

Chem 220a

Problem Set 9

Chapters 10 and 11

Due: Monday, November 28, 2005

The topic of oxidation levels of organic compounds is addressed in passing on pg. 460. We will consider the issue in more detail as described in [Oxidation Levels](#). The alcohol module in [ORGO](#) will give you a good review of some of the fundamental reactions discussed in class and in Chapters 10 and 11.

1. How many grams of CrO_3 are required to oxidize 20 grams of ethanol to acetic acid? Show work.

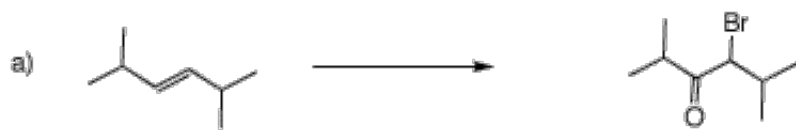
2. Compound **A**, $\text{C}_9\text{H}_{18}\text{O}_2$, reacts with 2 equivalents of Grignard reagent **B** to form **C** ($\text{C}_5\text{H}_{12}\text{O}$) and **D** ($\text{C}_6\text{H}_{14}\text{O}$). Compound **C** reacts with aqueous chromic acid to form compound **E** ($\text{C}_5\text{H}_{10}\text{O}$). Exposure of **E** to **B** forms **D**. Compound **D** reacts with catalytic H_2SO_4 to form **F**, which, upon ozonolysis and dimethyl sulfide reduction affords a single ketone **G**. Identify the structures **A-G**. Explain and illustrate.

3. Provide reagents necessary to complete each of the following reactions. No one can be accomplished in a single step.

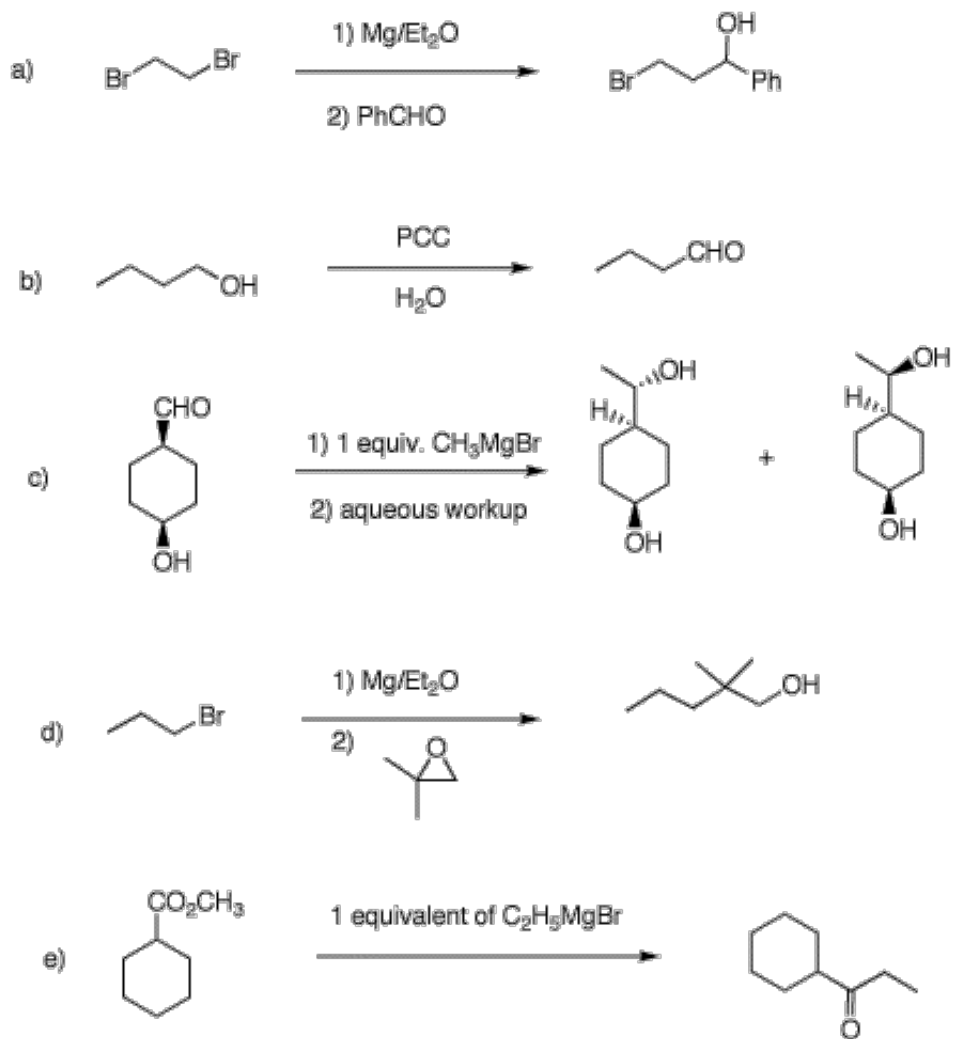


Victor Grignard (1871-1935)

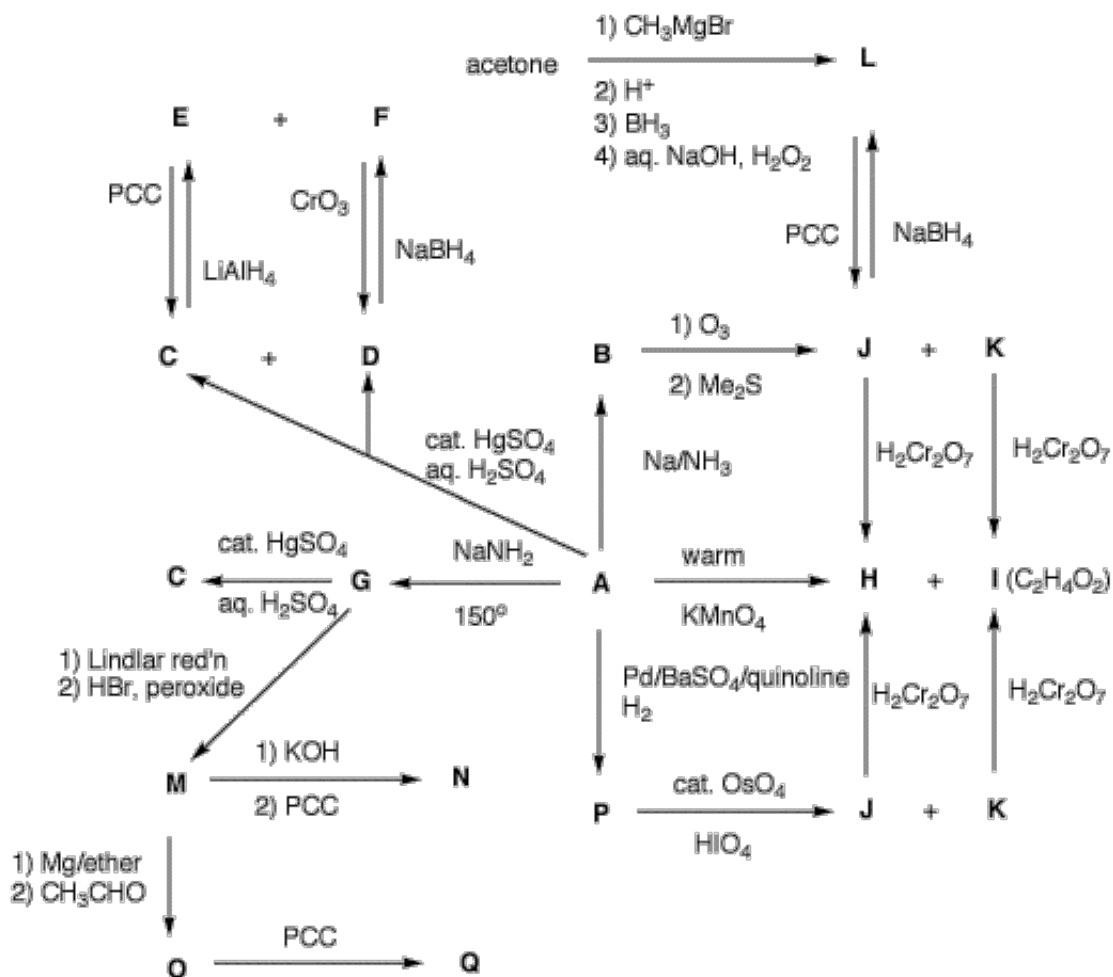
[Co-Nobel Prize in Chemistry \(1912\)](#)



4. Each of the following reactions has a fatal flaw. Comment.



5. Identify the compounds **A-Q** in the following "maze" of reactions. For a one-page copy of the maze, [click here](#).



6. In the following two problems, two pathways are provided for converting the starting material into the product. Thus, the total change in electrons (change in oxidation level or state) by both pathways must be the same. Over each arrow, show the change in oxidation state: $0 e^-$; $+n e^-$; $-n e^-$. Secondly, provide the reagents necessary to achieve these transformations. The [Web of Reactions](#) will be of help.

