

# **Exam #1**

## **Chemistry 334**

### **Organic Chemistry II**

**Thursday March 4, 2010**

Name: \_\_\_\_\_ **KEY** \_\_\_\_\_.

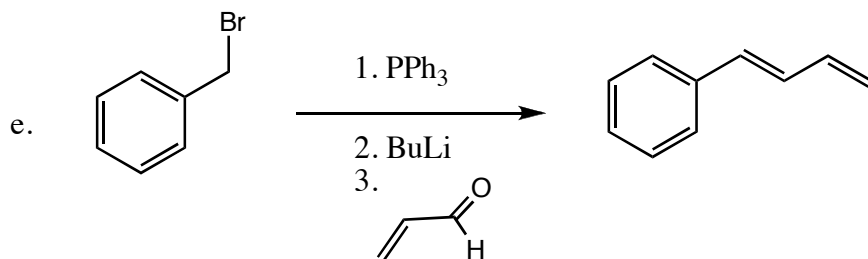
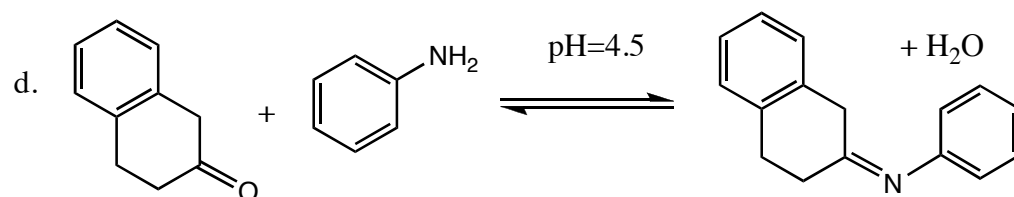
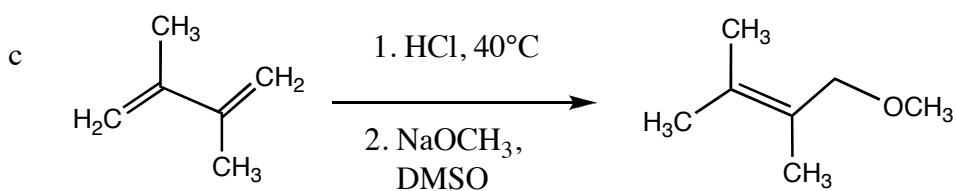
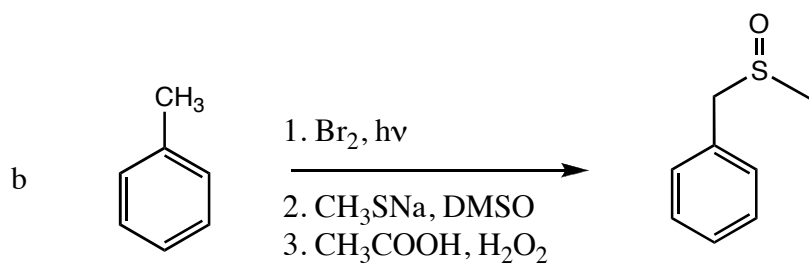
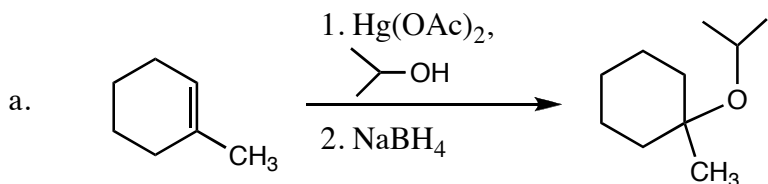
**The exam is worth a total of 100 points; there are six questions. Please show all work to receive full credit for an answer.**

**By putting your name on this exam, you agree to abide by California State University, Northridge policies of academic honesty and integrity**

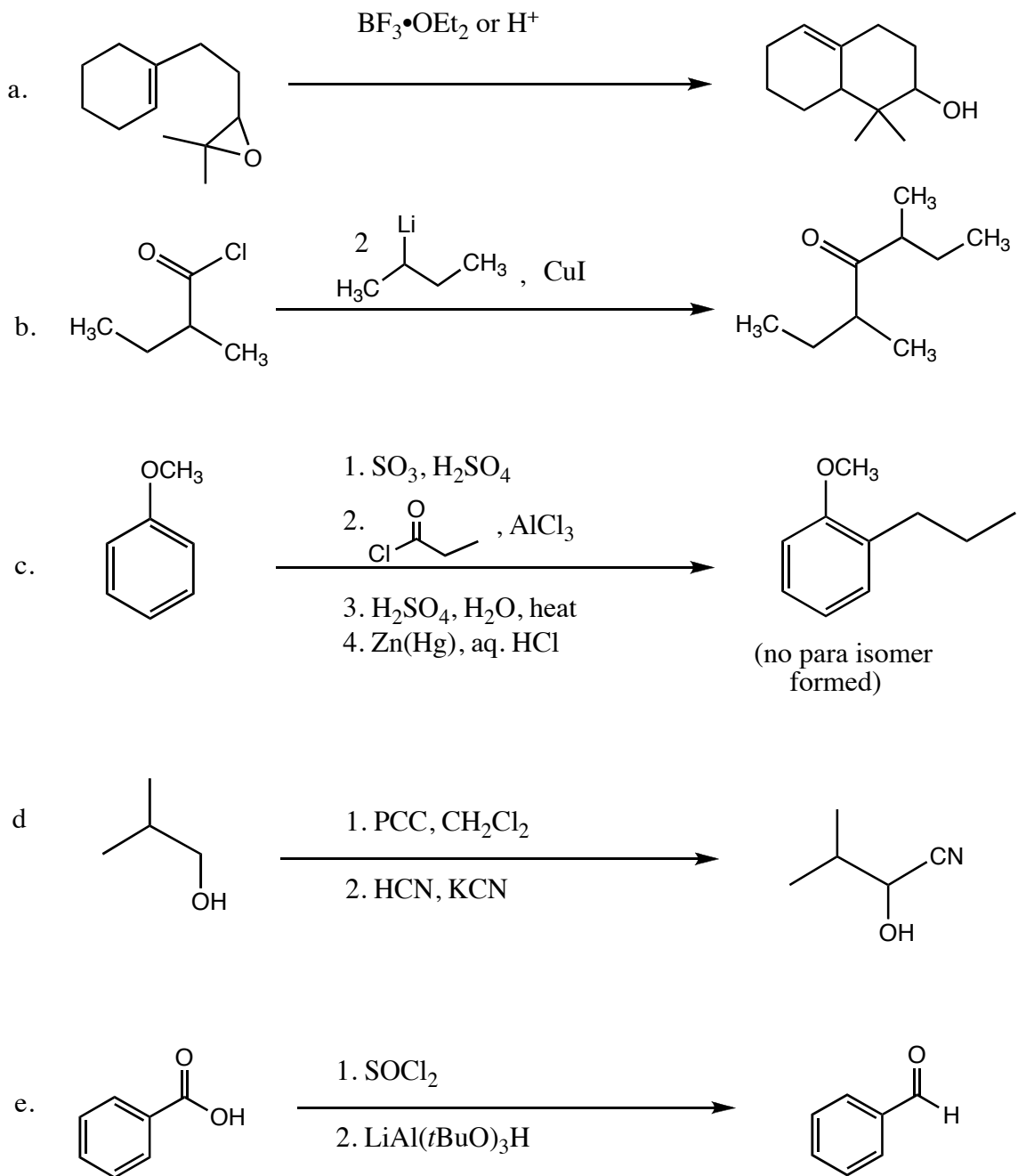
**Molecular models are allowed for this exam. Calculators are not needed.**

**Good Luck!**

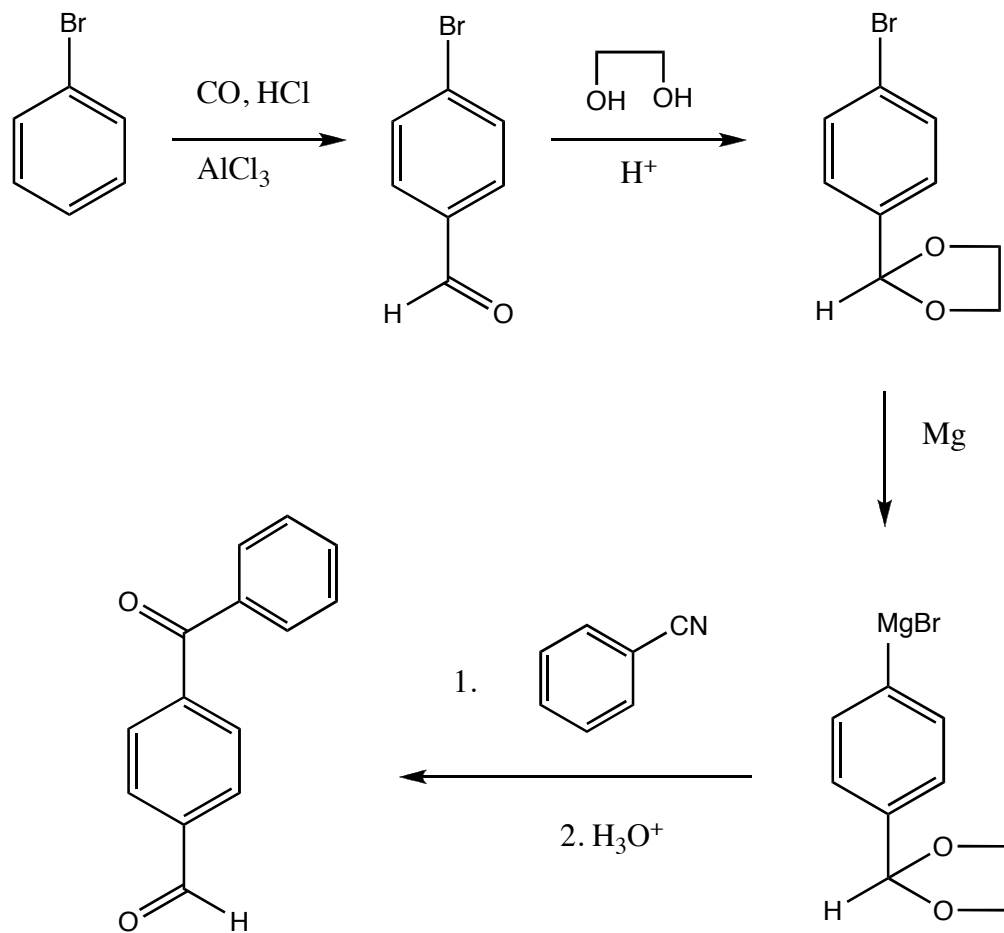
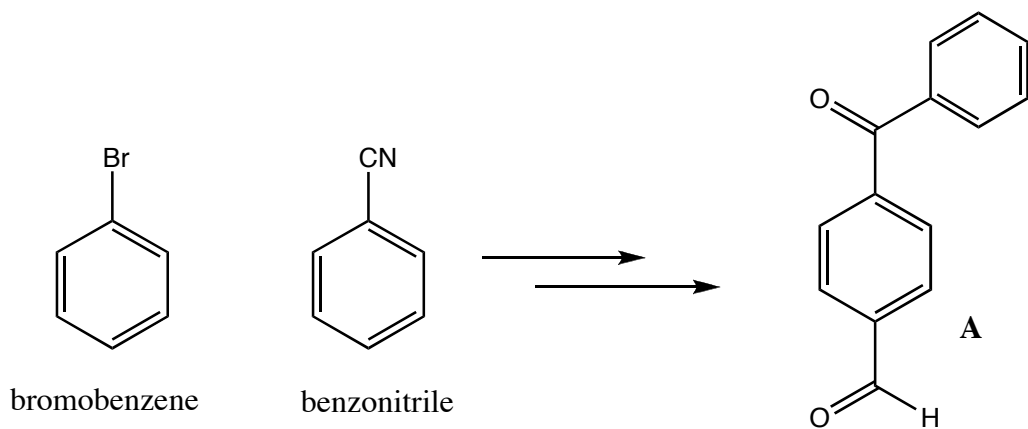
1. Predict the products of the following reactions. **Remember to indicate stereochemistry where relevant.** (20 pts)



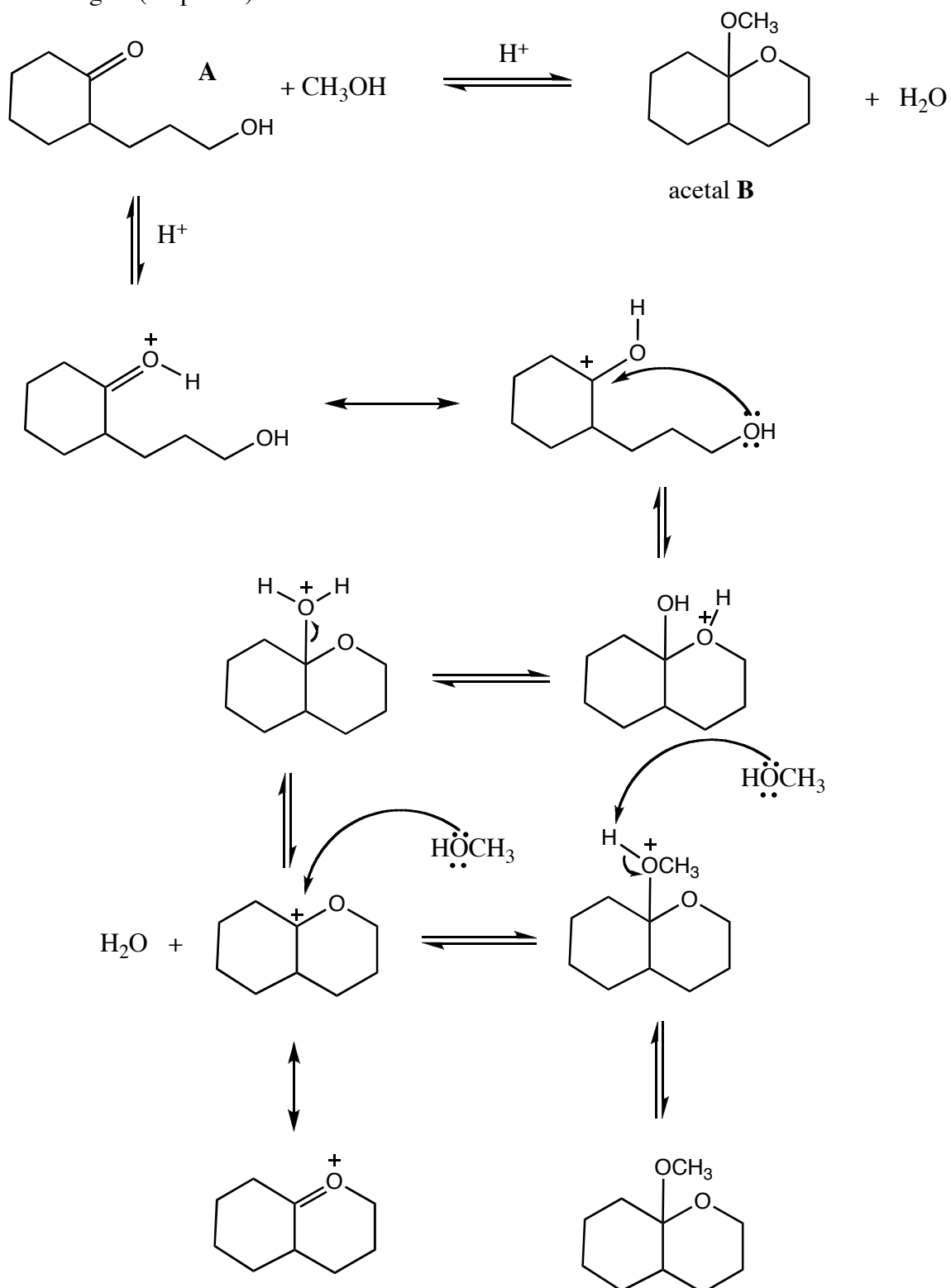
2. Indicate reagents to accomplish the following transformations. **More than one step will usually be required!!** (20 pts)



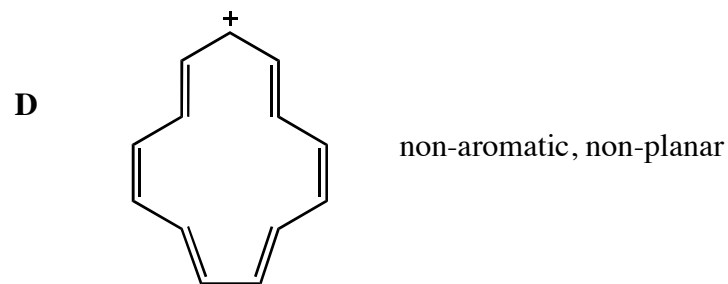
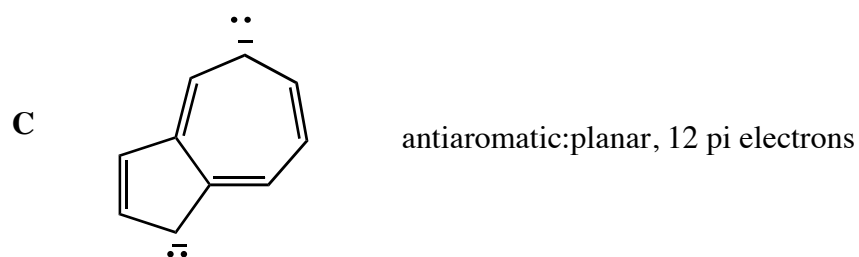
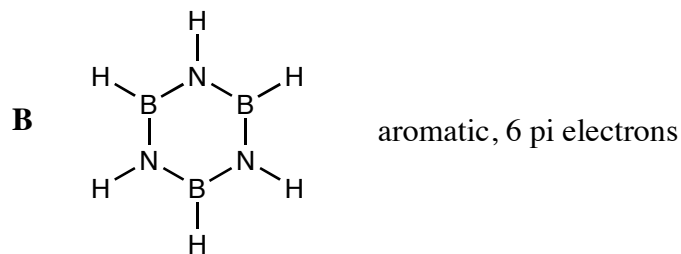
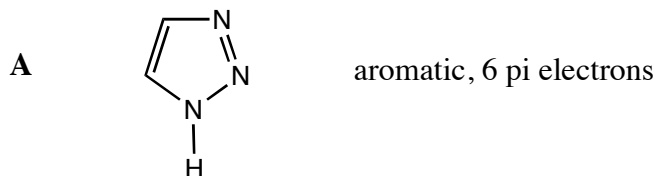
3. Design a synthesis of compound **A** from bromobenzene and benzonitrile. Useful reagents may include: HOCH<sub>2</sub>CH<sub>2</sub>OH, H<sup>+</sup>, CO, HCl, AlCl<sub>3</sub>, Mg, ether, H<sub>3</sub>O<sup>+</sup> (15 pts). 5 steps will do it!



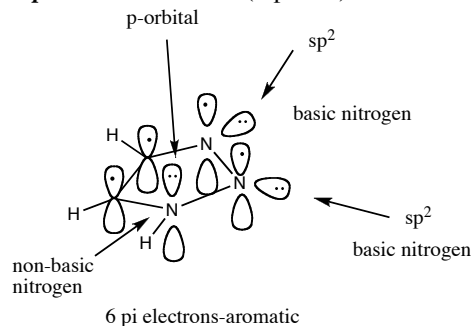
4. Draw a mechanism for the formation of acetal **B** from ketone **A** and methanol. Remember to include all intermediates, lone pairs on heteroatoms, and formal charges. (15 points)



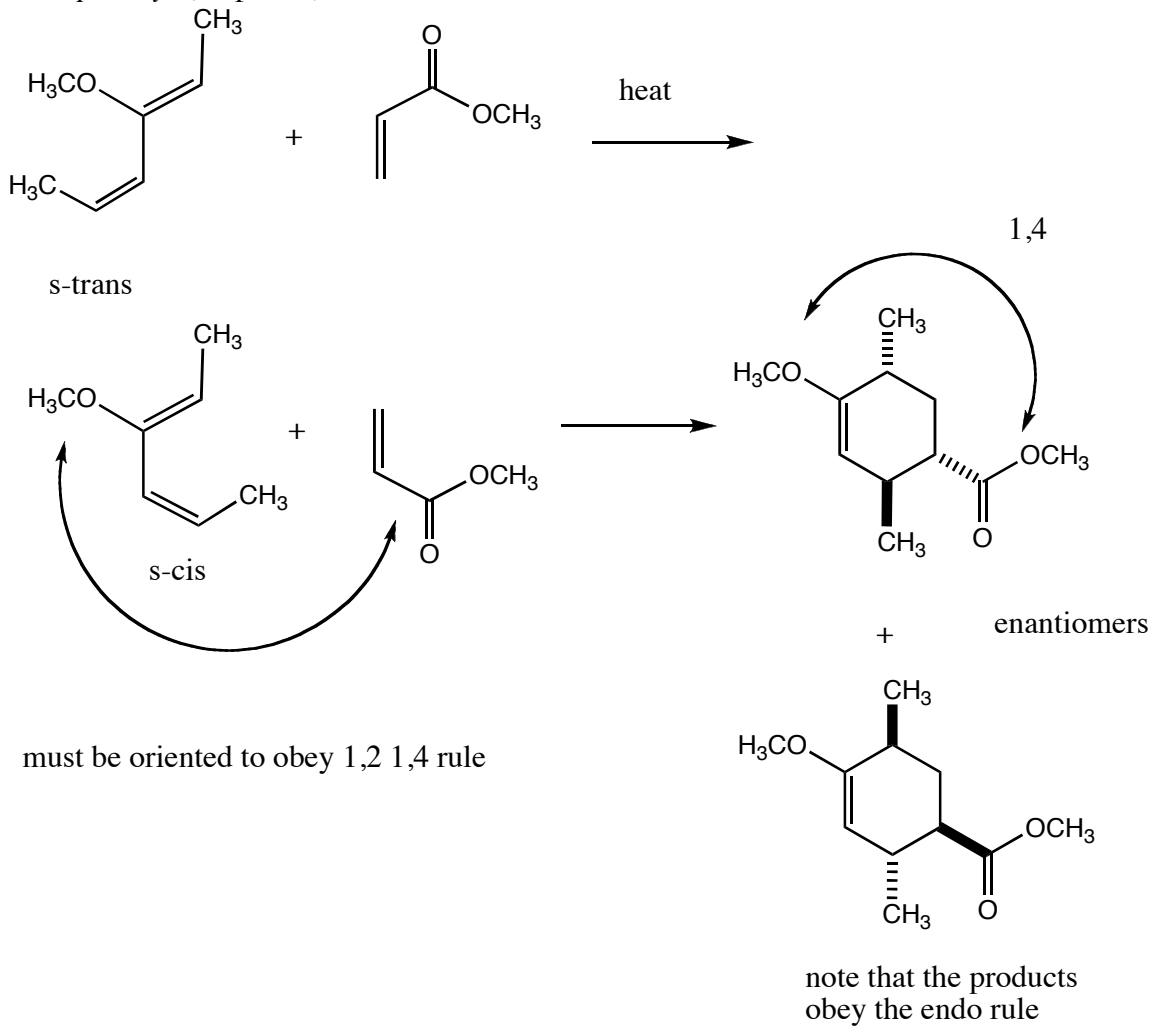
5. Identify whether each of the following compounds is **aromatic, antiaromatic, or non-aromatic**, **and explain why**. Be sure to draw out all lone pairs on heteroatoms! (12 points)



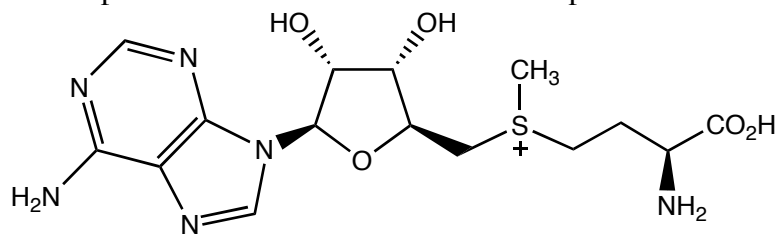
- E** Draw out the orbital structure of the compound in **A** above, showing explicitly the overlapping p orbitals of the pi system and any orbitals bearing lone pairs. **Which nitrogen(s) in the structure are expected to be basic?** (8 points)



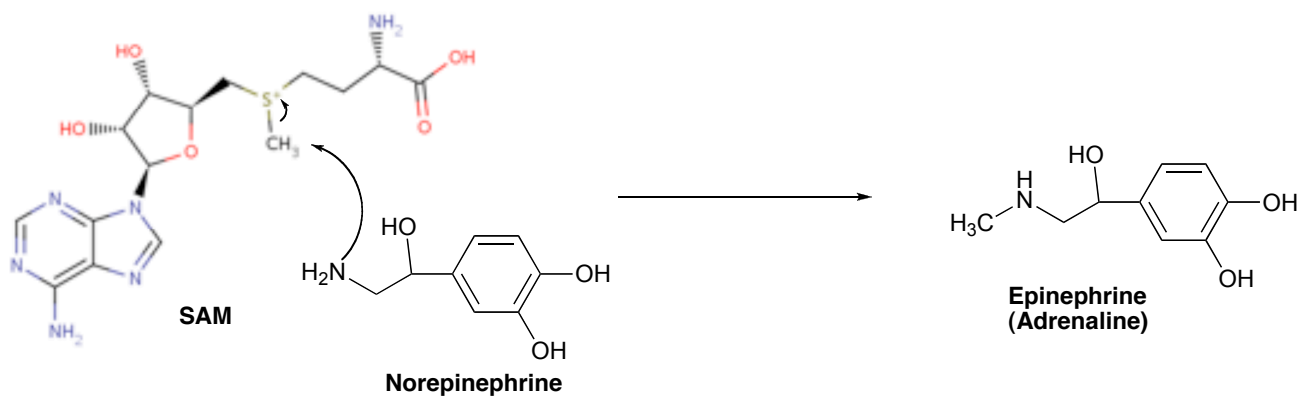
6. Draw the product(s) of the following reaction, *being sure to note stereochemistry explicitly.* (10 points)



Bonus. Explain how S-adenosyl methionine (SAM) acts as a biological methyl transfer agent, giving an example of its reaction with amine nucleophiles.



SAM (S-adenosyl methionine)



Congratulations!

Score:

1. \_\_\_\_\_ /20

2. \_\_\_\_\_ /20

3. \_\_\_\_\_ /15

4. \_\_\_\_\_ /15

5. \_\_\_\_\_ /20

6. \_\_\_\_\_ /10

Bonus: \_\_\_\_\_ /10

Total: \_\_\_\_\_ /100