

Organic Chemistry c3444y

1st Hour Exam

Monday, Feb. 22, 1999

Prof. Leighton

Name: _____ **ID#** _____

Signature: _____

- Write your name on every page.
- The exam is 5 pages long (*not* including this one). Please make sure you have all of the pages.
- Stay calm, and write complete but succinct answers. **Good Luck!**

Question 1 (20 pts): _____

Question 2 (10 pts): _____

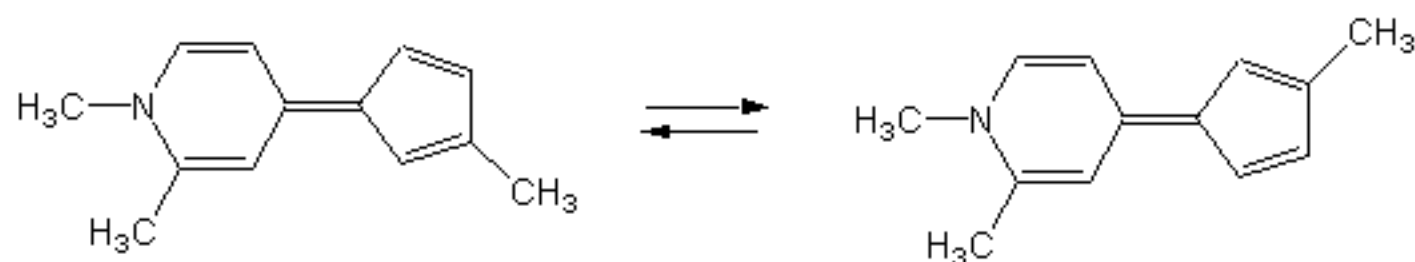
Question 3 (20 pts): _____

Question 4 (20 pts): _____

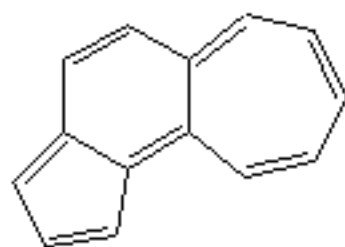
Question 5 (30 pts): _____

Total (100 pts): _____

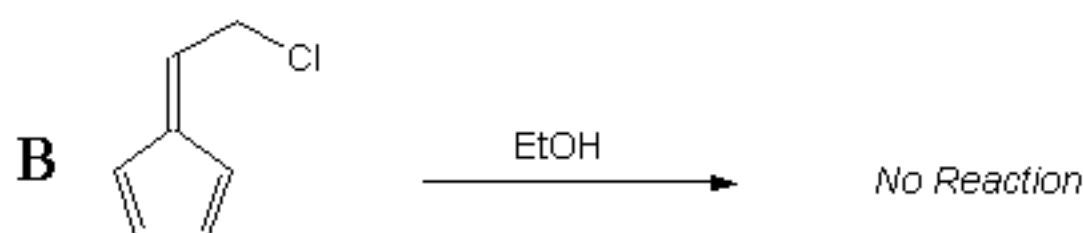
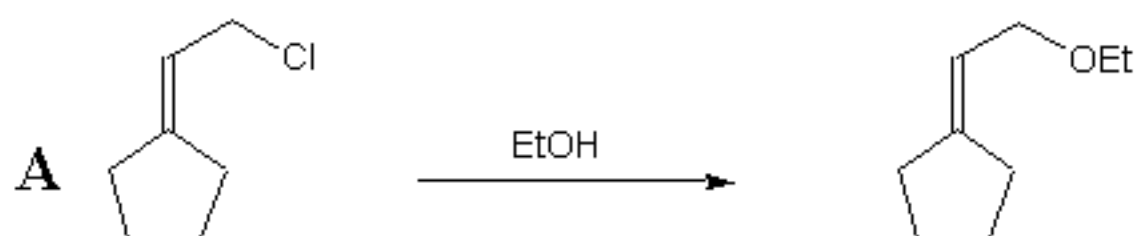
1. a. (10 pts) It has been observed that the following molecule undergoes unusually facile rotation about the central double bond, whereas "normal" double bonds will not rotate in such a manner. Using resonance structures, provide a simple explanation for this phenomenon.



- b. (10 pts) Make a prediction as to the relative stability of the illustrated compound. Would you expect it to be unusually stable, unusually unstable, or about the same as a regular polyene? Use resonance structures to provide a simple explanation for your answer.

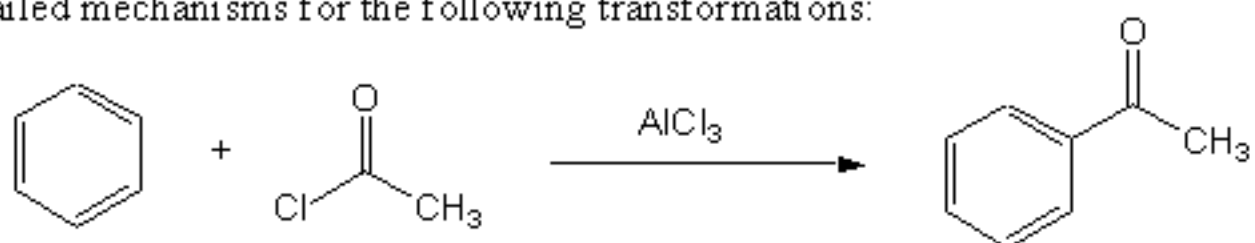


2. (10 pts) Consider the S_N1 reactions of the illustrated allylic chlorides. As expected, compound **A** reacts quite readily. However, under the same conditions compound **B** is quite inert. Recalling that the rate-determining step in the S_N1 reaction is the loss of chloride to form a cation, explain why compound **B** does not readily undergo S_N1 reaction.

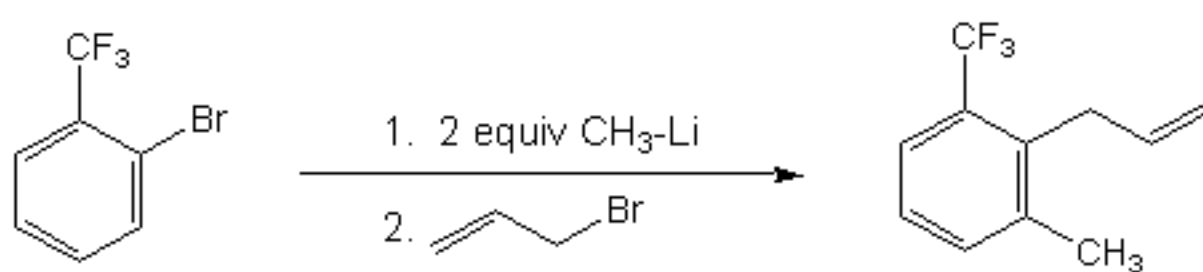


3. Provide detailed mechanisms for the following transformations:

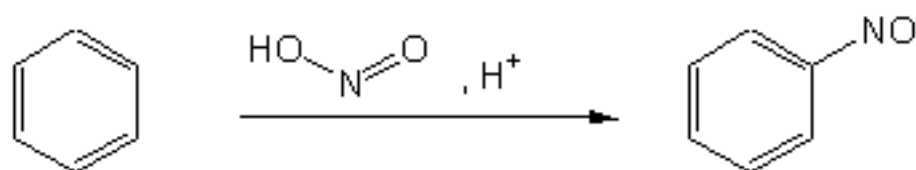
a. (10 pts)



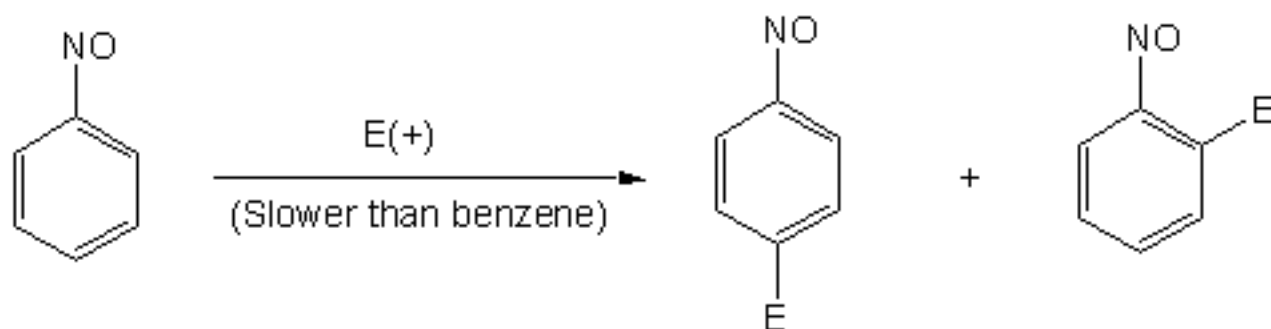
b. (10 pts)



4. a. (10 pts) There is another type of electrophilic aromatic substitution called *nitrosation*. Provide a mechanism for this reaction. First, you must decide what is the actual electrophile here, and how it is formed.

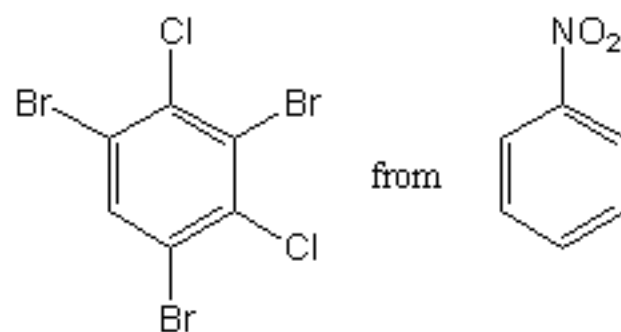


- b. (10 pts) Provide an explanation for the fact that the nitroso group (NO) is a deactivator, but an *ortho/para* director.



5. Propose syntheses of the following compounds from the given starting materials.

a. (15 pts)



b. (15 pts)

