UCSC, Binder Name_____

CHEM 108B Organic Chemistry II
EXAM 1, Version A (*200 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 (1 hr, 45 min), 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. Any student found using any of said devices, or 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.

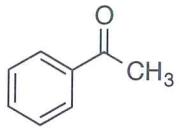
1 (50)	
2 (20)	
3 (30)	
4 (20)	
5 (30)	
6 (50)	
Total	/ 200
	%

note: this exam does not include nomenclature & reactions for aldehydes & ketones (Ch 19)
W17 exam WILL include Ch 19.1 - 19.7

CHEM 108B, UCSC W16 Exam 1, Version A

1. Nomenclature

(a) (*10 points*) Each compound below contains an arene. **List the other functional group in each compound.**



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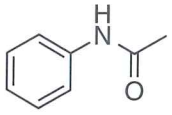

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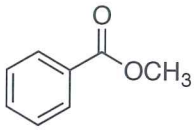

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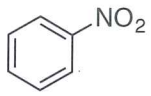

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(b) (*20 points*) **Draw structures** corresponding to the following names.

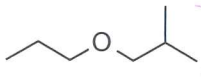
2-Mercaptopentanol

Nitric Acid (Lewis Structure)

2,4-Hexanediol

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

(c) (*20 points*) **Provide IUPAC names** for **any three** of the following compounds. "X" out the ones to skip.



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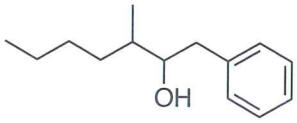

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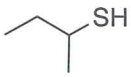

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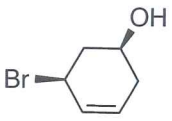

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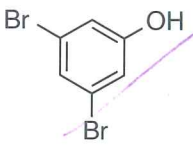

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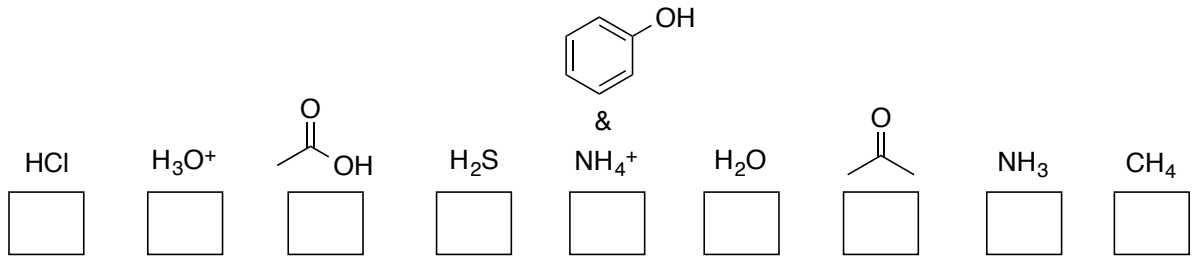
No structure → name W17

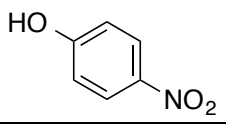
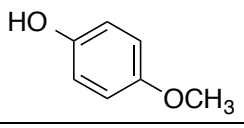
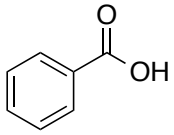
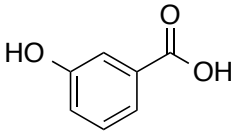
2. Acid-Base Chemistry

(a) (*9 points*) The following compounds are arranged from most (left) to least (right) acidic. Fill in the **pKa** values of each in the boxes provided.

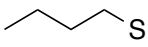
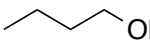
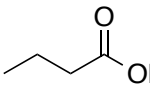
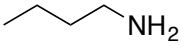


(b) (*10 points*) **Rank** the following sets of compounds in terms of acidity where **1 is the most acidic.** Provide your answer by circling ranking options **I**, **II**, or **III**.

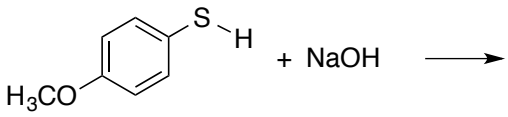
Set 1

Circle your answer below ↓				
I	2	4	1	3
II	1	3	4	2
III	3	4	1	2

Set 2

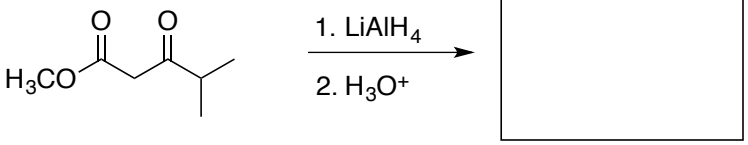
Circle your answer below ↓				
I	2	3	1	4
II	1	3	2	4
III	2	4	1	3

(c) (*11 points*) Draw the **products** of the following reaction and **two additional non-equivalent resonance structures** of the conjugate base. Include **arrow-pushing** for each step.

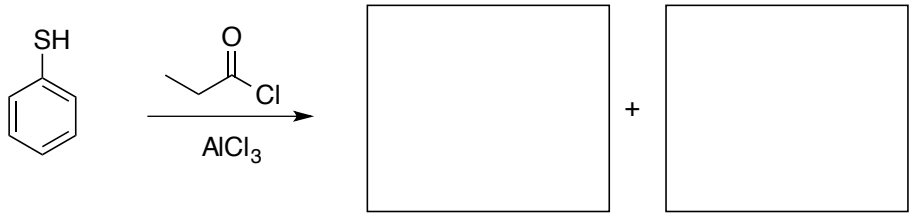


3. (*30 points*) **Single Step Reactions – <u>Choose any five</u>, <u>skip any two</u> reactions ("X" them out). Fill in the missing product or reactants in each reaction.**

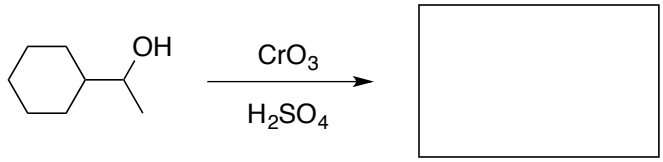
(a)



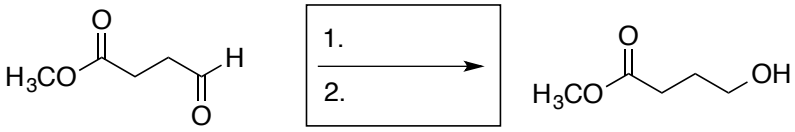
(b)



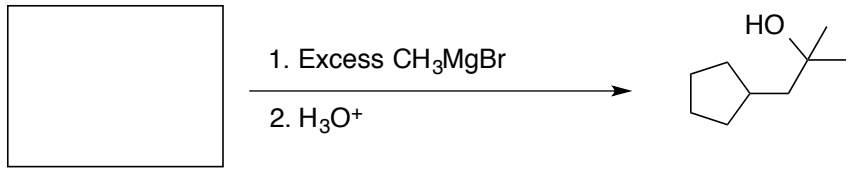
(c)



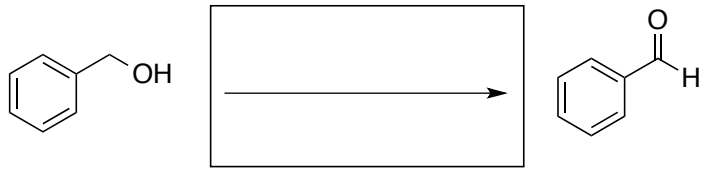
(d)



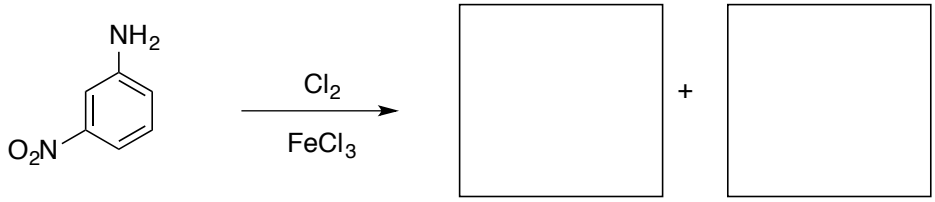
(e)



(f)

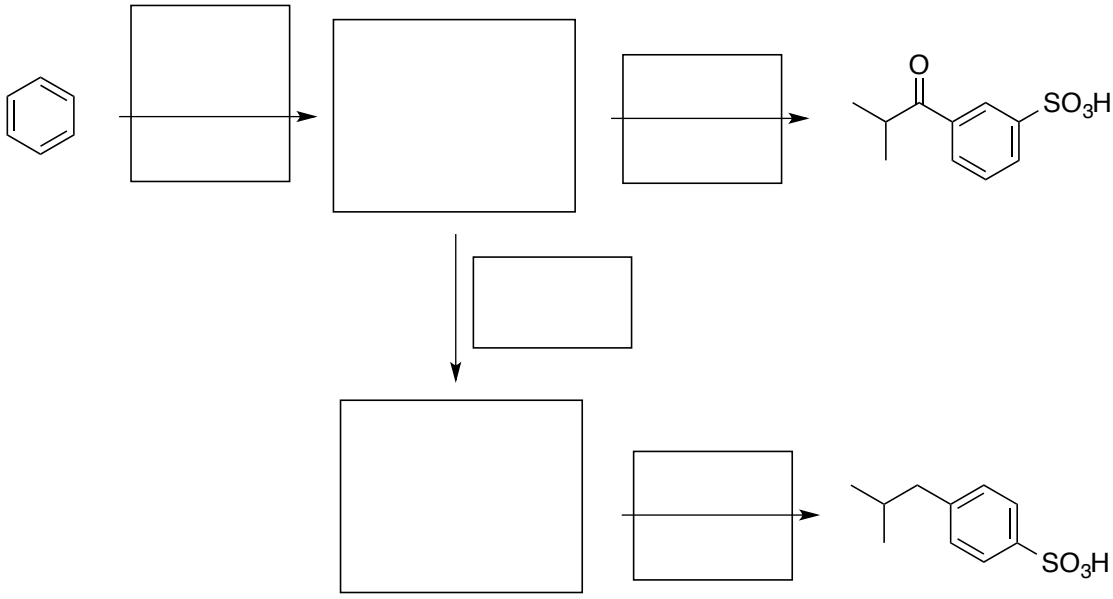


(g)

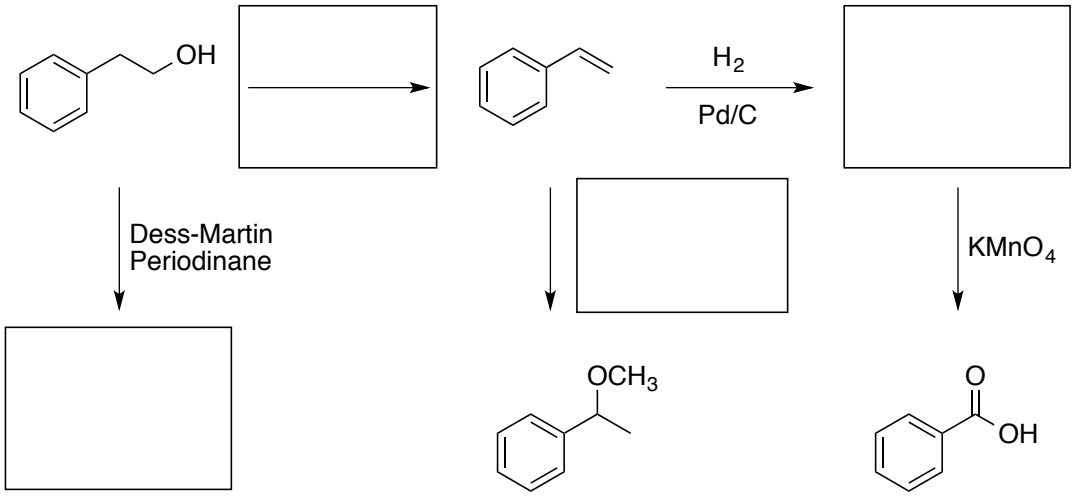


4. (*20 points*) **Reaction Puzzles** – Fill in the missing **reagents** or **product**.

Puzzle 1

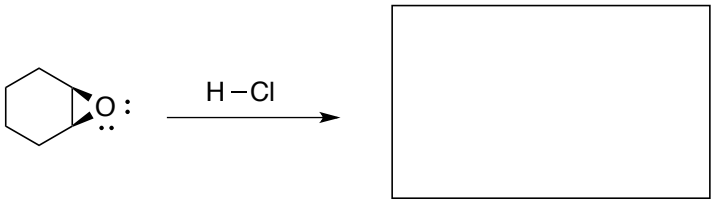


Puzzle 2

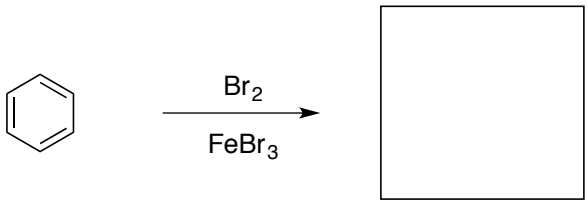


5. Mechanisms – complete <u>any two mechanisms. skip one</u> by placing a large X over the entire reaction, otherwise the first two will be graded.

(*30 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.



*Include stereochemistry



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.