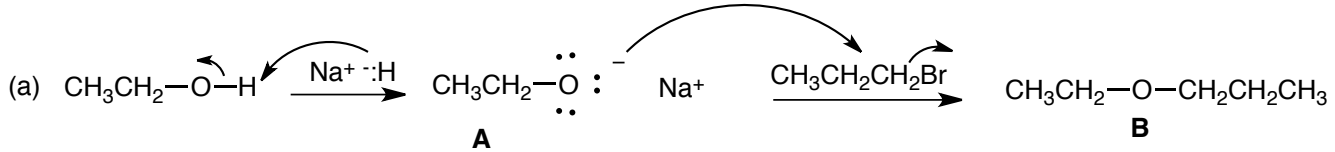
Name .....

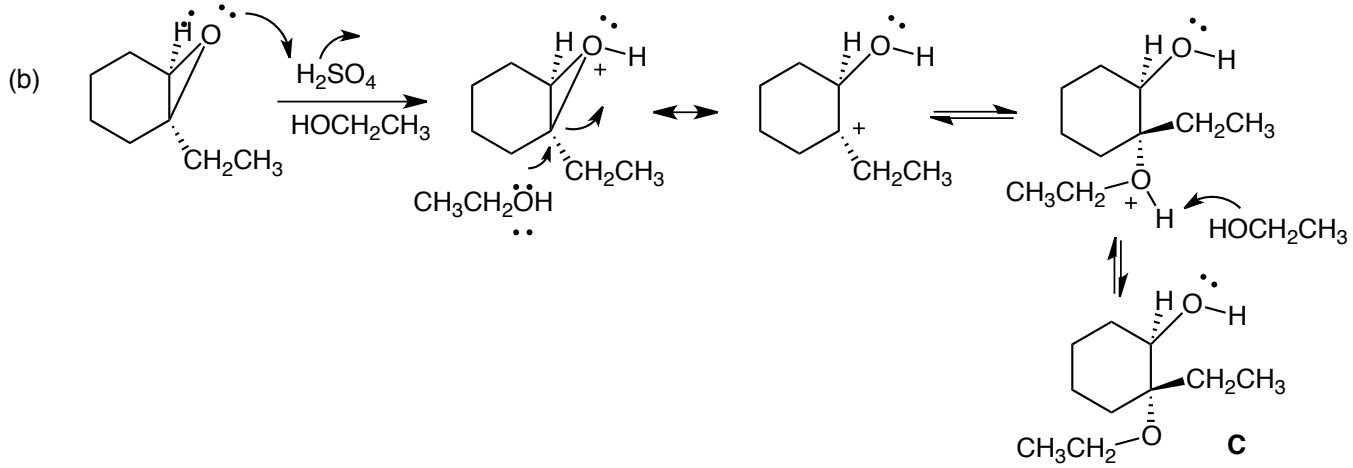
L.I.U.

ANSWER KEY

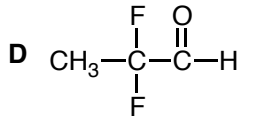
Chem. 122, Sect 009, Quiz 2, 50 pts, Spring, 2012

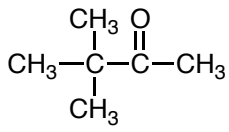
1. Give the product(s) of the following reactions, showing all intermediates and the full reaction mechanism in each case. (20 pts)



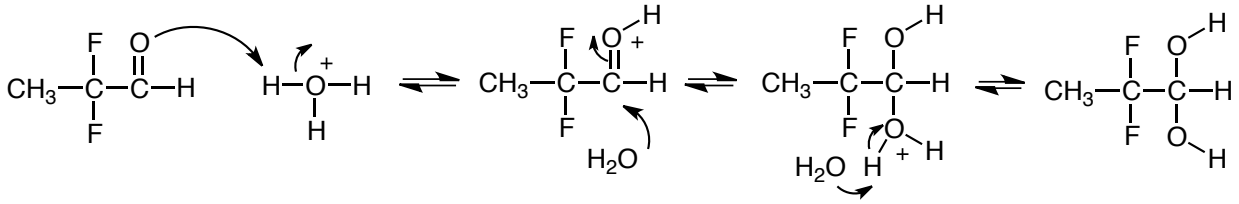


2. Looking at molecules **D** and **E** shown below, predict the one which would have the greatest hydration constant in acidic (H_3O^+/H_2O) conditions and show the reaction for the molecule that you choose, giving the complete reaction mechanism. (10 pts)

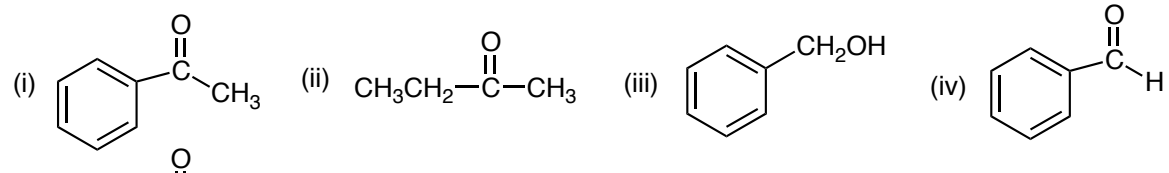


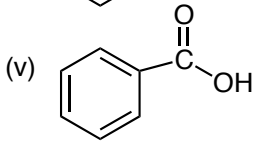


D is more reactive for two reasons: (1) It is less hindered - the fluorines and hydrogen of the aldehydes are much smaller than the CH_3 groups of the 3,3-dimethyl ketone and (2) the fluorines withdraw electrons from the carbonyl carbo of **D**, making it more electron deficient and more reactive to nucleophilic attack.



3. Which of the following molecules would give (a) a positive test with KI/I2? (b) a positive test with Ag^+? (c) a positive test with a semi-carbazone? (There may be more than one correct answer in each case.) (12 pts)

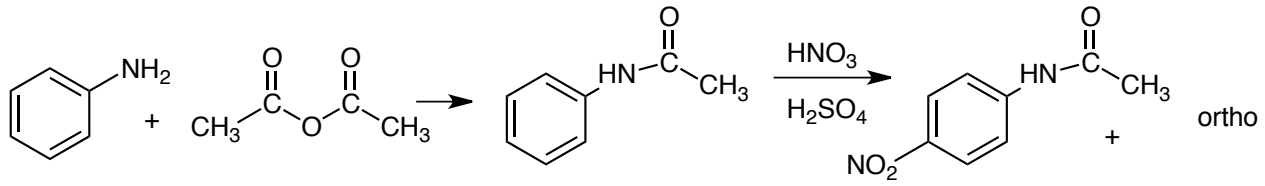




(a) Methyl ketones give a positive test with KI/I_2; therefore (i) and (ii)
(b) Aldehydes give a positive test with Ag^+ since they are easily oxidized to carboxylic acids by the mild Ag^+ oxidizing agent; therefore (iV)
(c) Ketones and aldehydes both will give a positive test with semi-carbazones: therefore (i), (ii), (iv) will all react.

4. In the preparation of *p*-nitroaniline from aniline ($C_6H_5NH_2$), (a) show the reactions that occur in step 1 and step 2. You do not need to show the mechanisms. (b) One student missed the first lab period for this experiment (her cat was very depressed and she had to stay home). To save time, the student decided to do the nitration step directly on aniline. What two products would she have made? (8 pts)

(a)



(b)