

University of California, Los Angeles  
Chem 14D – TaH Exam #3  
Fall 2020 – 12/14/20

I hereby state that **I have neither given nor received aid to or from other people during this exam** (including external websites and programs). **I vouch for the honesty and integrity of each and every answer given.**

Signature Zur Guan ID# 409 308 281

Circle your TA's name: Dominick Garrett Yiyi Eun Bin  
Brennan Shuaijing Tony

We would like to thank all students for their understanding as we navigate this unprecedented situation. In addition, the university would like to remind students about their obligations under the UCLA Student Conduct Code: <https://www.deanofstudents.ucla.edu/Individual-Student-Code>."

Use scratch paper first before inputting the answers onto the test for clearer scans onto Gradescope.

	Possible	Your score
I. This, That, or the Other	7	
II. Reactions, Pt. 1	15	
III. Mechanisms	10	
IV. Reactions, Pt. 2	11	
V. Synthesis	8	
Bonus	0 (2)	
Total	50*	



\*Yes, the actual total is 51. Think of it as 1 extra extra credit bonus point.

**\*\*Bonus Question 1** (1 pt): Let's play a game (theory) again. Below is a box. You may **choose** to check the box. If you do not check the box, no harm, no foul. **If you do check the box**, then:

- If **fewer than half** the students check the box, you **earn 1 point**  
- If **more than half** check the box, you **lose 1 point**

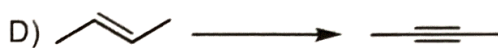
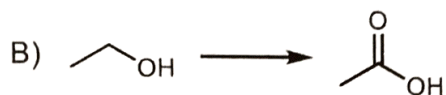
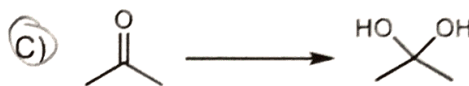
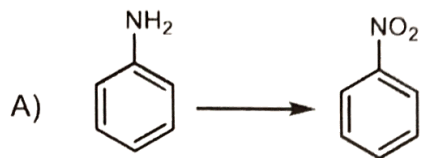
(If this question stresses you out, don't check it and move on)

**\*\*Bonus Question 2** (1 pt): *Do this after you finish your test!* On the bottom of page 6, there is a box. **Please use this space for anything you see fit.** Whether you would like to write your opinions of the class, share your thoughts on the current state of the world, tell your favorite joke or uplifting story, practice your creative drawing skills, admit that you have a favorite chemical reaction/element, or vent about something that people might think is insignificant, **you will get 1 point as long as you put anything down.**

**I. This, That, or the Other** (8 pts; 1pt each) Choose the *best* answer and **write the letter of your answer in the box** next to the question number.

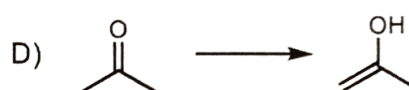
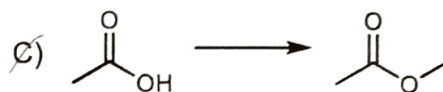
C

a) Which transformation is **not an oxidation**?



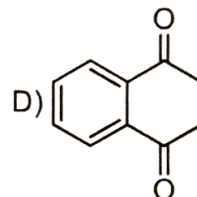
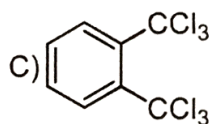
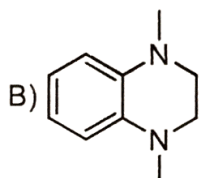
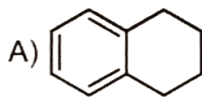
A

b) Which of the following transformations is **irreversible**?



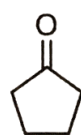
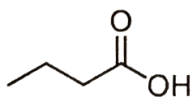
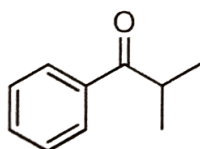
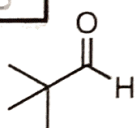
A

c) Which aromatic compound will participate in the **fastest Friedel-Crafts reaction**?



B

d) How many of the following compounds **could** participate in an **aldol reaction with itself**?



A) All 4 of them

D) Only 1 of them

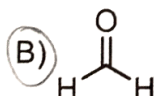
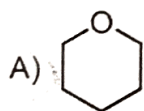
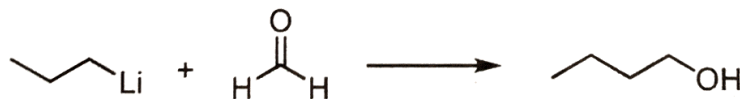
B) Only 3 of them

E) None of them

C) Only 2 of them

B

e) Which of the following would be the **best solvent** for the reaction shown?



E) Any of these will work

F

f) True or False: Reactions that create a **chiral center** will always lead to forming a **racemic mixture** of products.

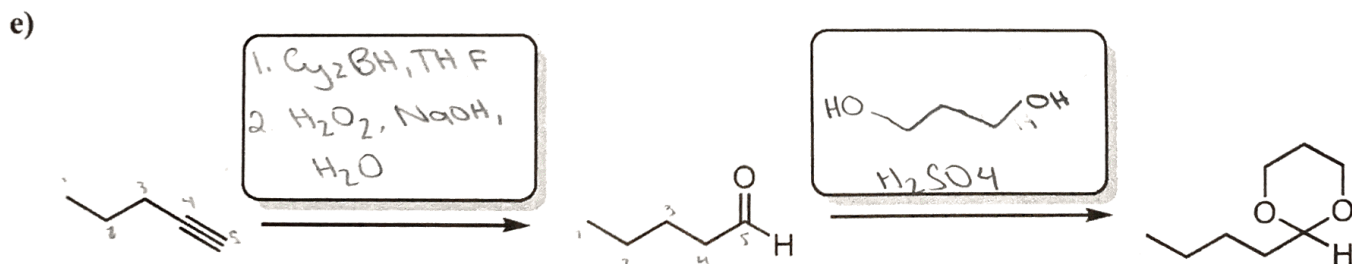
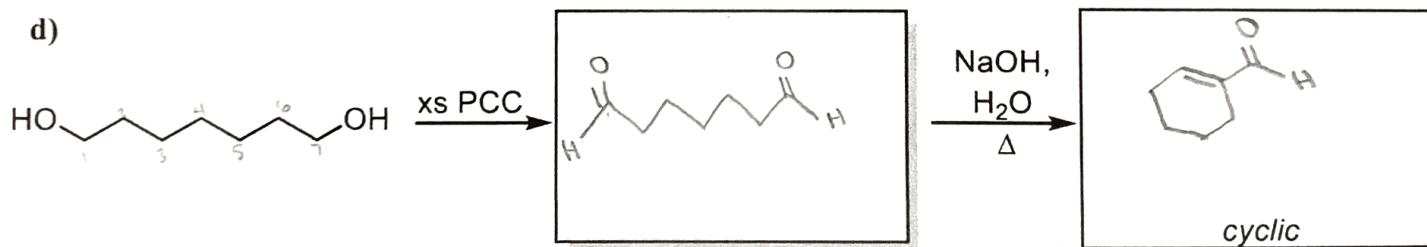
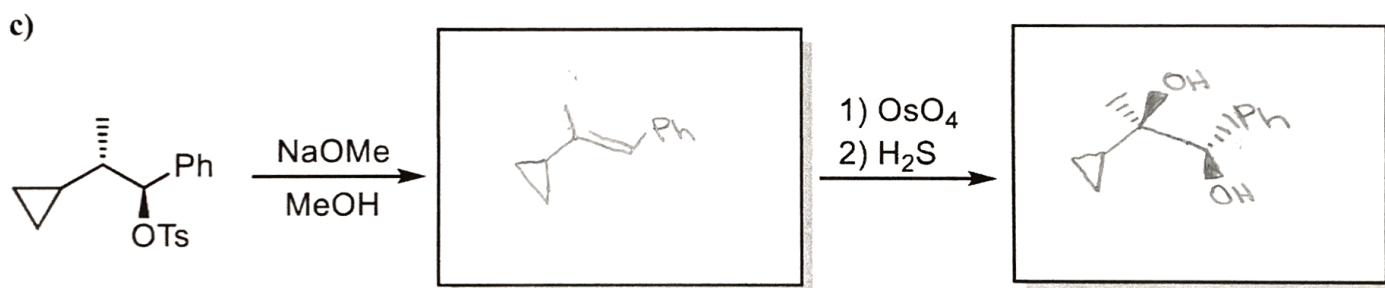
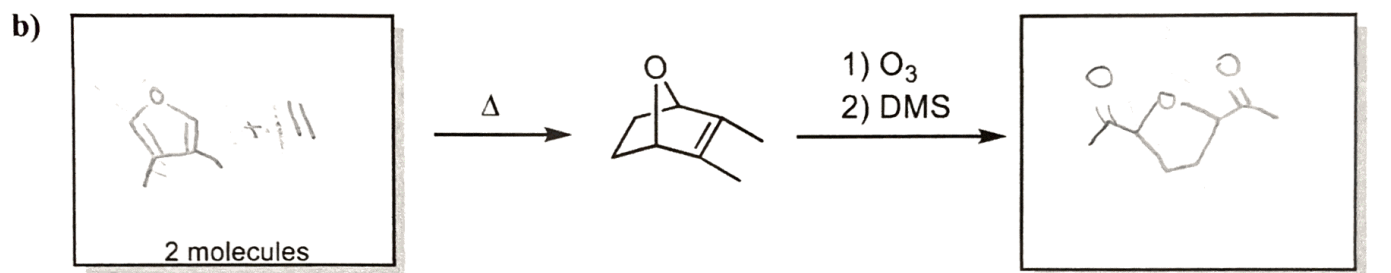
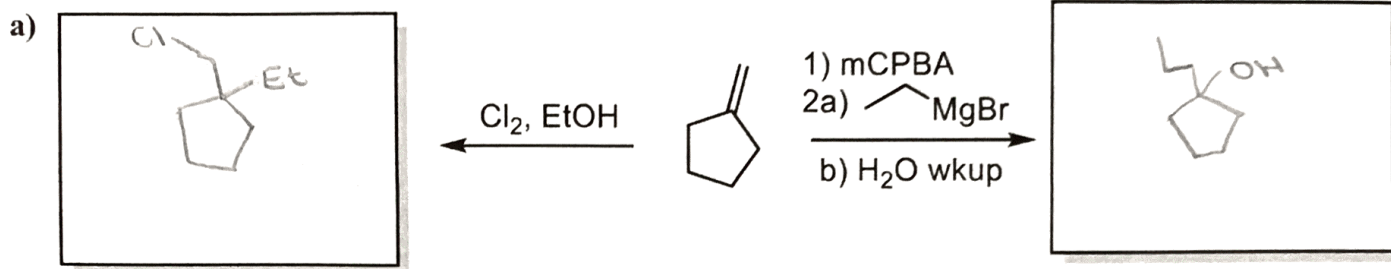
F

g) True or False: A reaction with **multiple mechanistic steps** will always **require more time** than a reaction with a **concerted** mechanism.

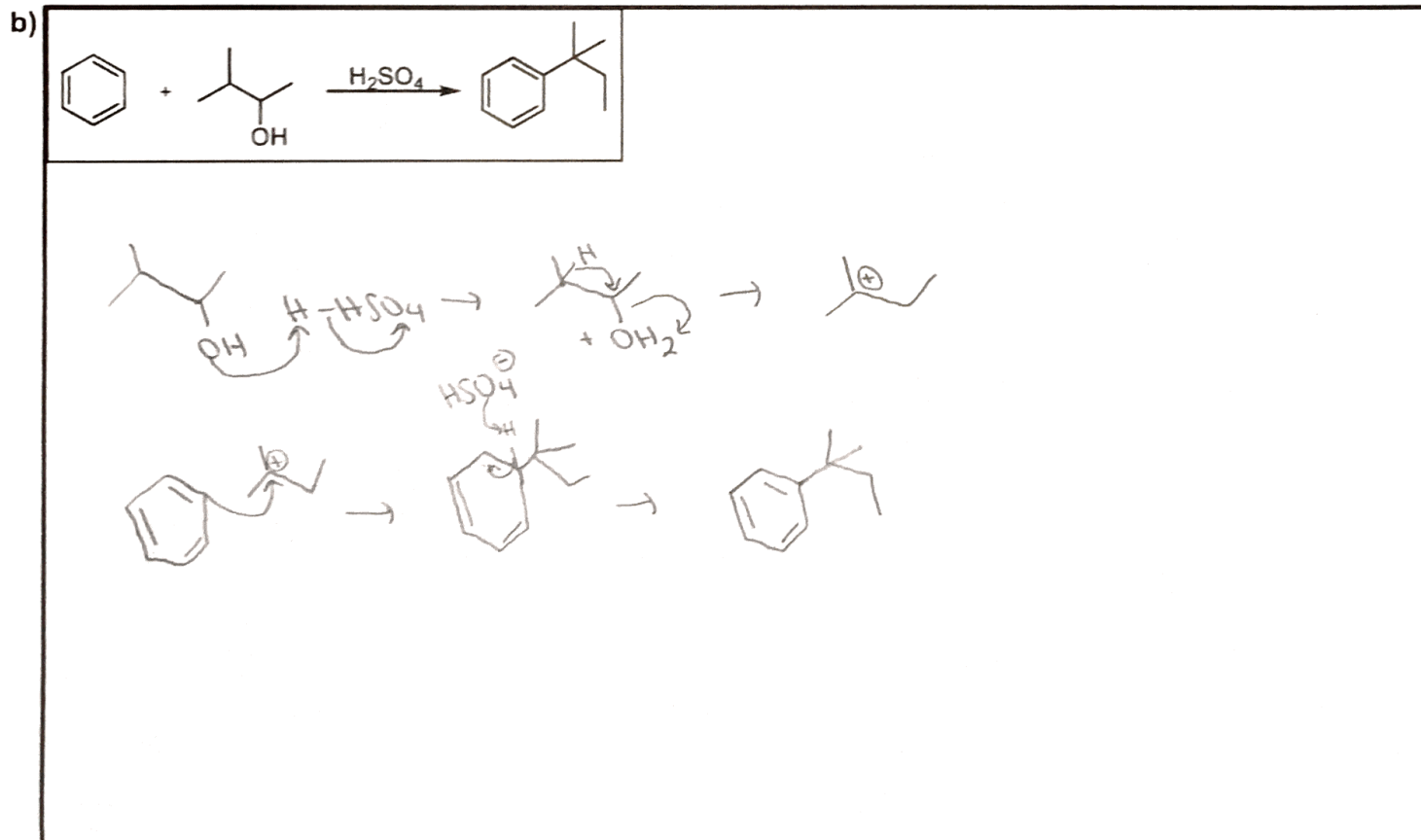
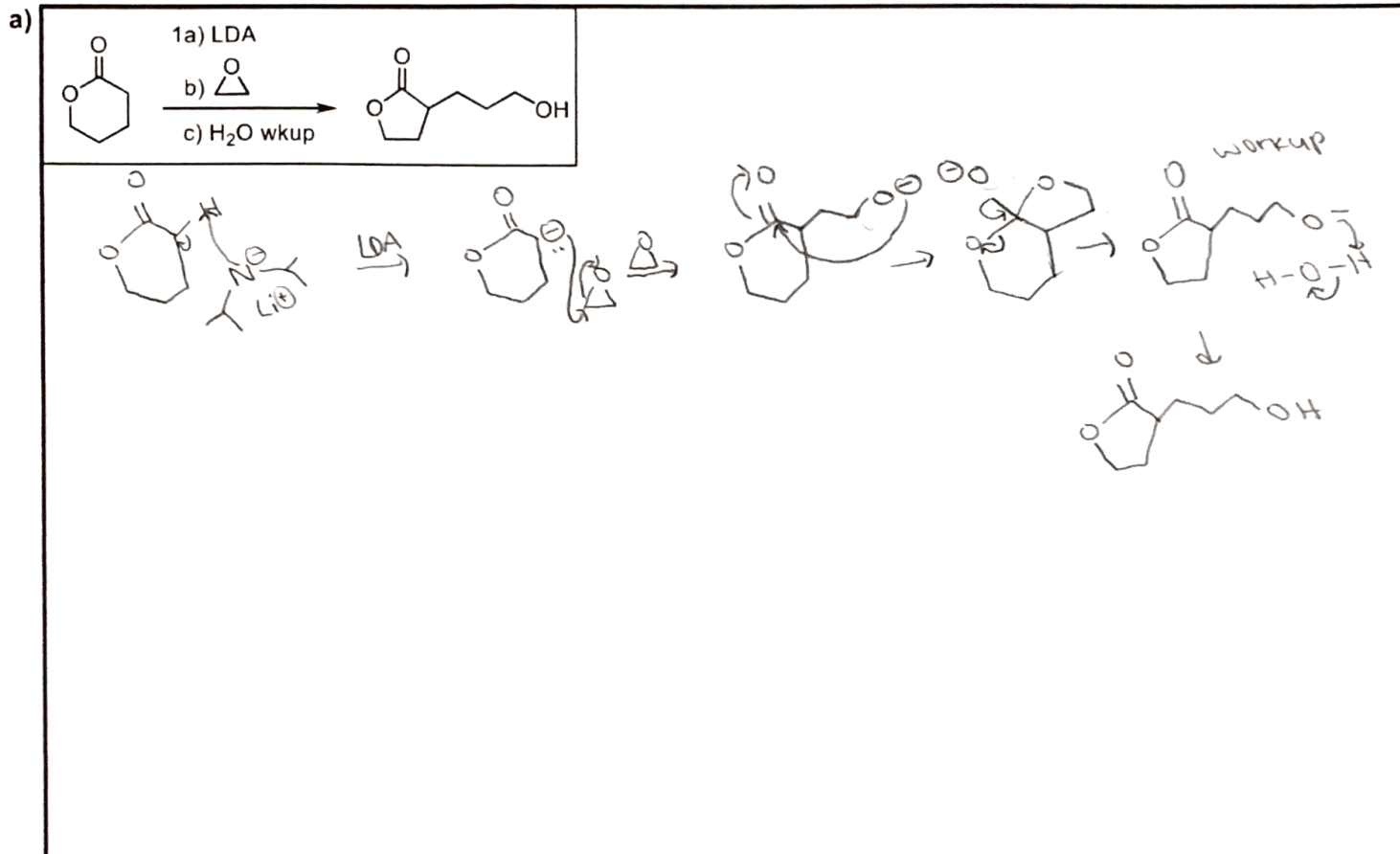
**II. Reactions, Pt. 1** (15 pts; 1.5 pts each) Complete the following reactions by **drawing clear structures** for the missing **reactants** or **products** or filling in the necessary **reagents**.

**Note on filling in the boxes:**

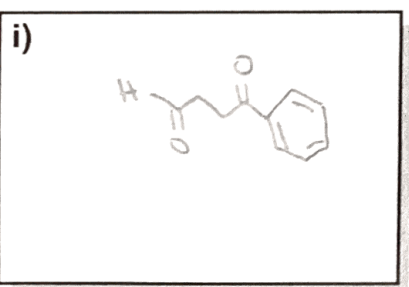
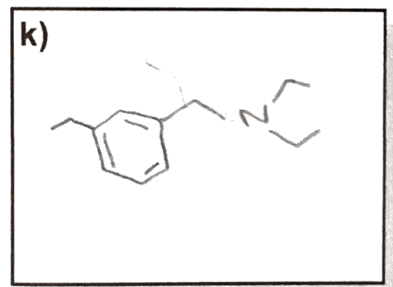
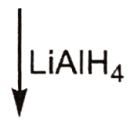
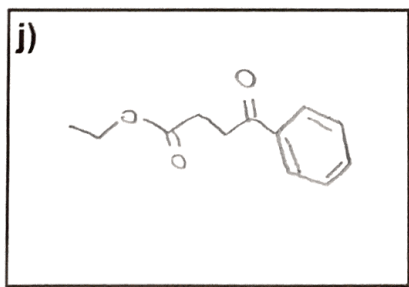
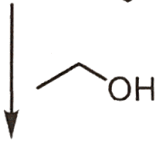
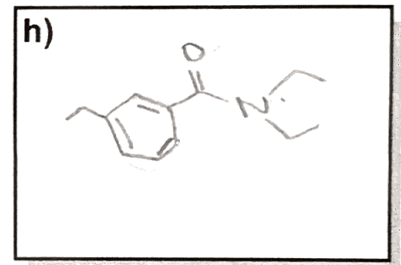
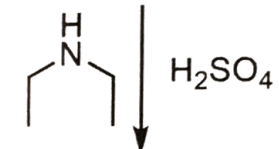
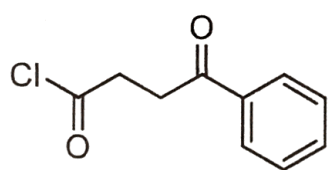
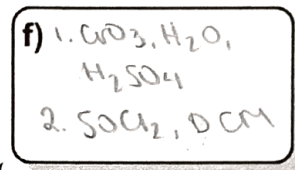
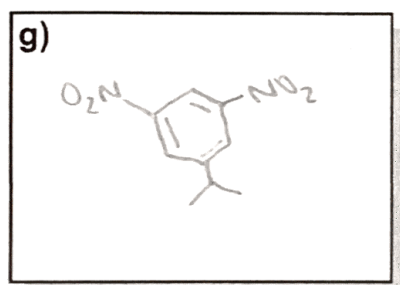
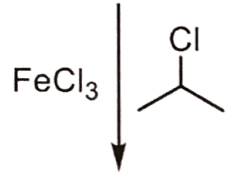
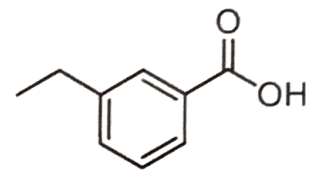
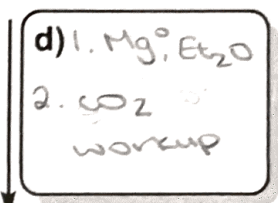
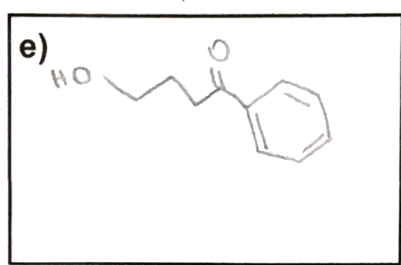
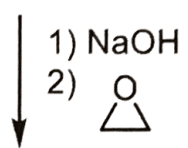
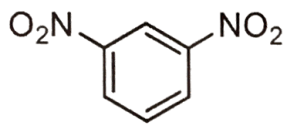
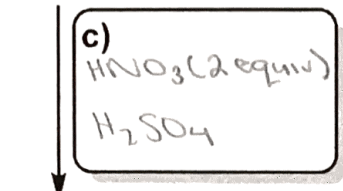
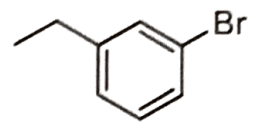
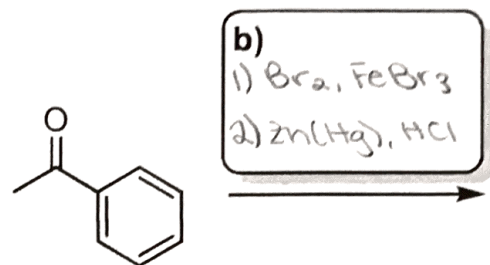
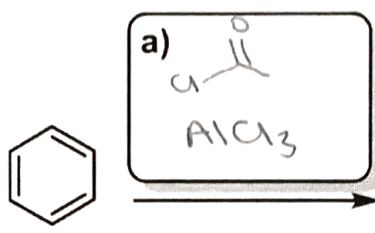
- If the box is at the end of a reaction arrow, it is a **compound**. Give its structure clearly, including stereochemistry if relevant. If the answer is racemic, you should state that.
- If the box is on a reaction arrow, it is a **reagent**. You may put multiple reagents in one box. If it requires multiple steps, **number your steps**.
- **Be neat!** Only what is written **inside the box** will be graded.



**III. Mechanisms (10 pts)** In the boxes provided, draw the **complete mechanisms** for the reaction sequences below, using **curved arrows** to symbolize electron movement. Show **each mechanistic step** clearly and neatly, including **all intermediates and formal charges**. *Messiness may result in lost points.*

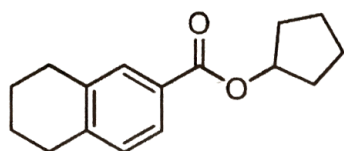
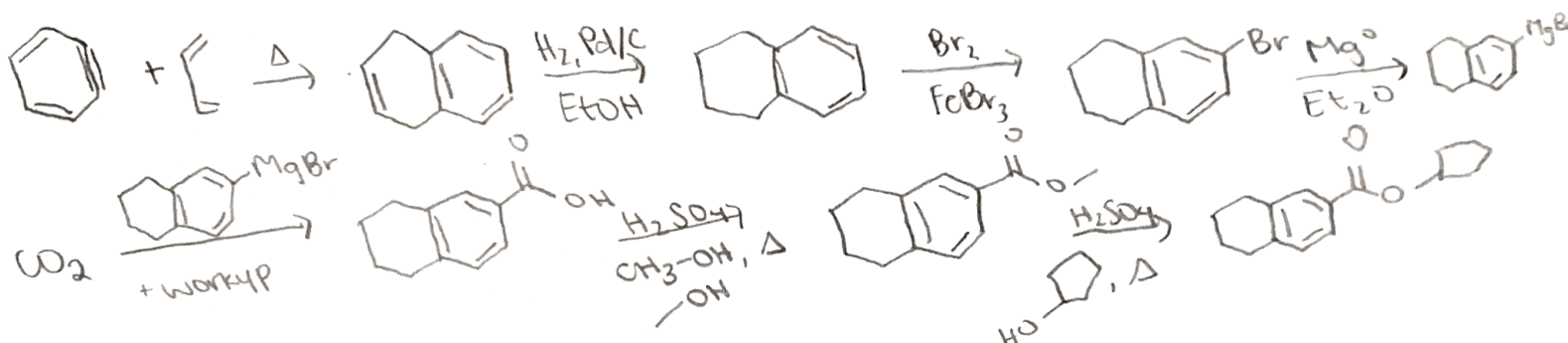
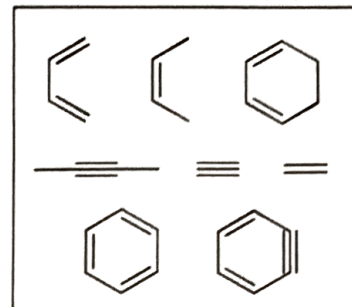


**IV. Reactions, Pt. 2** (11 pts; 1 pt each) Fill in the missing molecules and reagents to complete the syntheses. For instructions on filling in boxes, refer to Reactions, Pt. 1.



**V. Synthesis (8 pts)** Propose a synthesis for the molecule shown below by **providing reagents for each step** in the synthesis. Include **structures of intermediate products** that could be isolated after each step. Do **not** provide a mechanism or curved arrows. Pay attention to any **specific instructions** for each synthesis. Be clear! Messiness may result in lost points. *Note: There is often more than one correct answer!*

Synthesize the following product **starting with any molecules in the Reactant Toolbox**. You may subsequently introduce carbons (and other atoms) from other sources/reagents.


**Reactant Toolbox**


**Bonus Question 2 (see Page 1):**

