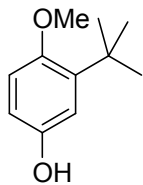


A

Sample midterm 1 KEY, CHM 2120  
2012

1. Name or draw the structure of the following molecules, as appropriate. (4 points)

a.

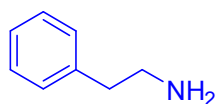


4-methoxy-3-*tert*-butylphenol

or

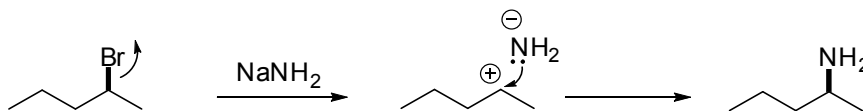
4-hydroxy-2-*tert*-butylanisole

b. 2-phenylethylamine

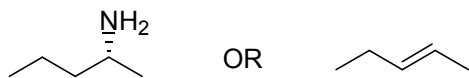


2.

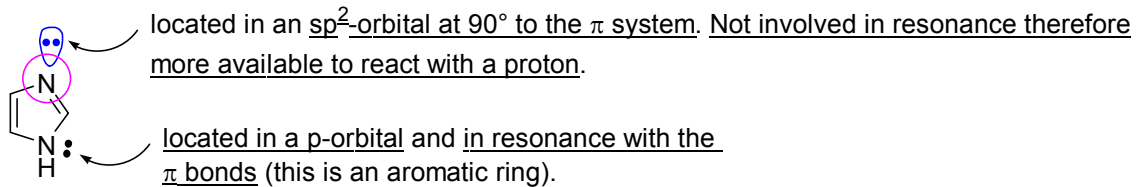
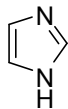
- Explain why the following reaction will not work as shown. (4 points)
- Give the true product of the reaction sequence. (2 point)
- How would you make the desired alkyne containing product from the alkene shown? (4 points)



- There is a strong nucleophile and a secondary alpha carbon that bears a good LG. These are conditions for an  $S_N2$  reaction (or E2)
- An  $S_N1$  reaction would give a mixture of stereoisomers

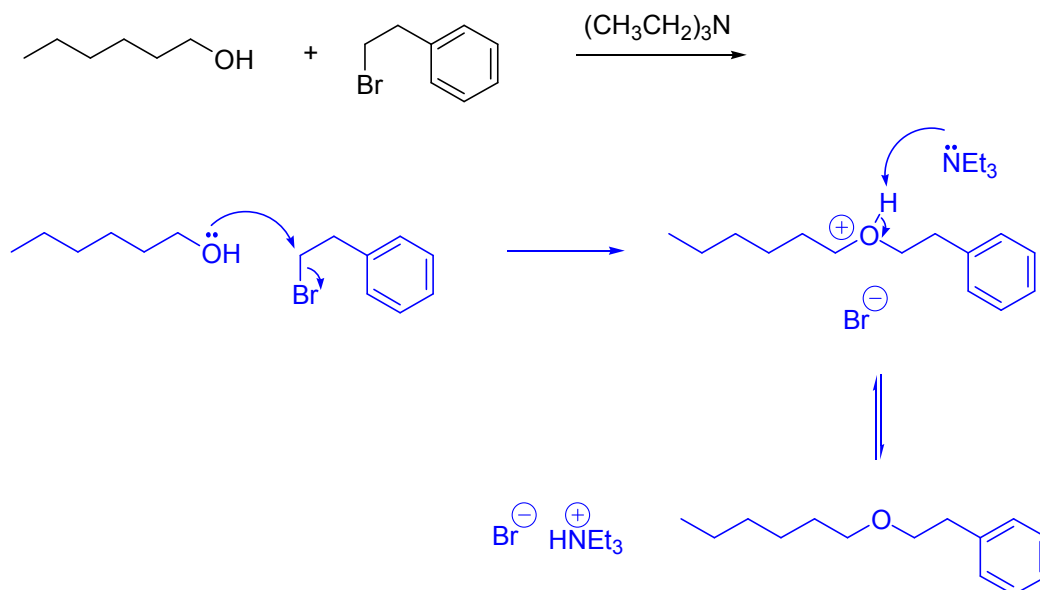


3. Circle the most basic atom in imidazole and explain your choice.



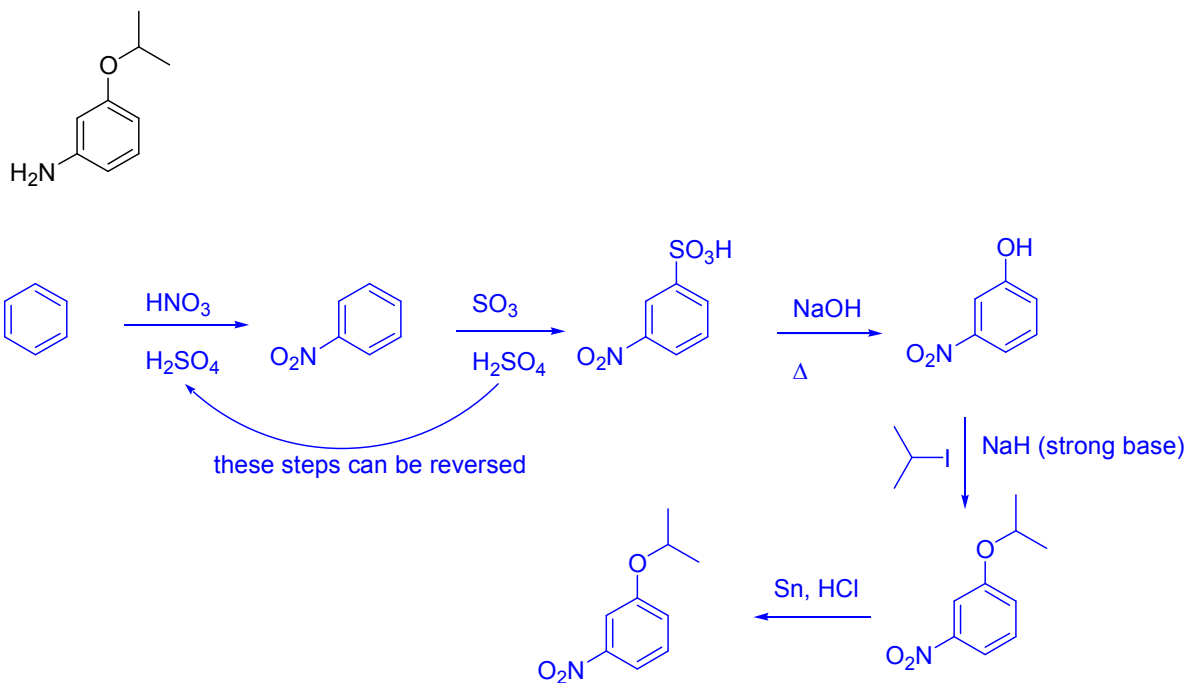
4.

- a. Give the full detailed mechanism for the formation of the major product in the reaction below.

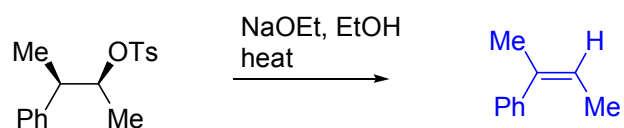
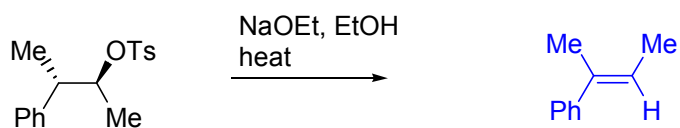
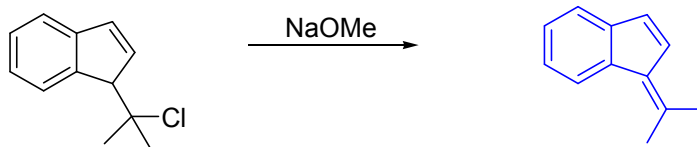
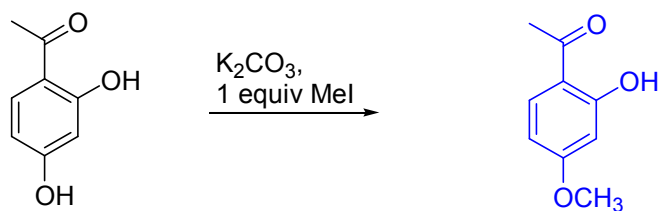
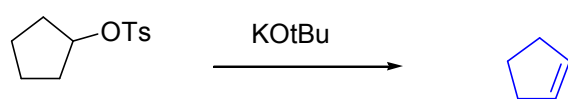
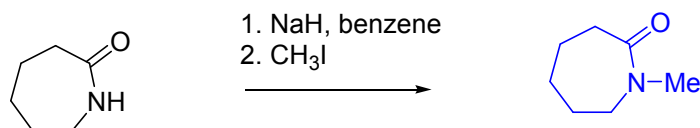
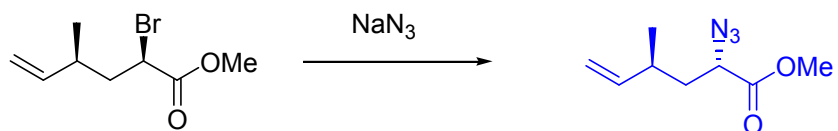


5. Propose a synthesis of the following compound from benzene. Show all required reagents and intermediates. An analysis and retrosynthesis are not required. (10 points)

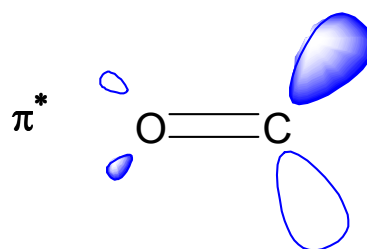
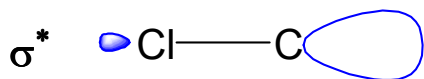
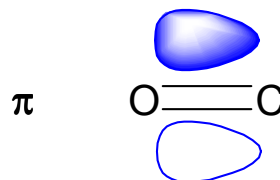
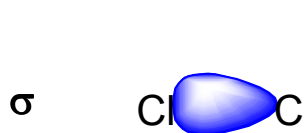
**Note:** your synthesis must give the compound shown as the major product of the sequence.



6. Give the major product of each of the following reactions.



7. Draw the molecular orbitals for the bonds shown below. Use shading to indicate phase. (4 points)



BONUS:

Provide a detailed mechanism for the following transformation:

