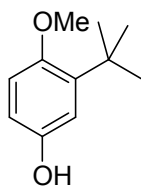


**Sample midetrm 1, CHM 2120
2012**

1. Name or draw the structure of the following molecules, as appropriate.

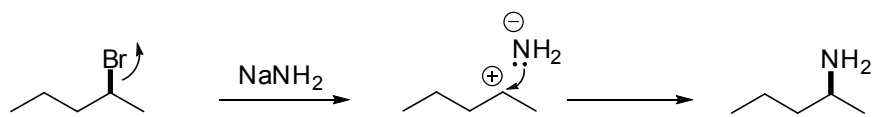
a.



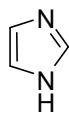
b. 2-phenylethylamine

2.

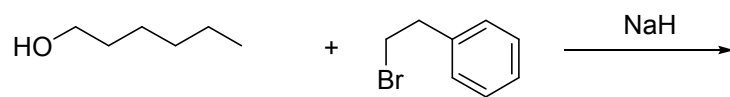
- a. Explain why the following reaction will not work as shown.
b. Give the true product of the reaction.



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

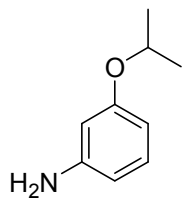


4. Give the full detailed mechanism for the formation of the major product in the reaction below. (5 pts)

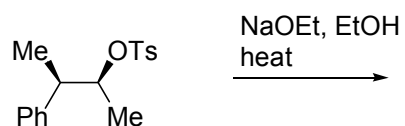
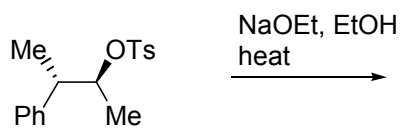
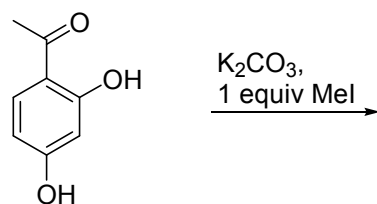
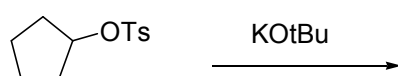
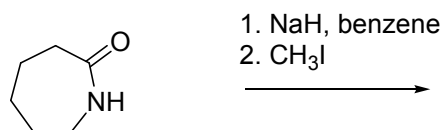
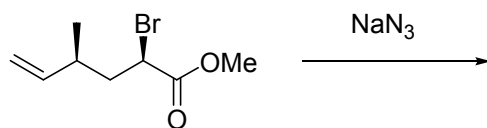


5. Propose a synthesis of the following compound from benzene. Show all required reagents and intermediates. An analysis and retrosynthesis are not required. **(10 points)**

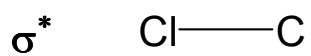
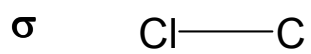
Note: your synthesis must give the compound shown as the major product of the sequence.



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

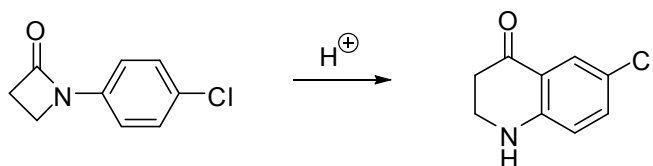


7. Draw the molecular orbitals for the bonds shown below. Use shading to indicate phase. (4 points)



BONUS:

Provide a detailed mechanism for the following transformation:



pK_a table

Acid	pK _a
HCl	-8
ROH ₂ ⁺	-2
H ₃ O ⁺	-1.75
RCOOH	5
R ₃ NH ⁺	10-11
H ₂ O	15.75
ROH	16-18
H ₂	36
RNH ₂	35-40
RCH ₃	55