

Please print:

Last name: _____

First name: _____

Chem 2062 Exam 2

Spring 2006

Andy Aspaas, Instructor

Friday, March 3, 2006

Instructions:

You have 55 minutes to complete this exam.

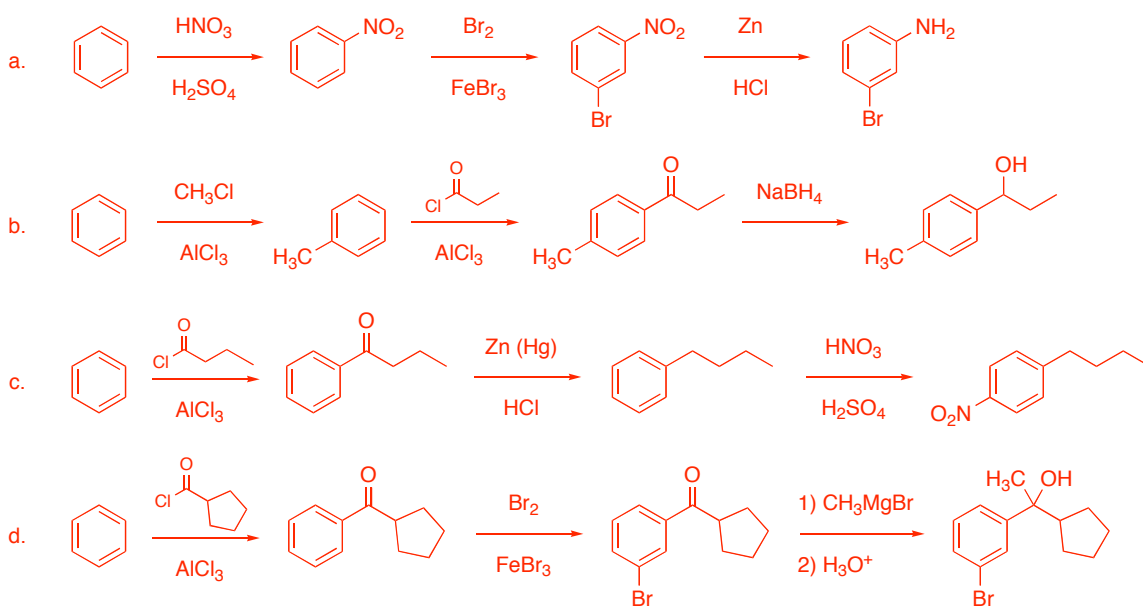
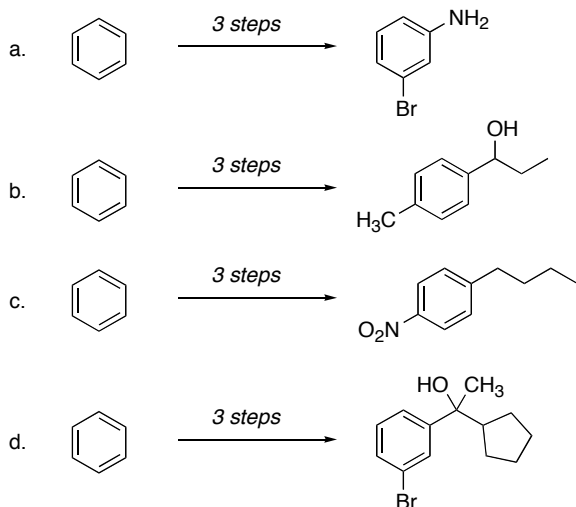
8 questions are included on this exam, totaling 100 points.

No model kits or calculators may be used.

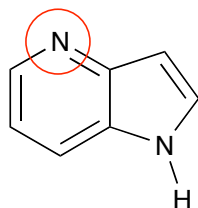
I, _____ have read and understand the directions given above, and pledge that I will follow all regulations with regard to Academic Dishonesty as outlined by this college when taking this exam.

Signature _____ Date and Time _____

3. **Choose two** of the following syntheses and complete them with the correct reagents and products for each reaction. No mechanisms are needed.



4. In the following compound, circle the nitrogen which is the **most basic** and briefly explain why:

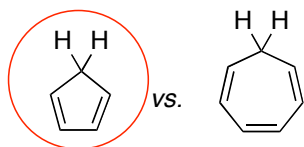


Explanation: the electron pair on the circled nitrogen is in an sp^2 hybrid orbital and is not part of the aromatic system. protonating at that nitrogen will not cause aromaticity to be lost

Does the nitrogen you circled have a **lower pK_b** or a **higher pK_b** than the other?

The lower the pK_b , the more strongly basic a compound or site is.

5. Circle the compound below which is the **most acidic** and briefly explain why:

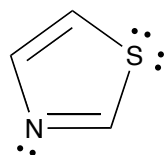


Explanation: deprotonating cyclopentadiene makes an aromatic cyclopentadienyl anion (with 6 π electrons). a stabilized conjugate base makes for a stronger acid

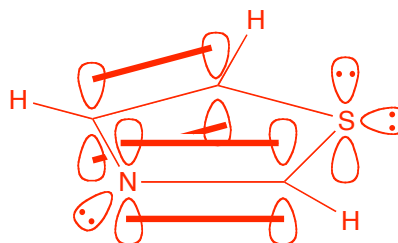
Does the compound you circled have a **lower pK_a** or a **higher pK_a** than the other?

The lower the pK_a , the more strongly acidic a compound is.

6. Draw the compound below 3-dimensionally, showing all hydrogens, p orbitals, π bonds, and lone pairs.



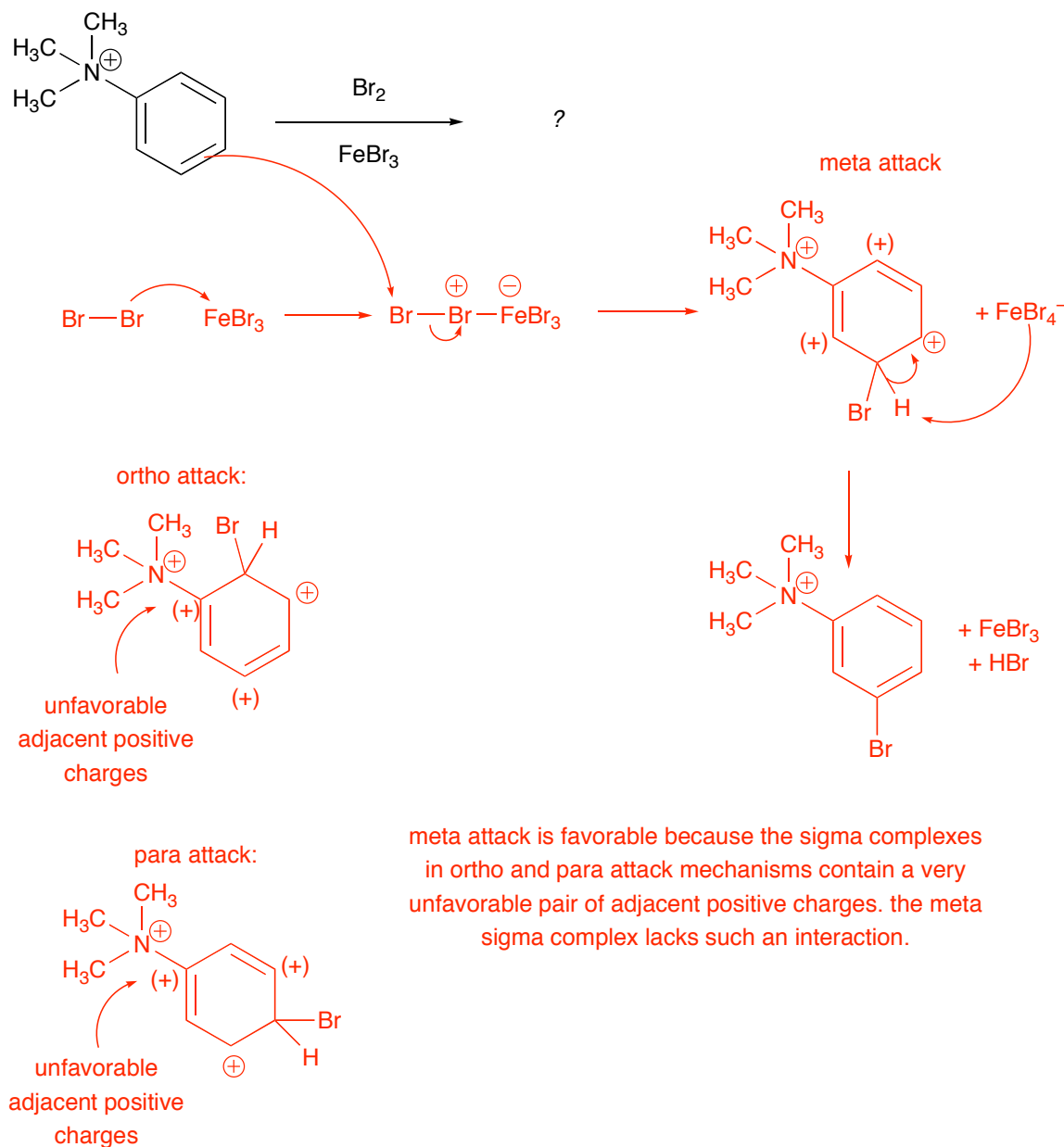
Drawing:



Is this compound nonaromatic, antiaromatic, or aromatic? Why?

There are 6 π electrons in adjacent coplanar p orbitals, so it is aromatic.

7. Draw the complete mechanism and predict the major monobrominated product for the following reaction. Briefly explain the regiochemistry of the major product, using the appropriate resonance structures of the other possible sigma complexes to illustrate.



8. (5 pts extra credit) Complete the synthesis below, showing the correct reagents required and the major product of each reaction.

