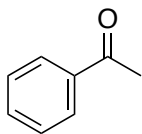


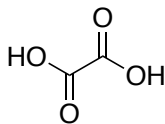
## Chemistry 2521 Exam 2 (135 points)

Name: Key

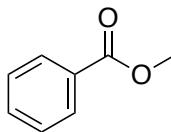
1. (12 pts) Provide structures for the following names:



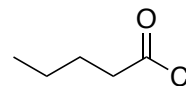
acetophenone



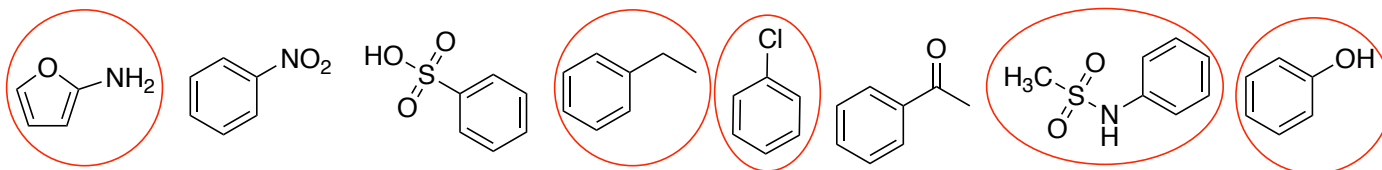
oxalic acid



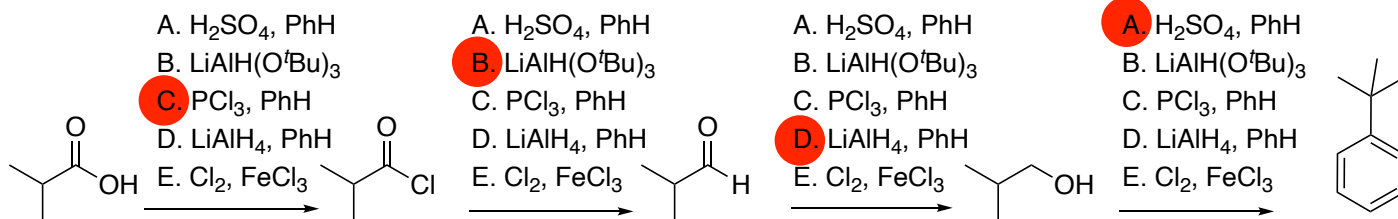
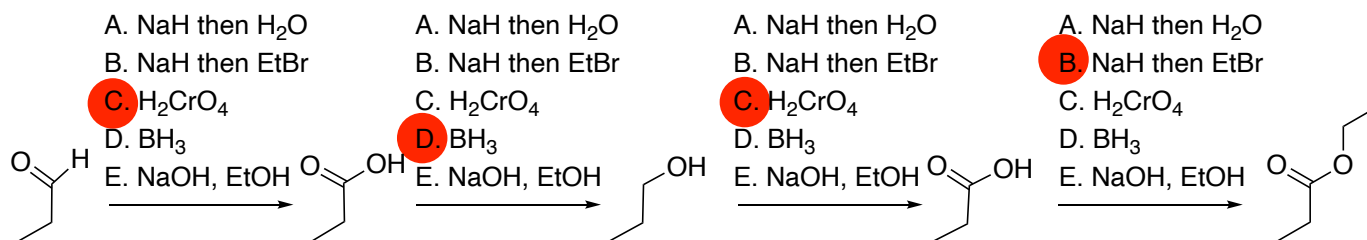
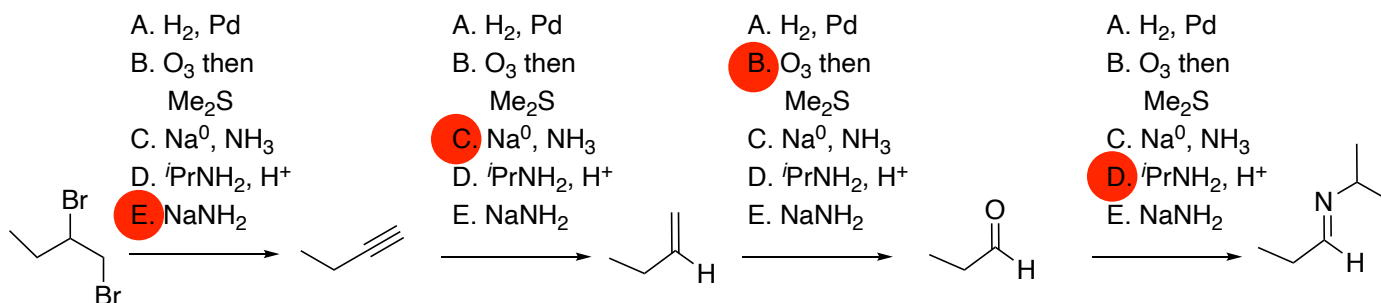
methyl benzoate



pentanoyl chloride

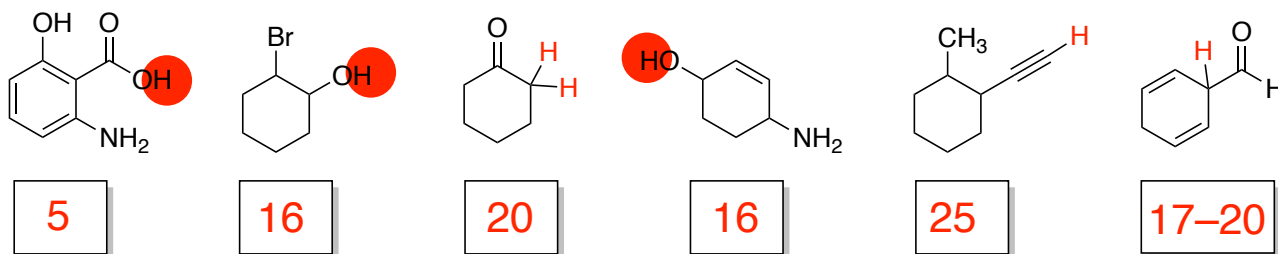
2. (16 pts) Circle the aromatic compounds that have ortho/para directors

3. (24 pts) Circle the letter (A–E) for the correct reagent for each transformation.



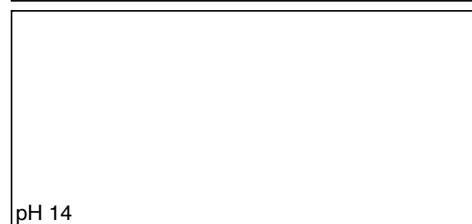
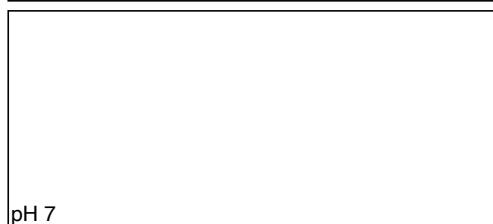
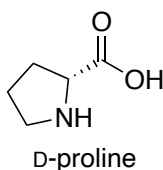
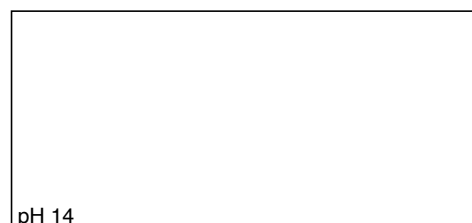
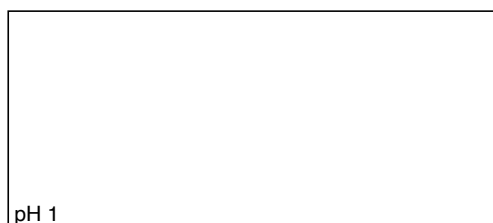
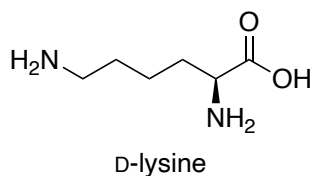
4. (12 pts) Circle or draw in the most acidic proton in each molecule and estimate its pKa.

note: if you skip circling (or drawing in) or estimating a pKa, no credit will be given.

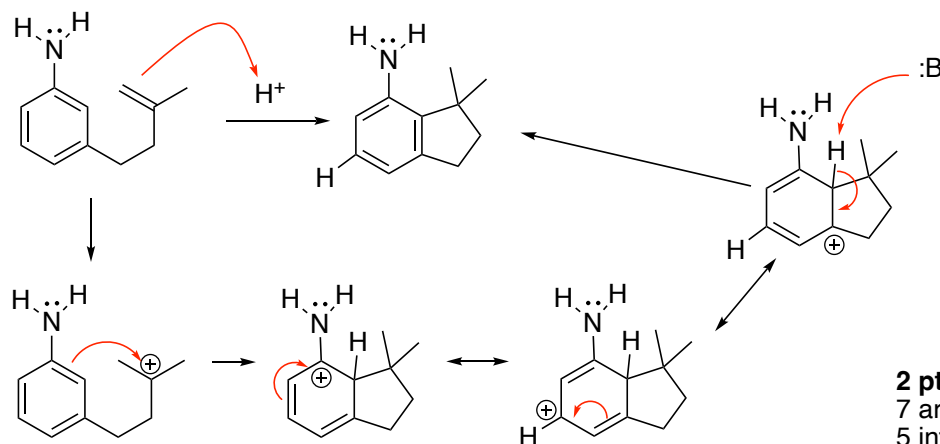


note: pKa values were not graded THIS TIME.

5. (8 pts) For each of the amino acid below, draw the form of the amino acid at the given pH values. Assume the isoelectric point is at pH 7 for both. In reality, that is not the case but I am trying not to confuse the issue.

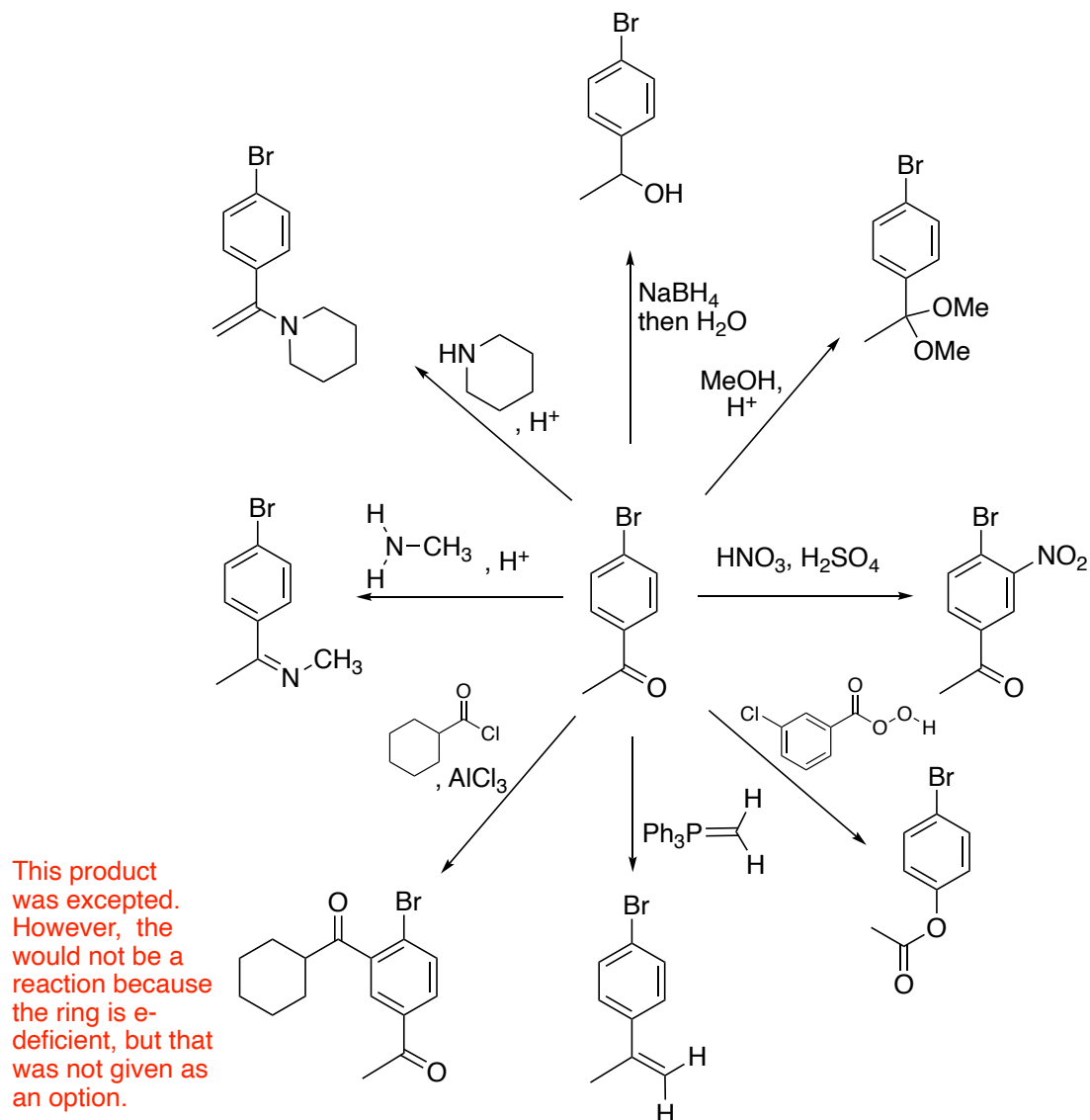


6. (24 pts) Draw a detailed arrow-pushing mechanism for the following transformation. Include ALL resonance structures that show distribution of charge.

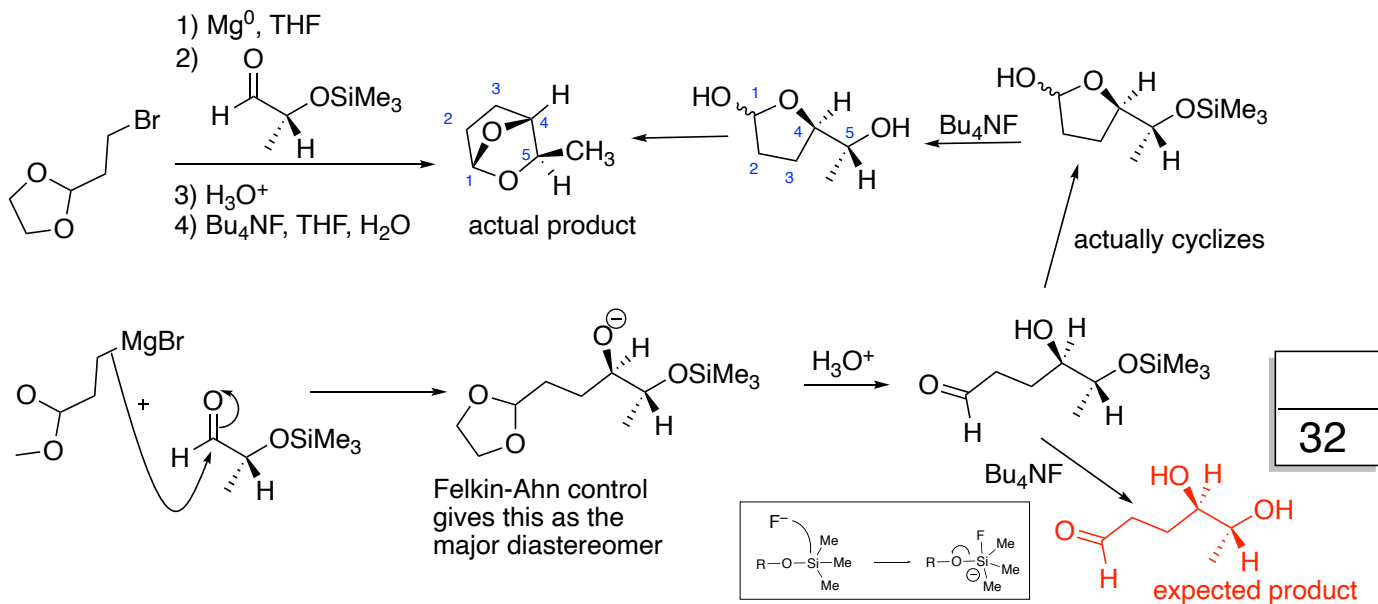


2 pts each for the:  
7 arrows  
5 intermediates/resonance structures

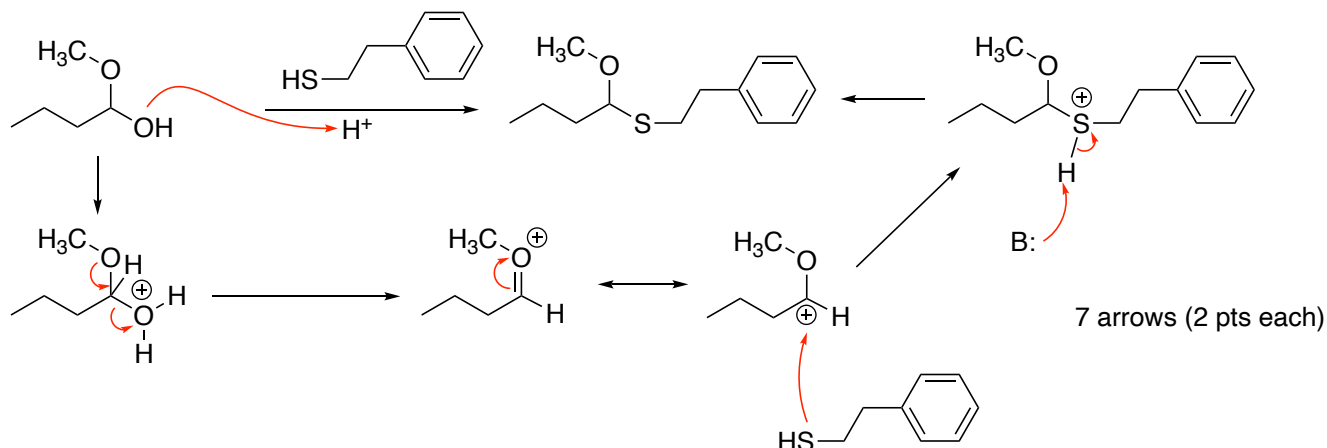
7. (24 pts) Give the major product for the following reactions.



8. (8 pts) Give the major product for the following reaction sequence. Give intermediate products for partial credit.



9. (14 pts) Draw a detailed arrow-pushing mechanism for the following transformation. Include all resonance structures that show distribution of charge.



10. (9 pts) Provide a retrosynthetic analysis of the following compound. You can use benzene and any other carbon containing starting materials of 3 carbons or less. Note: this could be made in just a few steps

