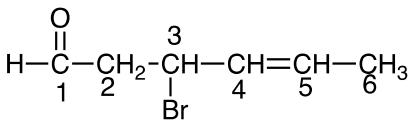
Name .....

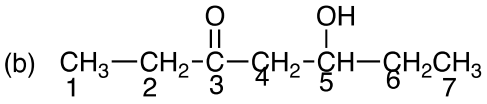
L.I.U.

Chem. 122, Sect 007, Quiz 2, 50 pts, Spring, 2011

1. Name the following compounds (10 pts)

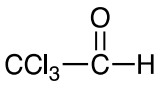
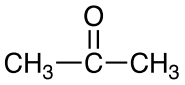
(a) 

3-bromo-4-hexenal

(b) 

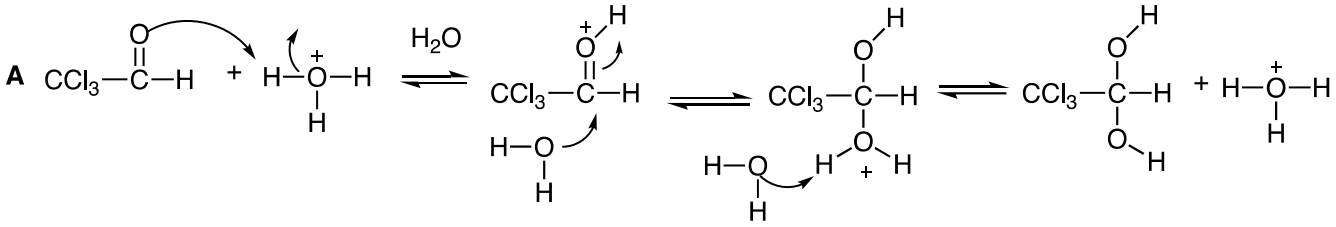
5-hydroxy-3-heptanone

2. Looking at the molecules **A** and **B** shown below, predict the one which would have the greatest hydration constant in both acidic (H_3O^+/H_2O) and basic (H_2O/NaOH) conditions and show both reactions for the molecule you choose, giving the complete reaction mechanism in each case. **You need to do this for only one of the molecules.** (20 pts)

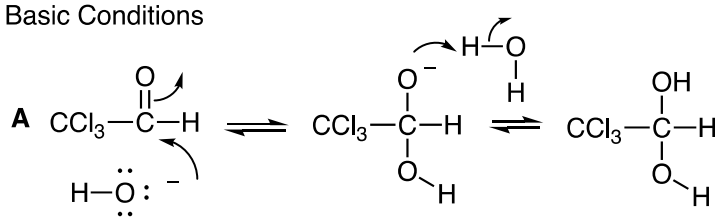
A  **B** 

A reacts faster due to (1) the electronic effect. The hydrogen substituent is not an electron donating group like the CH_3- groups in **B** and the CCl_3- group is a strong electron withdrawing group. Both of these factors make the carbonyl carbon of **A** more electron deficient than the carbonyl carbon in **B** and therefore more reactive to attack by nucleophiles.

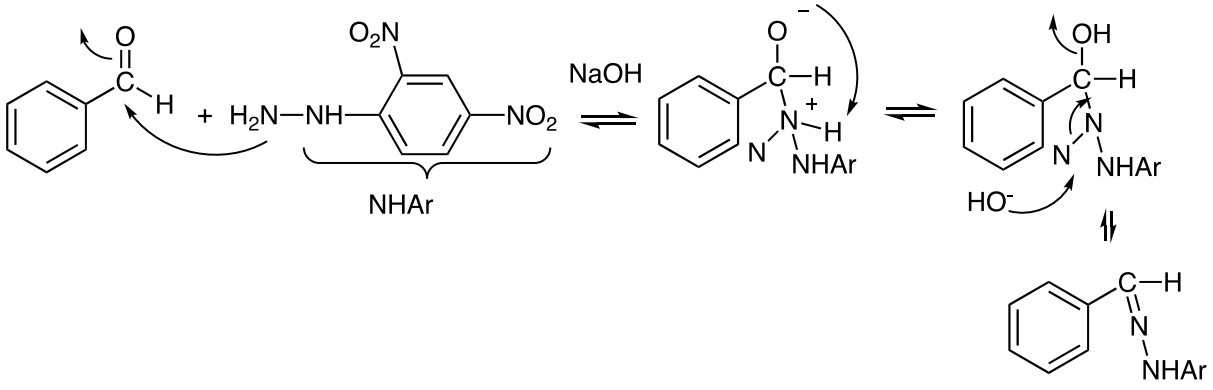
Acidic Conditions



Basic Conditions



3. Show the reactions that occur between benzaldehyde (C_6H_5CHO) and 2,4-dinitrophenylhydrazone [$H_2NHC_6H_4(2,4\text{-}NO_2)_2$], giving all of the steps of the mechanism. (7 pts)



Name .....

4. One student's unknown gave a positive Tollen's test (it formed a silver mirror) and formed a blue-green precipitate with chromic acid. The semi-carbazone had an m. p. of 98-103°C and the 2,4-DNP had an m. p. of 115-121°C. Choose the best match for her compound from those listed below. (7 pts)

	semicarbazone	2,4-DNP
2-pentanone	103	117
n-heptaldehyde	109	108
n-butyraldehyde	106	123

The best choice is n-butyraldehyde. Both of the experimental m.p.'s must be LOWER than the literature m.p.'s since any impourities present will lower the m.p.

5. One student missed the first week of the acetanilide experiment and so to catch up with the class in the second week, she decided to skip the first step of the experiment and to do the nitration using nitric acid and sulfuric acid directly on aniline ($C_6H_5NH_2$). Was this a good idea? Explain briefly and show what product(s), if any, she would obtain from her reaction. (6 pts)

No, this was not a good idea. The acetyl group must be added first so as to protect the amino group of the aniline from protonation. Otherwise, the *meta*-product will be the major product, along with some of the oxidation product, the n-oxide.