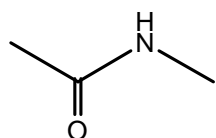
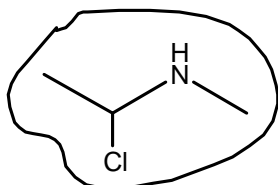


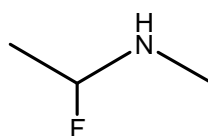
1) Circle the strongest base on each line (10pts)



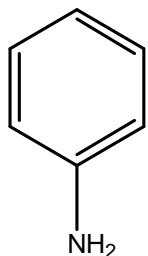
l.p. in resonance (amide)



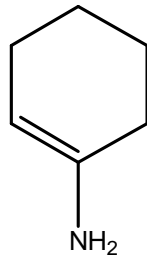
FONCIBrICS  
Cl less EWD from l.p. than F



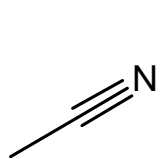
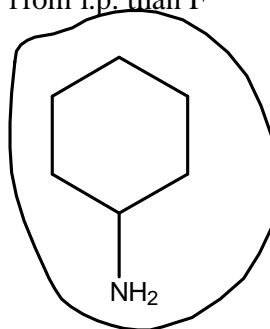
2) Circle the strongest acid on each line. (10 pts)



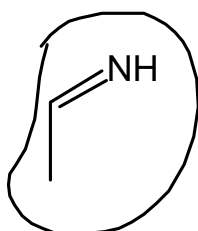
l.p. in resonance



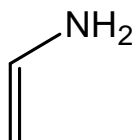
l.p. in resonance



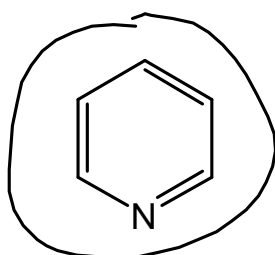
l.p. in plane, sp



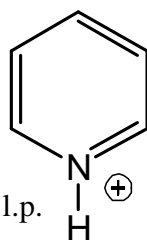
l.p. in plane, sp<sup>2</sup>



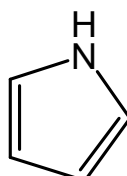
l.p. in resonance



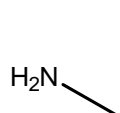
l.p. in plane



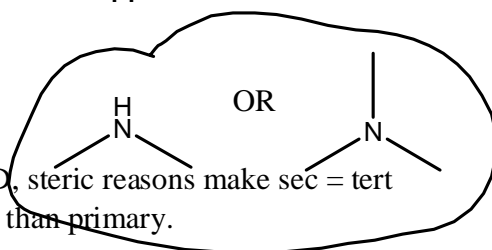
no l.p.

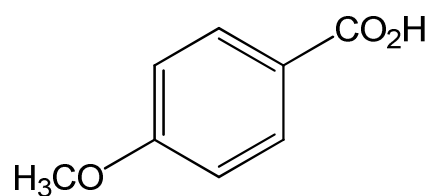
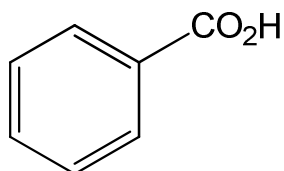
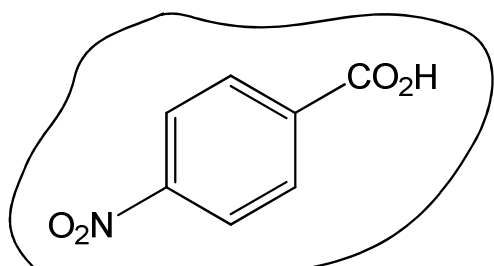
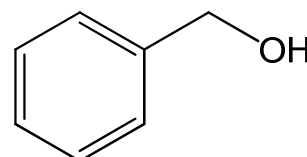
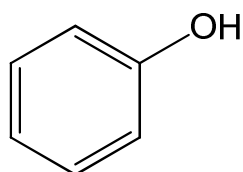
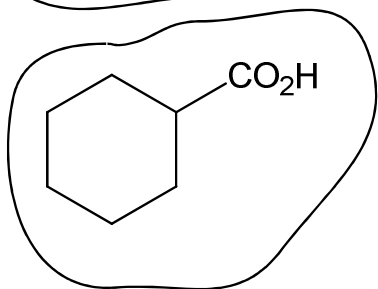
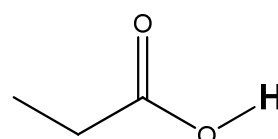
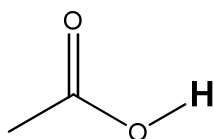
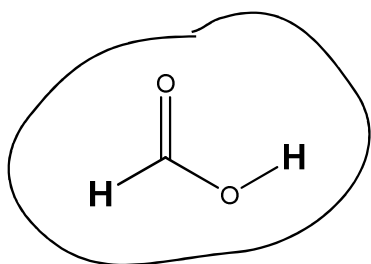
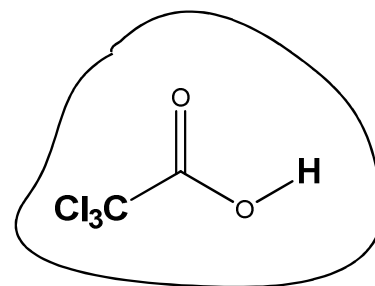
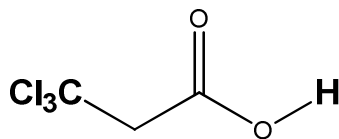
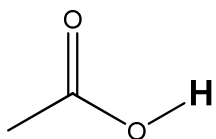


aromatic

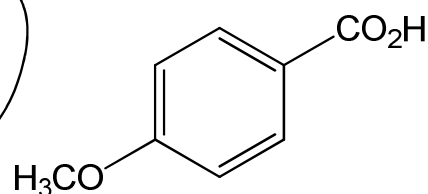
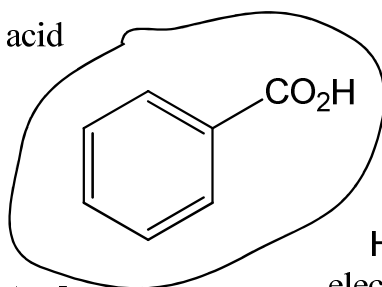
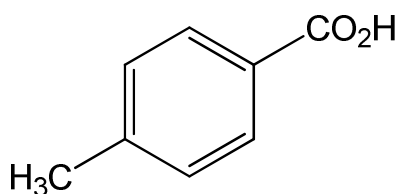


Alkyl groups are ED, steric reasons make sec = tert  
Both slightly better than primary.





electron withdrawing group takes  $e^-$  out of ring. XO-H more of an acid

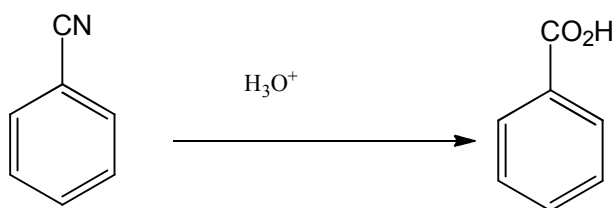
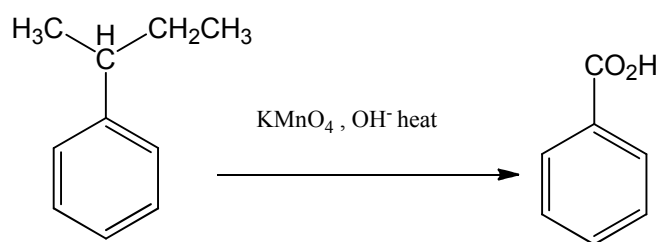
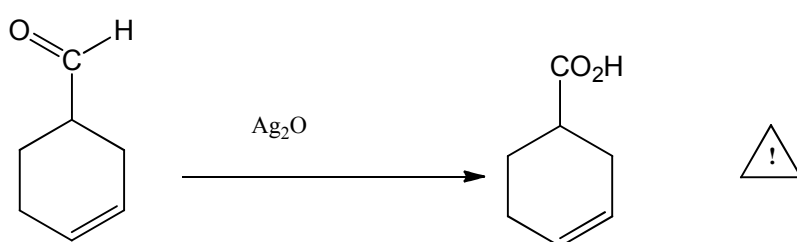
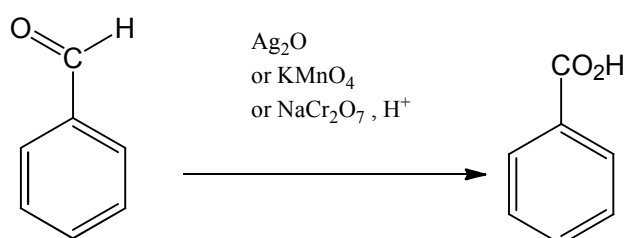
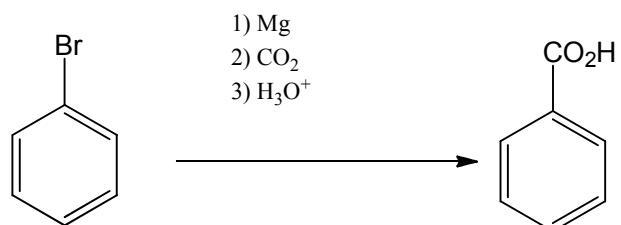


electron donating group puts  $e^-$  into ring. XO-H less of an acid

electron donating group puts  $e^-$  into ring. XO-H less of an acid



- 4) Benzoic acid and other carboxylic acids can be made from a wide variety of benzene derivatives and substituted compounds. Fill in the missing reagents. (15 pts)



\_\_\_\_\_/\_\_\_\_\_/15/\_\_\_\_\_/47

- 5) Write the mechanisms for both the **acid** and **base** catalyzed hydration of propanone (acetone). “Curley” arrows must be shown and properly used. Use resonance structures where possible to indicate enhanced reactivity at an atom. (12pts)

**Acid:**

See notes

**Base:**

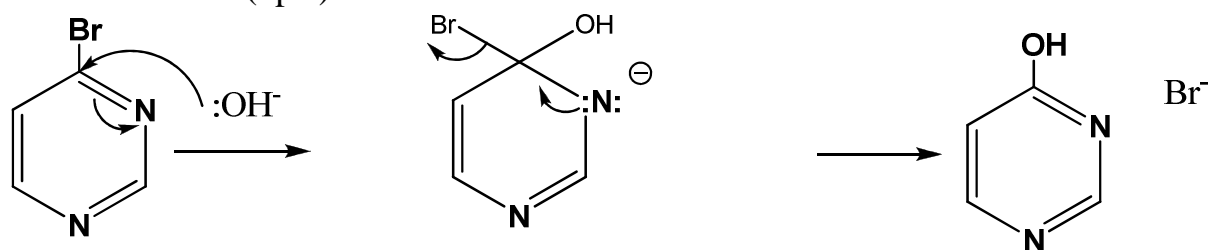
Asked on test 2, 2008

Answers:

Acid: Spring 2004 exam 2, question 9

Base: spring 2007 quiz 3, question 19-20

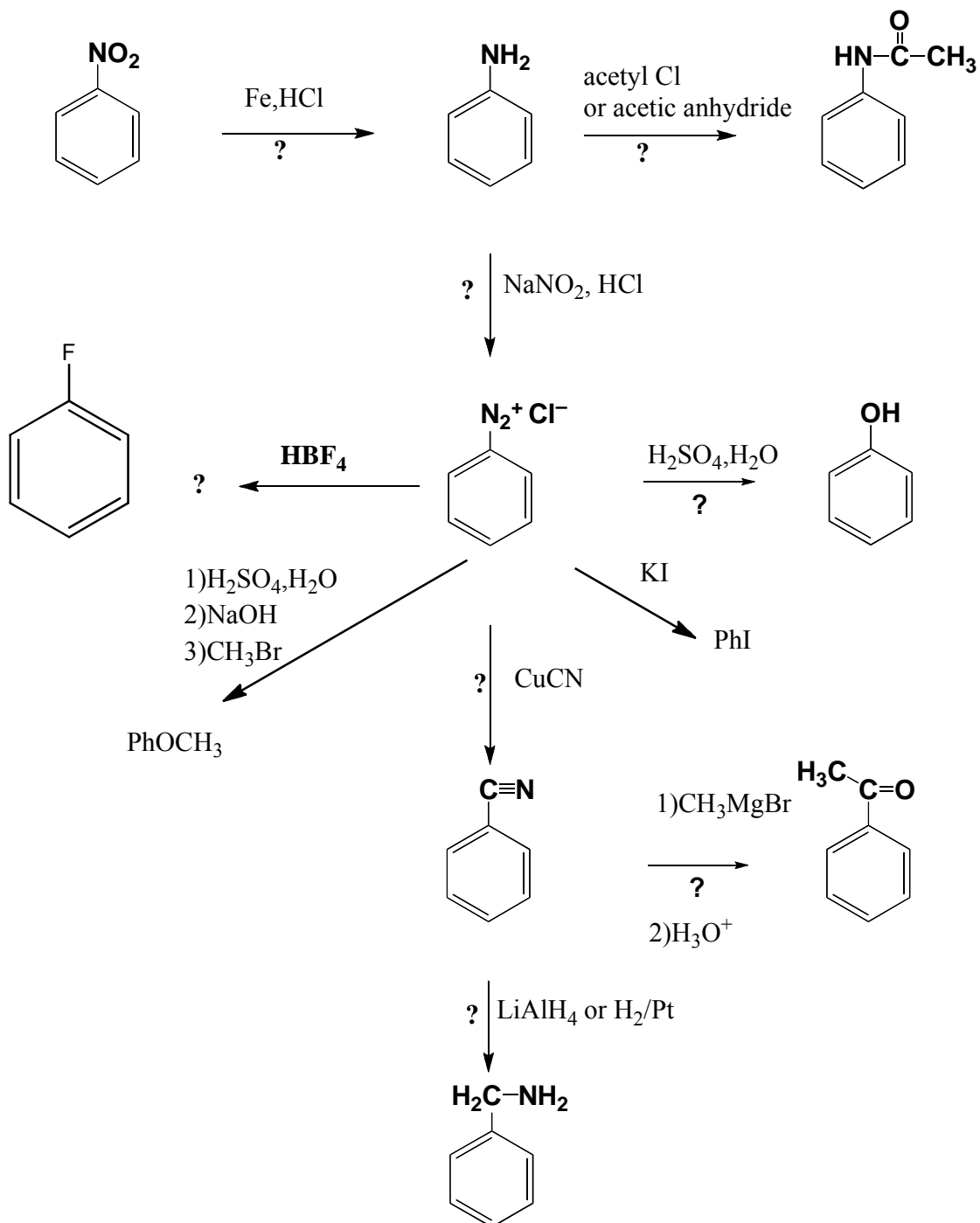
- 6) Give the name and show the mechanism for the following reaction. Include the structure of the intermediate and supply “curly” arrows on the reactants and on the intermediate. (9pts)



**Name: Nucleophilic Aromatic Substitution**

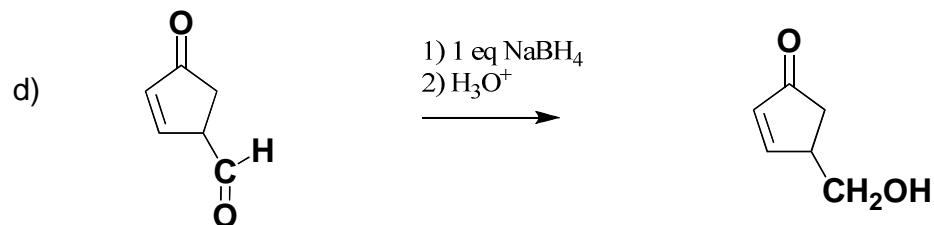
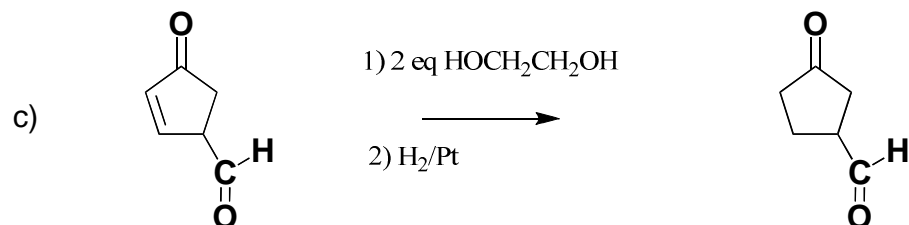
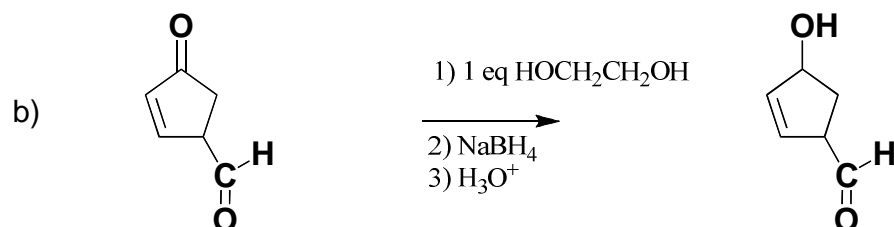
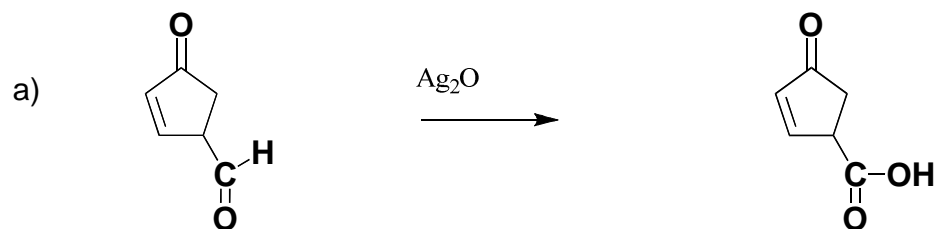
\_\_\_\_\_/\_\_\_\_\_/21/\_\_\_\_\_/68

7) Fill in the blanks of the following scheme. (There are **10** answers) (20 pts)



\_\_\_\_\_/\_\_\_\_\_/20/\_\_\_\_\_/88

8) Give reagents for the following oxidations and reductions, bearing in mind the (in)compatibility of some of the functional groups. (12 pts)



\_\_\_\_\_/\_\_\_\_\_/12/\_\_\_\_\_/100