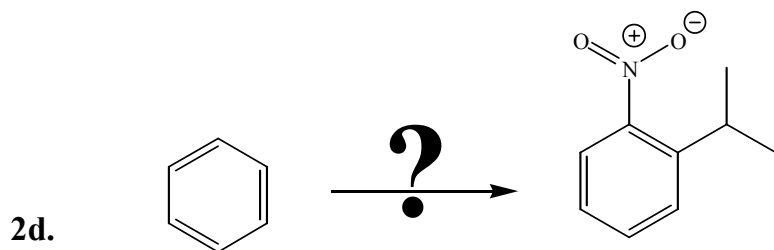
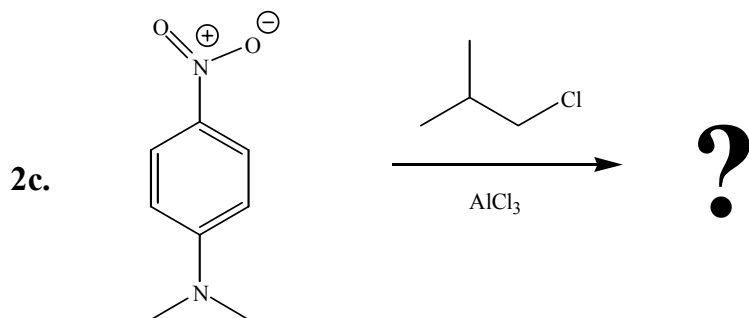
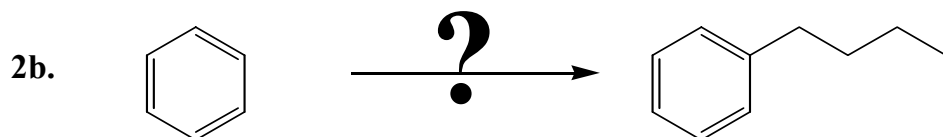
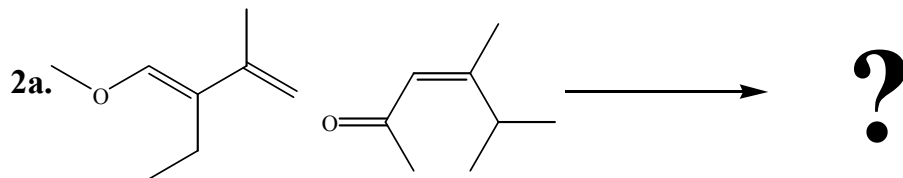


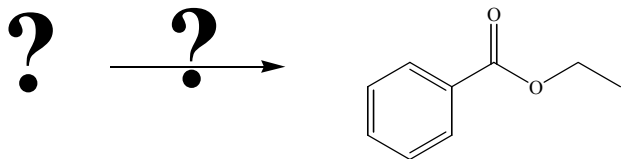


2. Consider the following reactions. Provide an answer that satisfies the question mark: Either predict the major product for each reaction **OR** provide the reagents for each synthesis (more than one reaction may be required). Pay Close attention to stereochemistry. Concisely explain your rationale: (72 points – 8 points for each)

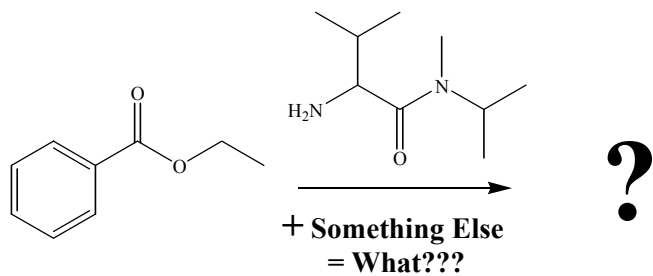


2cont.

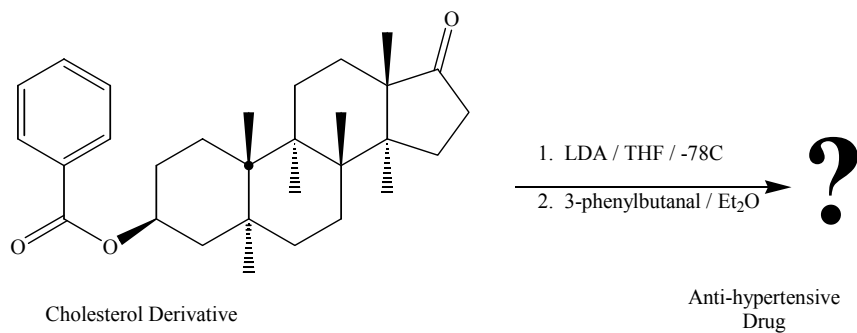
2e.



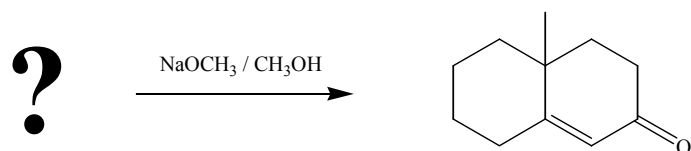
2f.



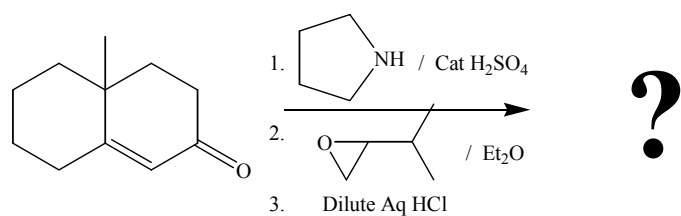
2g.



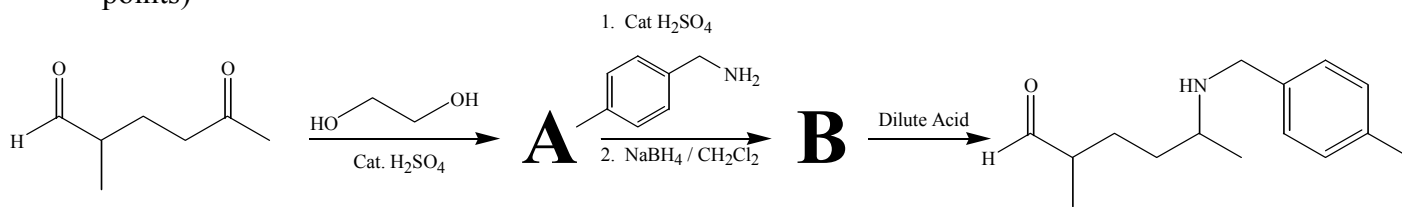
2h.



2i.



3. Bob wanted to do his end of the year project on the following reactions to produce the final product. (30 points)



- 3a. What is the structure of Product A? (2 pts)

- 3b. Write a mechanism that accounts for its formation. (7 pts)

- 3c. The reaction that forms product A is regioselective; explain why this is the case (2 pts).

- 3d. What is the structure of Product B? (2 pts)

- 3e. Write a mechanism that accounts for the formation of this product (10 pts)

3f. Bob wanted to treat product B with dilute acid to get his desired molecule. However, upon addition of dilute acid, only one product was observed with the following spectroscopic data:

GC-MSD: One peak at 7.35 minutes,  $m/z = 215$

IR: 3100 – 3000 (multiple medium peaks), 2960, 2870, 1620, 1400 – 1200 (multiple medium peaks), and fingerprint region.

NMR: 1.05 (d, 3H), 1.35 (q, 2H), 1.61 (d ( $J = 2\text{Hz}$ ), 3H), 2.11 (trip of doub ( $J = 7$  and  $2\text{Hz}$ ), 2H), 2.25 (s, 3H), 2.81 (sex, 1H), 4.10 (s, 2H), 5.05 (m ( $J = 2\text{Hz}$ ), 1H), 7.17 (d, 2H), 7.35 (d, 2H) (all peaks with out reported J values have  $J = \sim 7\text{ Hz}$ )

What product did Bob make? Show a mechanism that accounts for its formation. (7 pts)

Extra Credit: Why is the product that Bob wanted to form, not formed? (5 pts)