Exam 1
Organic Chemistry II C3444
Prof. Nuckolls
February 17, 2003

- **Write your name on every page.**
- **You should have 5 pages including this one.**
- **Turn off your cellular phones.**
- **Do your own work.**
- **Good Luck!**

Name: _____

Columbia I.D. #: _____

Signature: _____

_____

Grading:

#1	/12
#2	/12
#3	/12
#4	/12
#5	/12
#6	/12

Section 1 _____ /72 points

Section 2 _____ /28 points

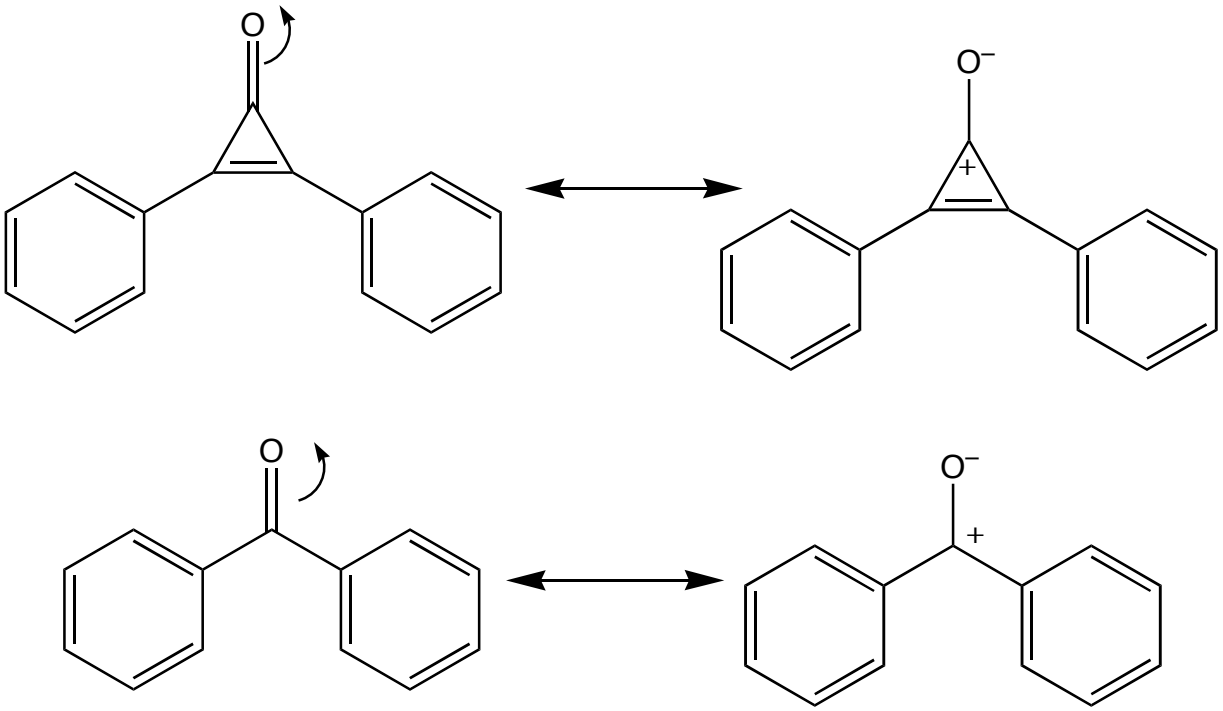
_____

Total _____ /100 points

Name:

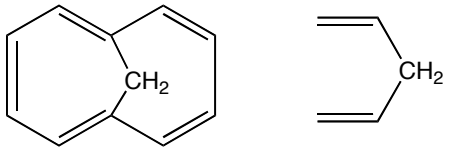
Section 1. Answer the following questions in the space provided. (12 points each, 72 points total)

1. Circle the compound below with the greater dipole moment. Draw resonance structures and *a few words* to explain your answer.



The resonance form of the cation from B above is an aromatic cation. So, the charge is more stabilized than the cation drawn for A which is not aromatic. Therefore the dipole is greater in B than A.

2. Would you consider compound **A** to be aromatic? Explain why in *one sentence*. Consider the proton NMR resonance for each of the methylenes from **A** and **B**. Which methylene resonance would occur at lower field strength (i.e., larger ppm numbers). Explain why in *one sentence*.

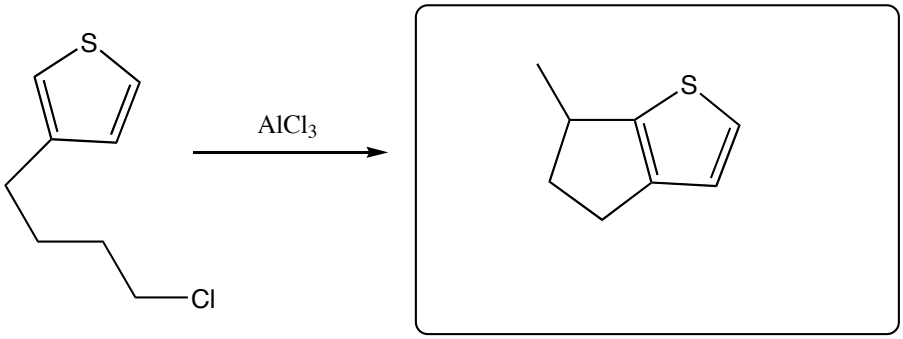


A **B**

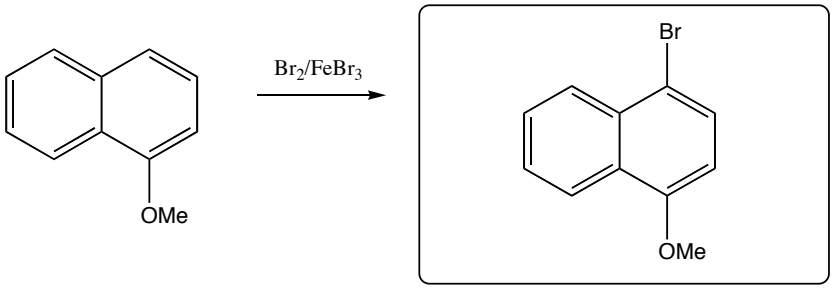
A is aromatic because it has 10π electrons conjugated in a cycle. The methylenes from B occur at larger ppm values (downfield) relative to A because of the shielding environment inside the aromatic ring current that is lacking in B because it is not cyclic.

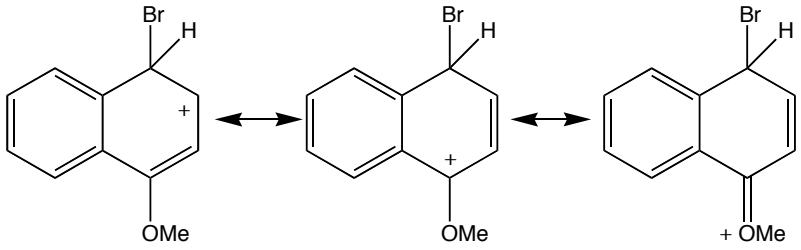
Name:

3. Draw the product from the reaction below in the box. If your answer is incorrect, the work below the problem will be used to determine the amount of partial credit



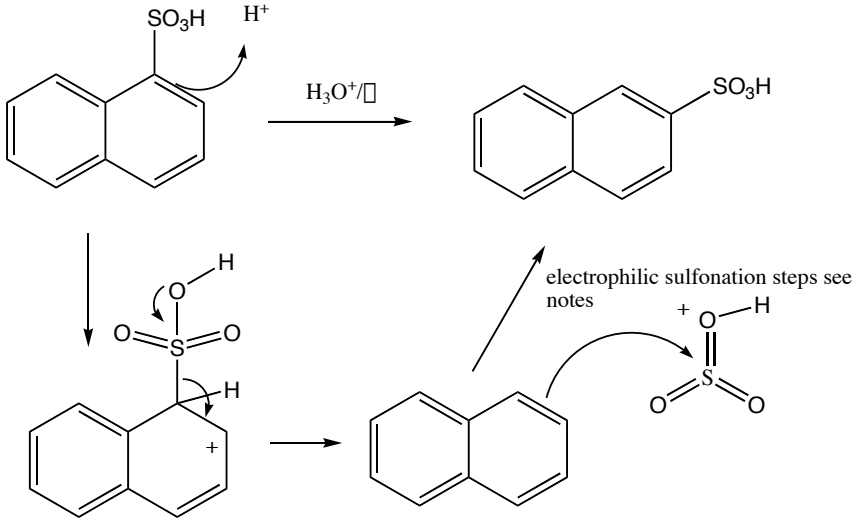
4. Draw the product of *monosubstitution* in the box. Below the reaction, draw the *three* lowest energy resonance forms for the arenium cation that predict the product that you drew.



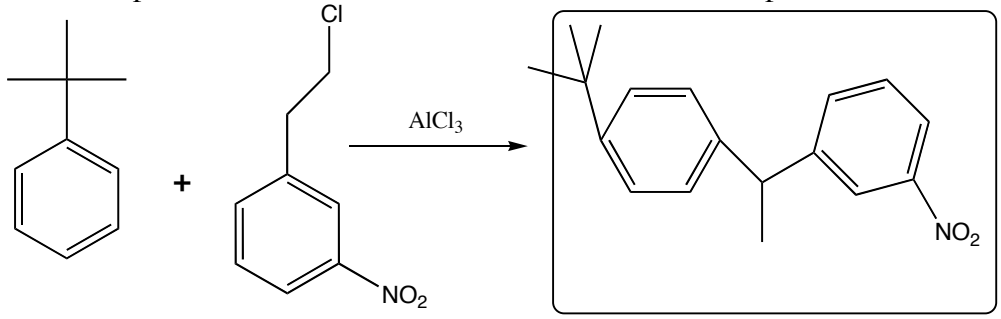


Name:

5. Write a mechanism for the following transformation.



6. Draw the product from the following reaction in the box provided. If your answer is incorrect, the work below the problem will be used to determine the amount of partial credit.



Name:

Section 2. Show the steps (and the intermediate products) you would use to synthesize the target molecule from the starting materials given. You do not need to write out the mechanisms. (28 points)