

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.

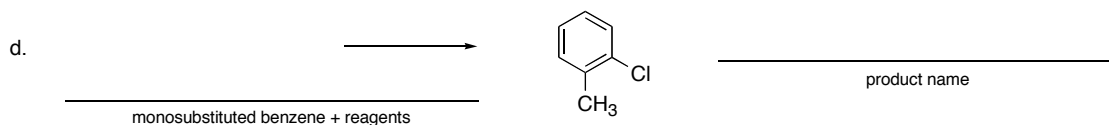
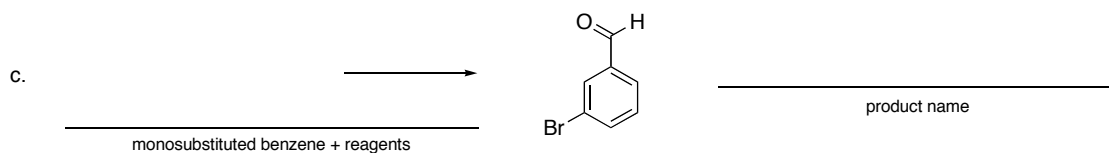
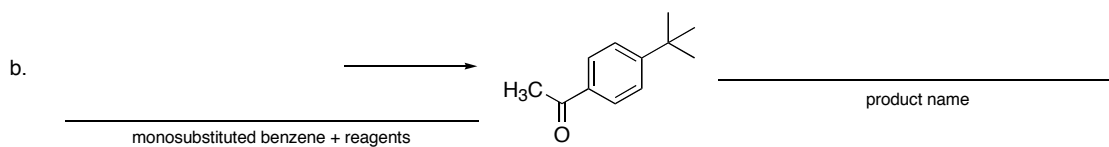
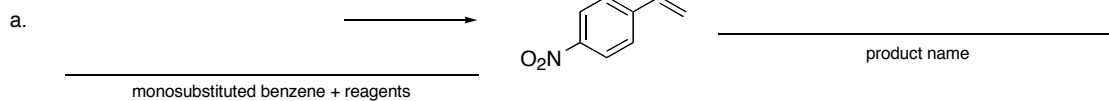
8 questions are included on this exam, totaling 100 points.

No model kits or calculators may be used.

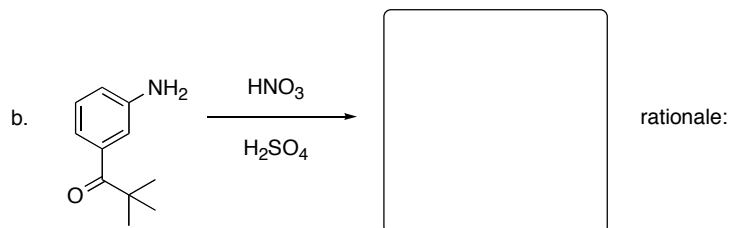
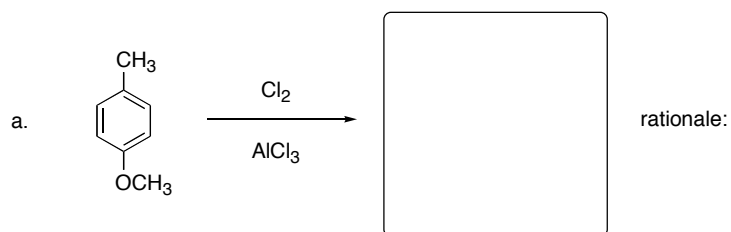
I, \_\_\_\_\_ have read and understand the directions given above, and pledge that I will follow all regulations with regard to Academic Dishonesty as outlined by this college when taking this exam.

Signature \_\_\_\_\_ Date and Time \_\_\_\_\_

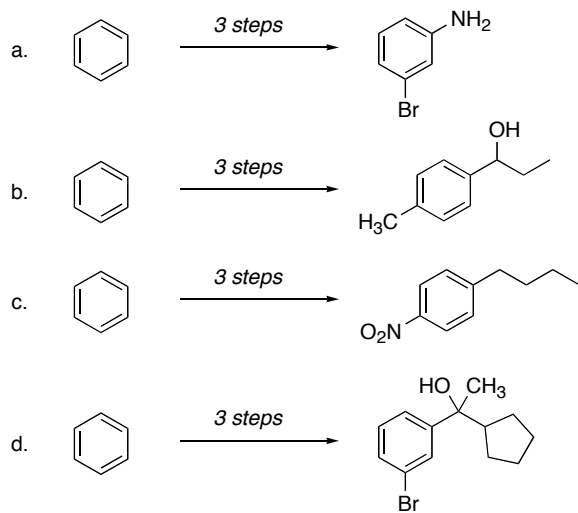
1. Use an electrophilic aromatic substitution reaction to synthesize the following products in one step (using the most efficient process possible), starting with a **monosubstituted** benzene of your choice. Then, write the correct name of the product.



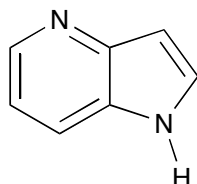
2. Predict the major product for each of the following electrophilic aromatic substitution reactions, and briefly summarize your rationale for the product's regiochemistry.



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



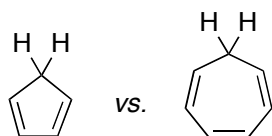
4. In the following compound, circle the nitrogen which is the **most basic** and briefly explain why:



Explanation:

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

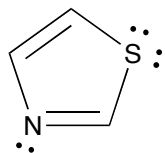
5. Circle the compound below which is the **most acidic** and briefly explain why:



Explanation:

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

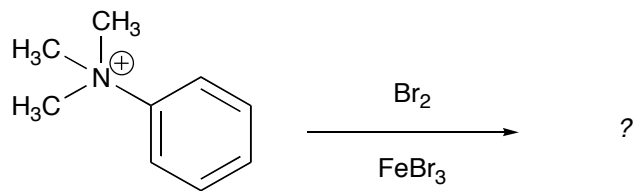
6. Draw the compound below 3-dimensionally, showing all hydrogens, p orbitals,  $\pi$  bonds, and lone pairs.



Drawing:

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

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.

