

CHEM 8B Organic Chemistry II
EXAM 1, Version A (300 points)

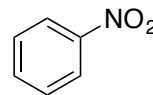
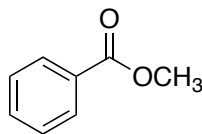
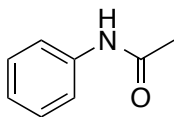
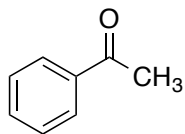
In each of the following problems, use your knowledge of organic chemistry conventions to answer the questions in the proper manner. **Be sure to read each question carefully.** You will have the entire class period to complete this exam, but hopefully you won't need it! **Pay attention to provided point values and opportunities to skip problems to use your time wisely.** You are welcome to use pre-built models.

Keep your eyes on your own paper. Electronic devices of any kind are not allowed, including cell phones and calculators. Draw a picture of a cat pirate at the bottom of the next page. Any student found using an electronic device or cheat sheet, or clearly found examining another student's exam, will be promptly removed from the exam room and at minimum will receive a zero on this exam. Such an incident may also be considered a form of academic dishonesty and reported to the UCSC Judiciary Affairs Committee.

1 (50)	
2 (50)	
3 (50)	
4 (50)	
5 (50)	
6 (50)	
Total	/ 300
	%

1. Nomenclature

(a) (20 points) Each compound below contains an arene. **List the other functional group in each compound.**



(b) (30 points) **Draw structures** corresponding to the following names.

Nitric Acid (HNO₃ Lewis Structure)

1,5-pentanediol

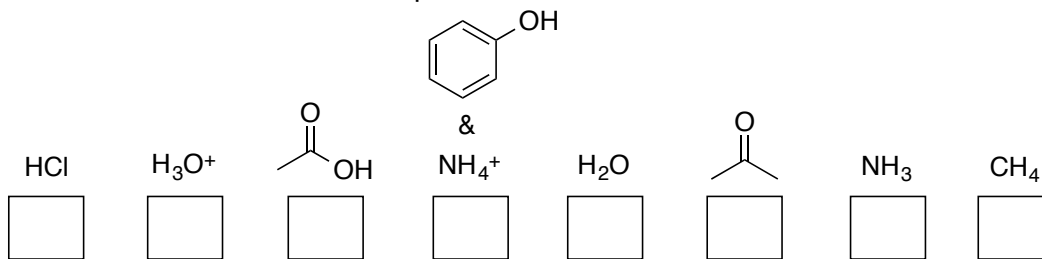
(E)-2-Ethyl-2-buten-1-ol

2,4,6-trinitrotoluene

meta-dibromophenol

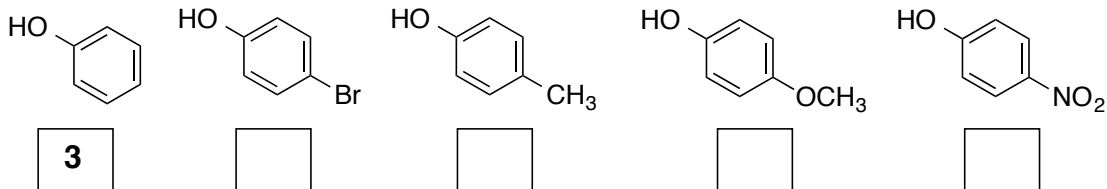
2. Acid-Base Chemistry

(a) (16 points) The following compounds are arranged from most (left) to least (right) acidic. Fill in the **pKa** values of each in the boxes provided.

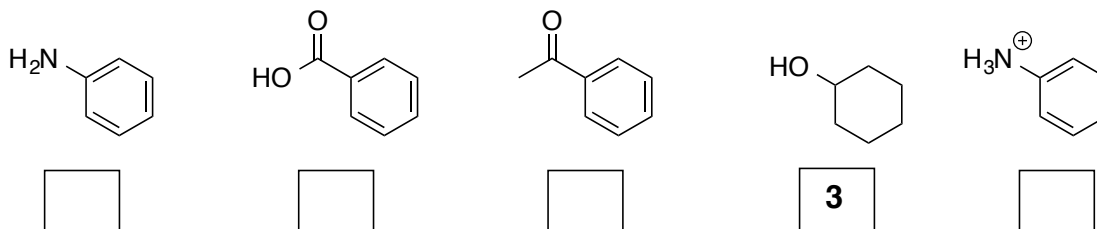


(b) (16 points) Rank the following sets of acids from **most acidic (1)** to **least acidic (4)**, where #3 is provided. Put your answers in the box below each compound.

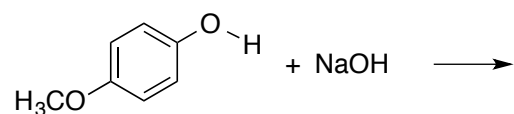
Set 1



Set 2

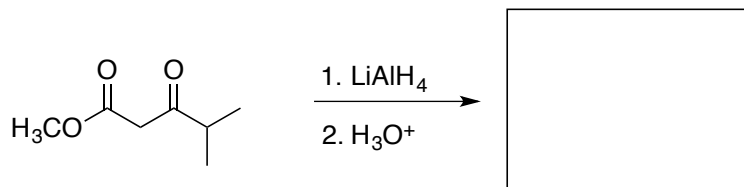


(c) (18 points) Draw the **products** of the following reaction and **one additional non-equivalent resonance structures** of the conjugate base. Include **arrow-pushing** for each step.

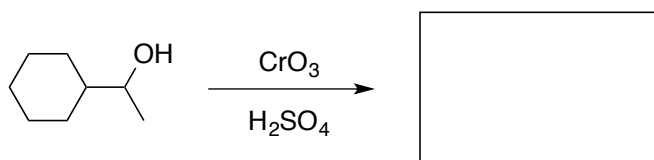


3. (50 points) Single Step Reactions – Choose any five, skip any one reaction (“X” it out). Fill in the missing product or reactants in each reaction.

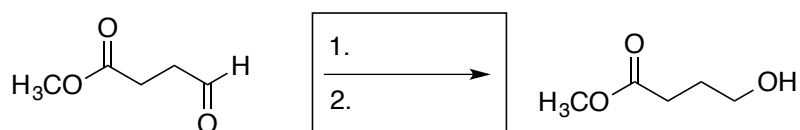
(a)



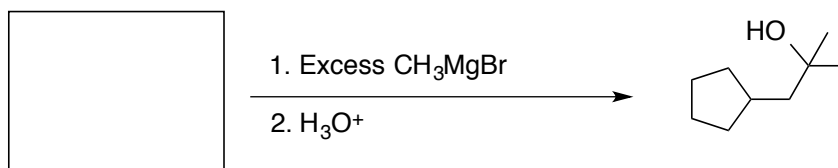
(c)



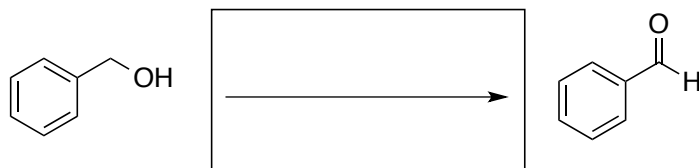
(d)



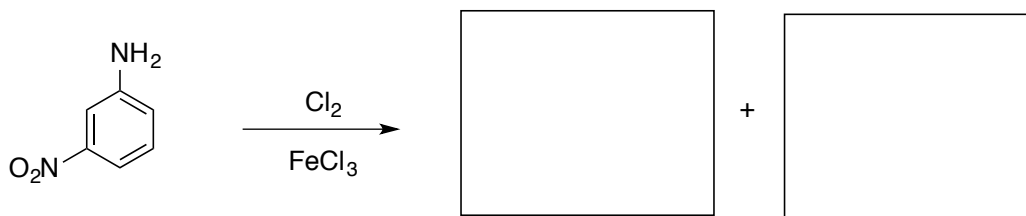
(e)



(f)

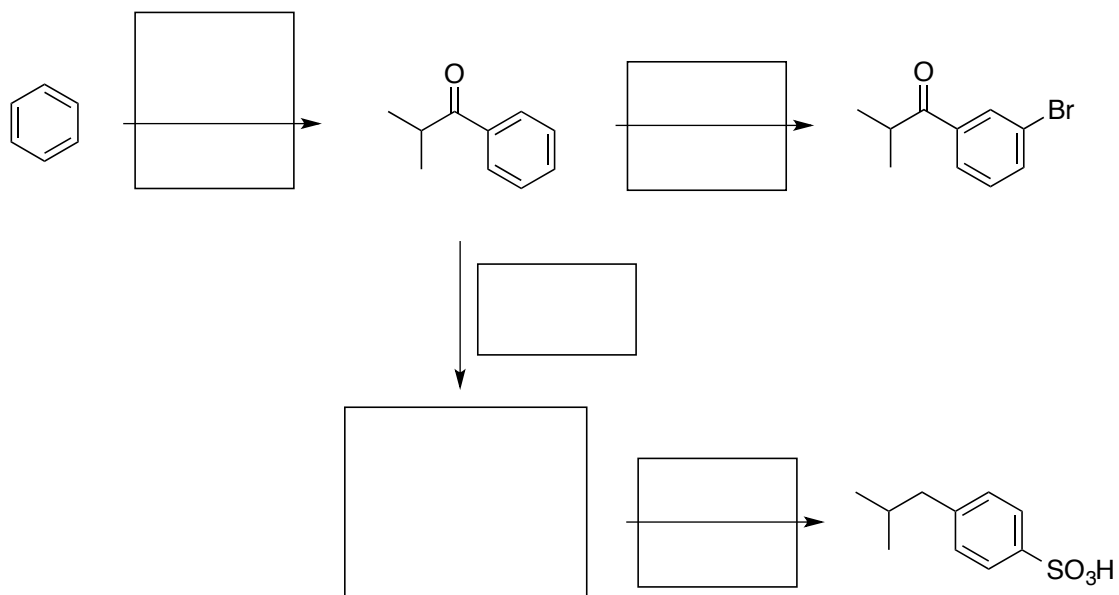
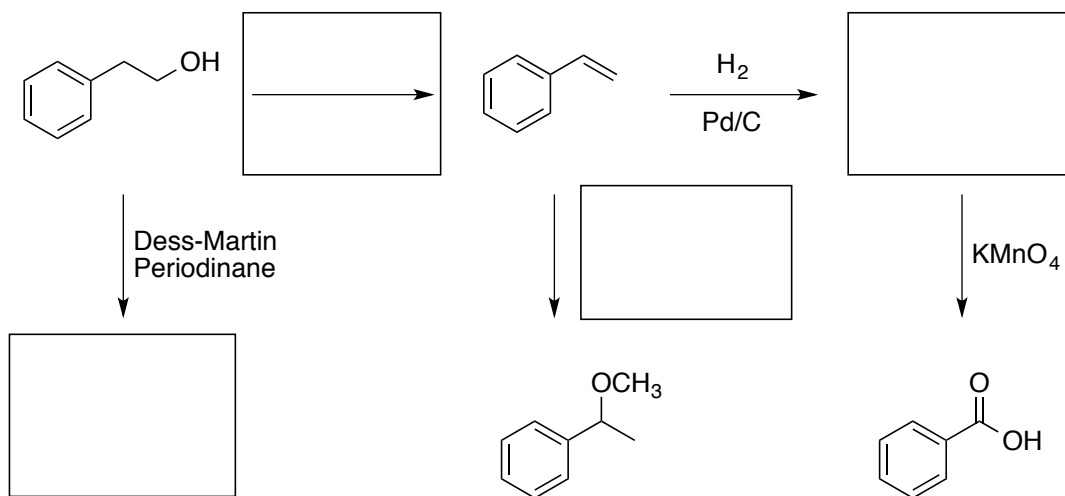


(g)



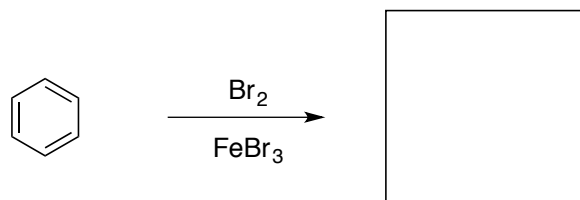
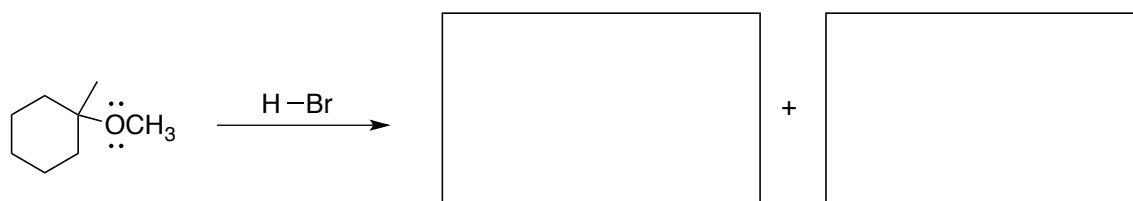
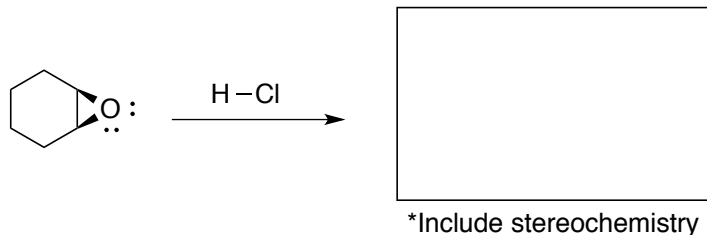
PUT A LARGE 'X' OVER THE REACTION TO SKIP OR THE TOP FIVE WILL BE GRADED

4. (50 points) Reaction Puzzles – Fill in the missing reagents and products.

Puzzle 1**Puzzle 2**

5. Mechanisms – complete any two mechanisms. skip one by placing a large X over the entire reaction, otherwise the first two will be graded.

(50 points) Show the **product** and full **arrow-pushing mechanisms for any two reactions** (including all acid-base steps, no "PT"). Be sure to clearly indicate all **charged atoms** and **intermediates** after each step.



PUT A LARGE 'X' OVER THE MECHANISM TO SKIP OR THE TOP TWO WILL BE GRADED

6. (50 points) Multi-Step Synthesis – Choose any two

Carry out the synthesis of the indicated target molecules using the starting material provided and any other reagents or sources of carbon needed. **Show the product after each reaction.** No mechanisms. Partial credit is given where possible so if you're stuck, take a deep breath then work your way backwards and/or forwards.

