

**CHEM 330**

**Exam 2**

November 19, 2014

**ANSWERS**

**Your name:** \_\_\_\_\_

**This document consists of 7 pages**

This a closed-notes, closed-book exam

You may use your set of molecular models

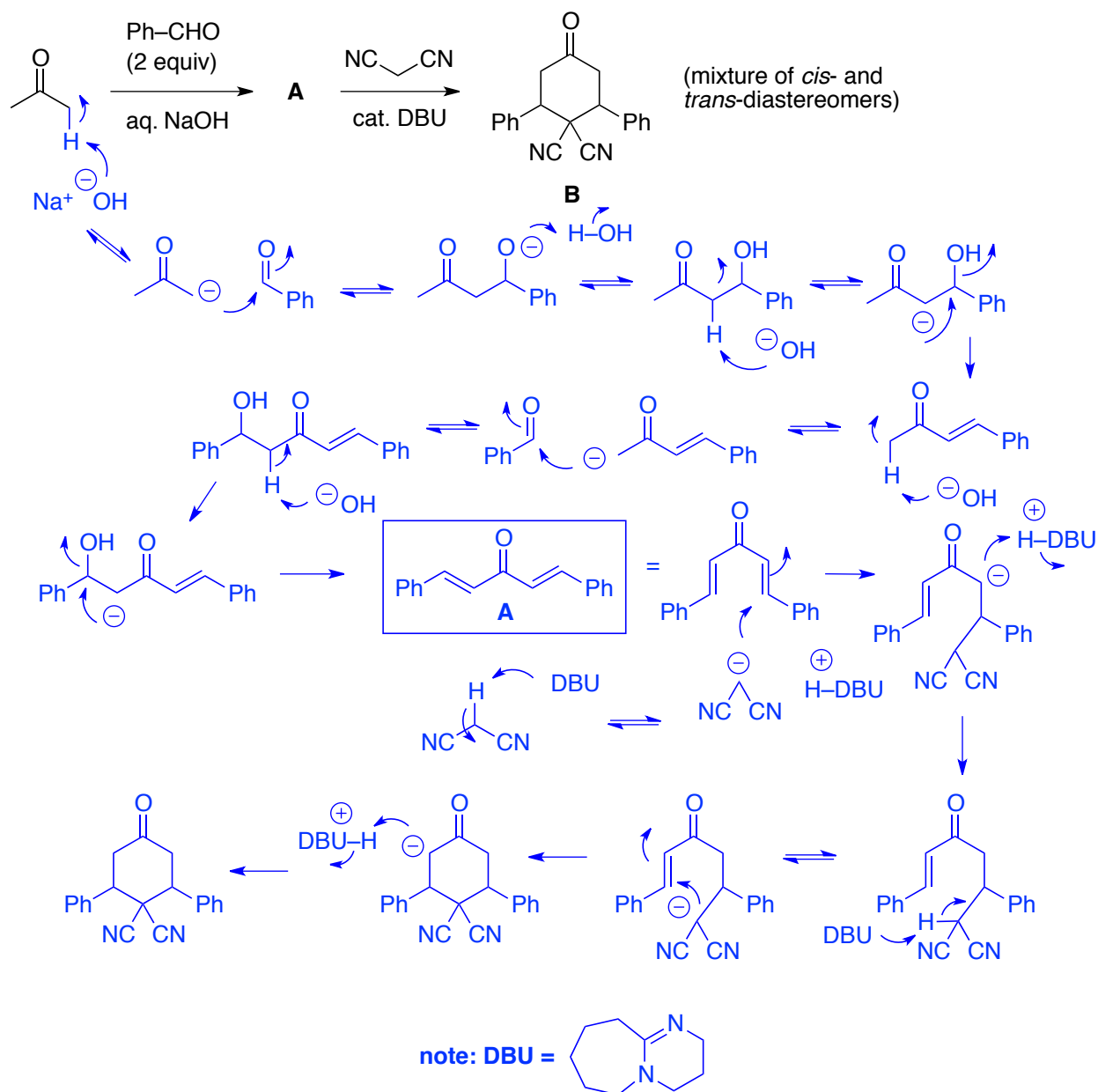
Time: 1.5 h

1. \_\_\_\_\_ / ~~15~~ 20
2. \_\_\_\_\_ / ~~15~~ 20
3. \_\_\_\_\_ / 20
4. \_\_\_\_\_ / 20
5. \_\_\_\_\_ / 20

**TOTAL** \_\_\_\_\_ / 100

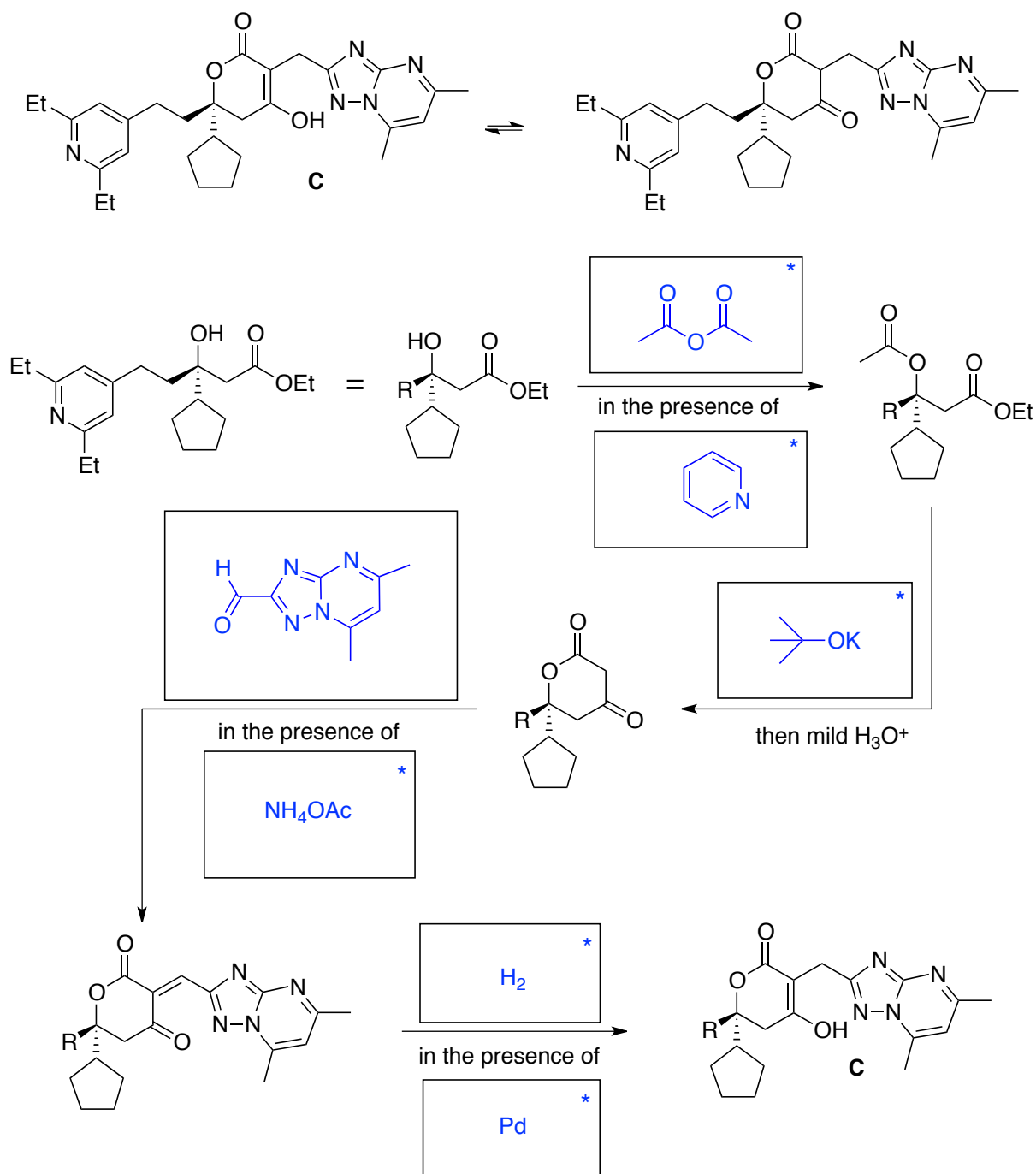
This exam counts for 25% of your CHEM 330 final grade

1. (15 20 pts.) Draw the structure of product **A** in the known sequence shown below (cf. *Org. Lett.* **2011**, 13, 374) and write an accurate mechanism for the formation of both **A** and **B**:



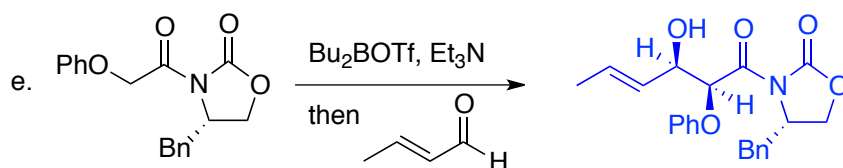
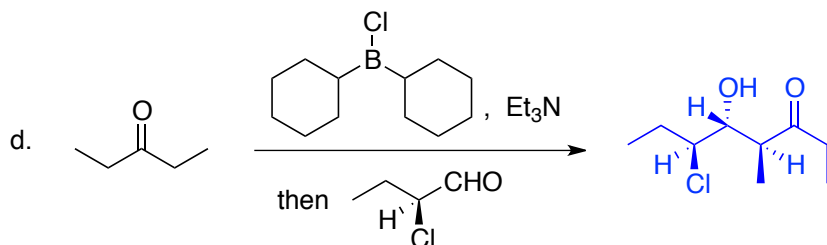
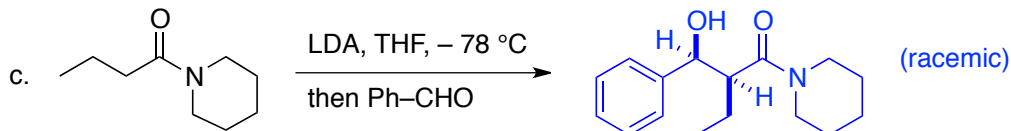
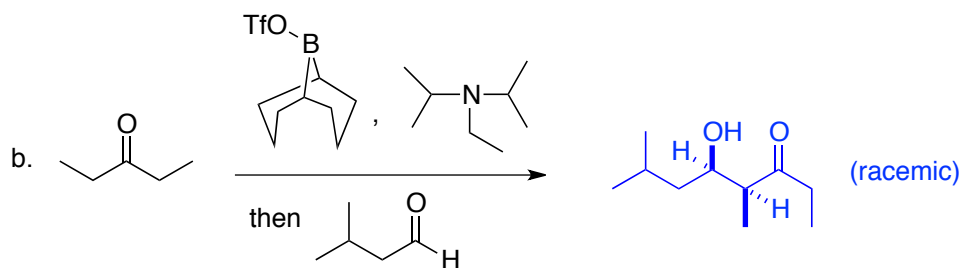
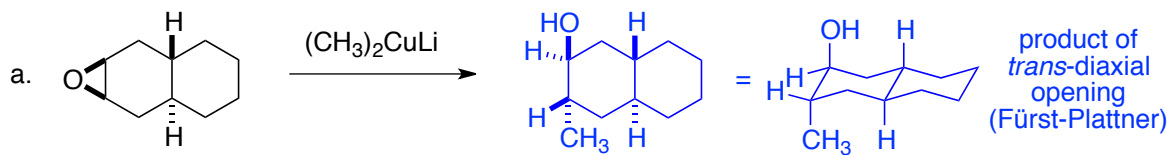
2. (15 20 pts.) Filibuvir, **C**, is a new drug that is currently being evaluated for the treatment of hepatitis C virus infection (the leading cause of liver transplants in North America). An efficient synthesis of the compound was recently described by Pfizer chemists (cf. *Org. Proc. Res. Dev.* **2014**, *18*, 26) as outlined in the diagram below. Complete this diagram by indicating all missing reagents / products. Each box corresponds to **one** reagent / product.

**Note:** aqueous workup steps are understood and are not to be included in your answers.

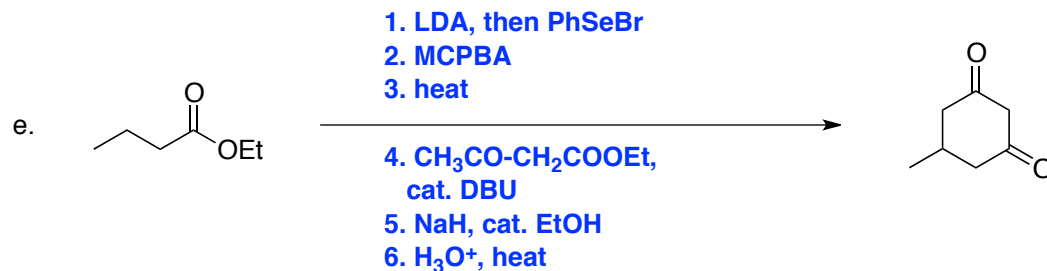
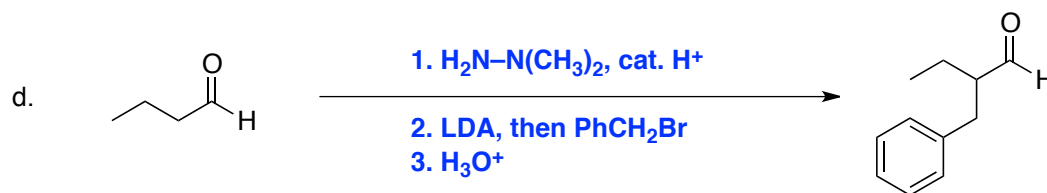
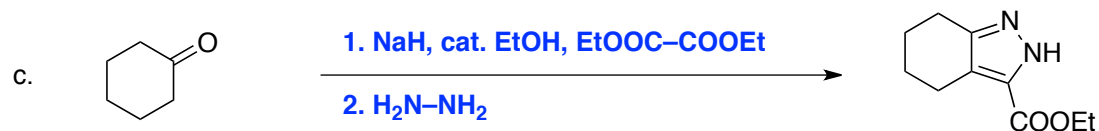
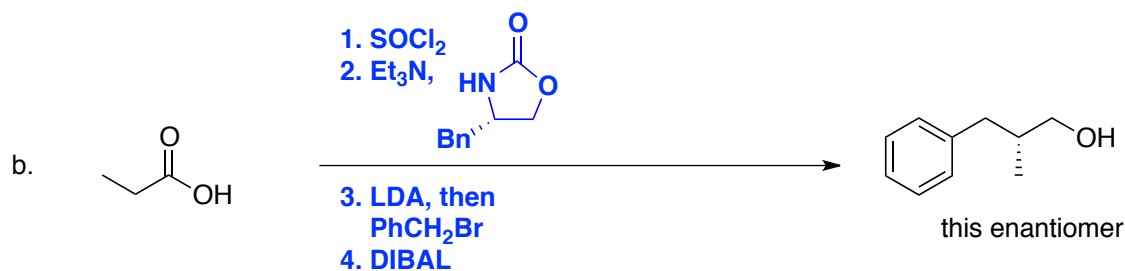
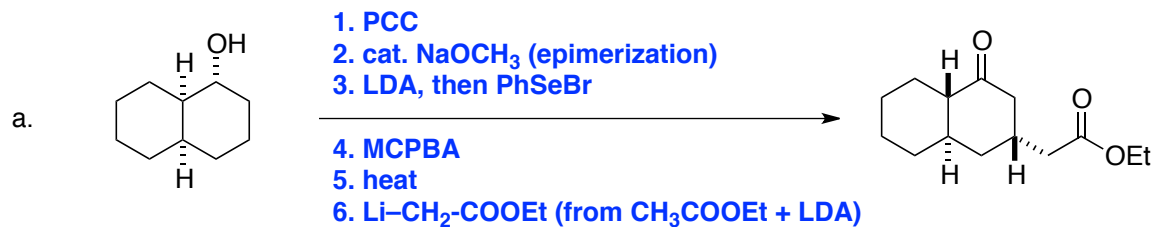


\* alternative reagents may be OK

3. (20 pts.) Draw the structure of the major product expected from the reactions shown below.  
**Note:** it is understood that each reaction is subject to a final aqueous workup.

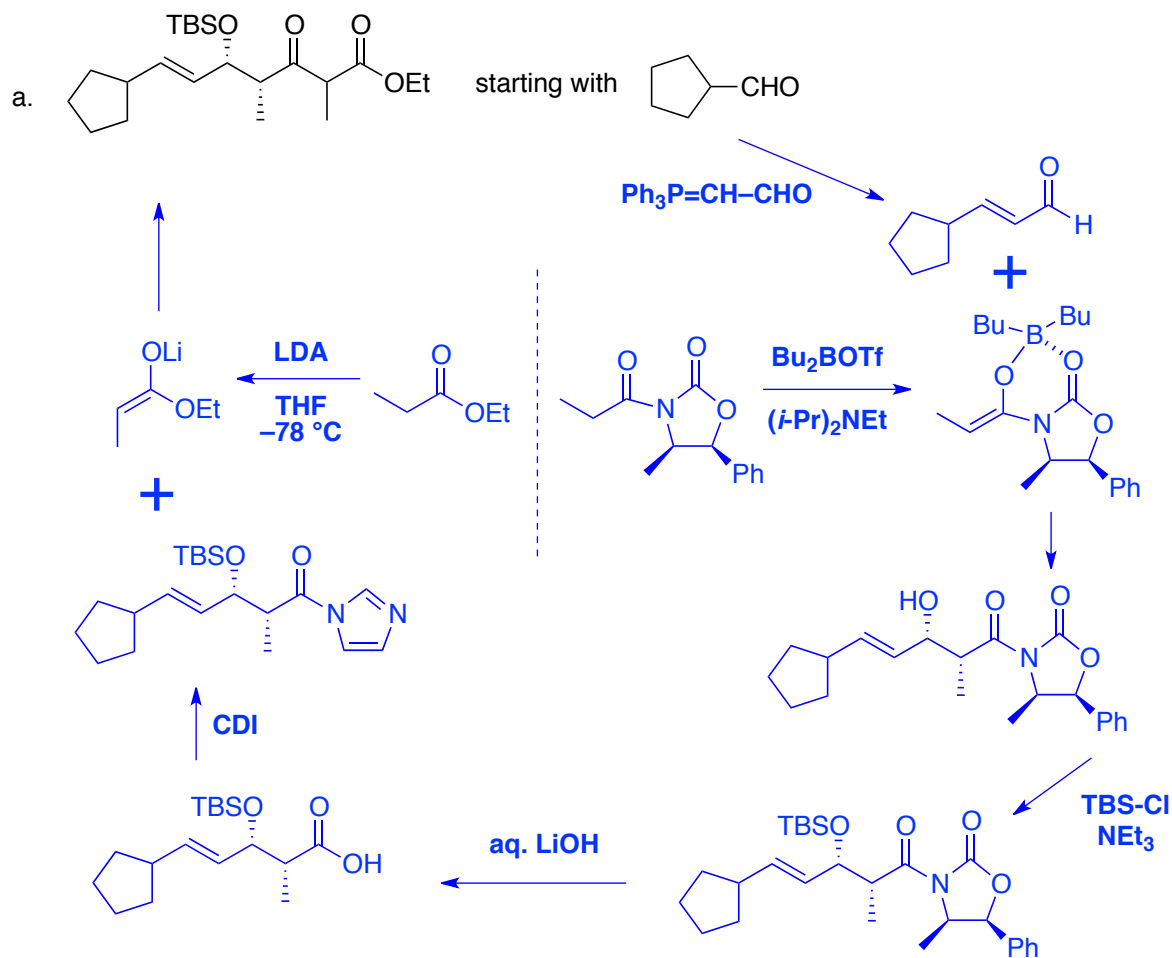


4. (20 pts.) Propose a method to achieve the transformations shown below. In each case, a multistep sequence (= not just one reaction, but several) may be required. Indicate all requisite reagents, in the correct order, as a numbered list above/below the reaction arrow. **Aqueous workups after each step are understood and there is no need to specify them.**



*alternative reagents may be OK*

5. (20 pts.) Propose a method to synthesize the substances shown below from the indicated materials. Assume the availability of all reagents needed to convert the starting compound into the product (e.g, bases, alkyl halides, etc.). Present your answer as a flowchart. **It is not necessary to draw mechanisms. Also, aqueous workups after each step are understood.**



• Virtually identical to problem 3c in HW 5

• Alternative approaches may be OK

