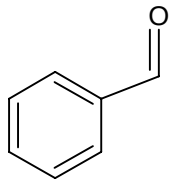
Organic Chemistry 212
Prof J. Walker
Notes: *Chapter Nine – Aldehydes and Ketones*

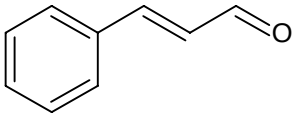
An aldehyde is a carbonyl group bonded to one carbon atom and a hydrogen atom and a ketone is a carbonyl group bonded to two carbon atoms.

Write the structures for formaldehyde, acetaldehyde, and acetone:

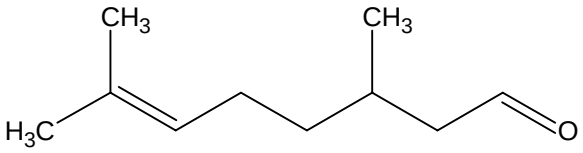
Here are some naturally occurring aldehydes:



Benzaldehyde
(oil of almonds)



Cinnamaldehyde
(oil of cinnamon)



Citronellal
(citronella oil, lemon, lemon grass oil)

Write the structure of vanillin (vanilla bean):

Aldehydes are easily oxidized, liquid aldehydes oxidize in air. Write a reaction for the oxidation of Benzaldehyde.

Ketones are not easily oxidized. This chemical differences provides a method for testing and distinguishing aldehydes from ketones.

What is Tollens' reagent and what is the silver mirror test?

Why is the silver mirror test no longer used?

Aldehydes and ketones can be reduced. This requires a catalyst. The end product of these reductions are alcohols.

Write the reaction for the reduction of cyclopentanone with hydrogen as the reducing agent:

Draw a structure for a hemiacetal:

Draw a structure for an acetal:

Hemiacetals and acetals form as the result of addition of alcohols to aldehydes and ketones. These reactions are reversible. What conditions drive the reaction toward the formation of acetals?

What is an alpha carbon? What is an alpha hydrogen?

Describe keto-enol tautomerism: