glucose, completed in 1891, is one of the most amazing feats in chemistry (see Jones section 23.4). Read this section of the textbook and understand the stereochemical arguments. (You do not need to "learn" the Kiliani-Fischer synthesis (section 23.2g) as a process, but you should be able to understand the process and mechanism. You *should* recall that addition of cyanide is a great way to form new C-C bonds.)

Describe any *one* of the steps in the Fischer proof: draw the starting material and products, and what the products told Fischer about the stereochemistry of D-glucose.

(You should be prepared for a similar stereochemical question on the final exam!)

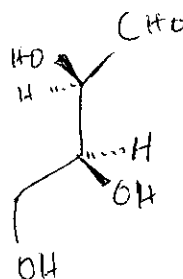
3. Draw the following molecules in the form shown. Pay attention to stereochemistry. Molecular models may be helpful.



D-ribose

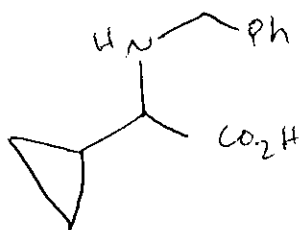
Draw in cyclic, furanose form (both  $\alpha$  and  $\beta$  anomers)

5-membered ring



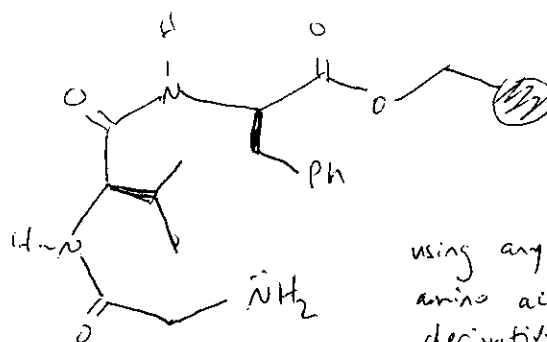
as a Fischer projection

4. Propose syntheses of the following molecules.



Via a Strecker synthesis

will exist as a zwitterion!



using any amino acid derivatives