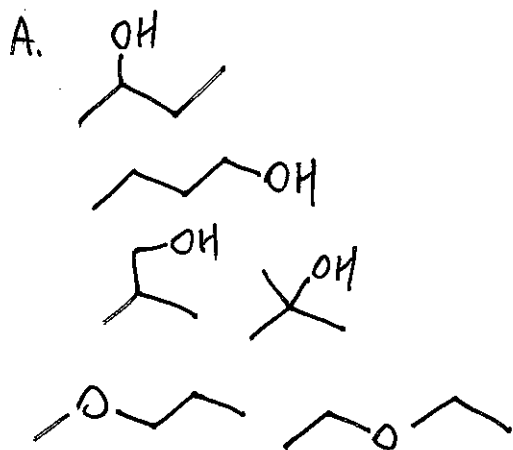


Practice Exam 1  
R340

From  
Hmwk 1.

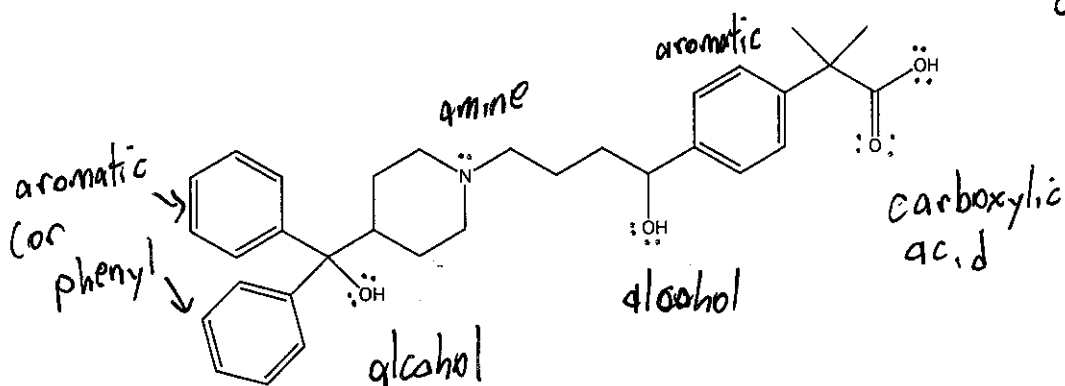
(10pts) Draw bond-line structures for all typically bonded constitutional isomers of

- A.  $C_4H_{10}O$
- B.  $C_3H_5Br$



From  
Hmwk

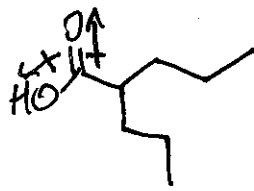
2. (12pts) Antihistamines are drugs commonly used to treat allergy symptoms. Newer antihistamines are blockbuster drugs because they do not cause drowsiness (due to the fact that they don't cross the blood-brain barrier.) The structure of fexofenadine (Allegra) is shown below. How many lone pairs does it have? Name all of its functional groups.



From Hmink

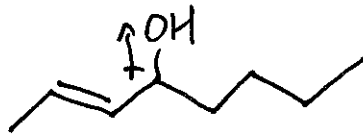
3. (10pts) Draw the structures of these compounds, then draw dipole arrows designating any polar bonds. Indicate one atom that could be considered Lewis basic in each.

A. 2-propylpentanoic acid



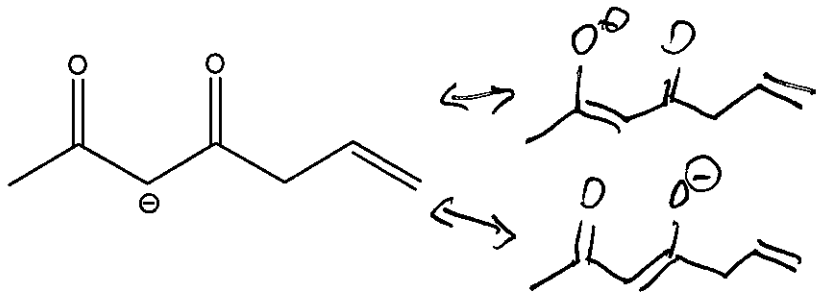
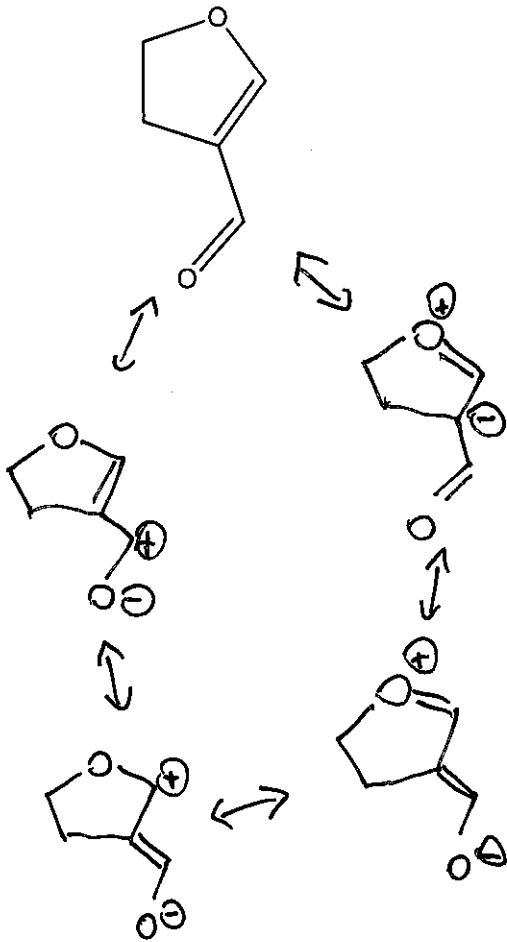
Oxygens  
are Lewis basic

B. oct-2-en-4-ol



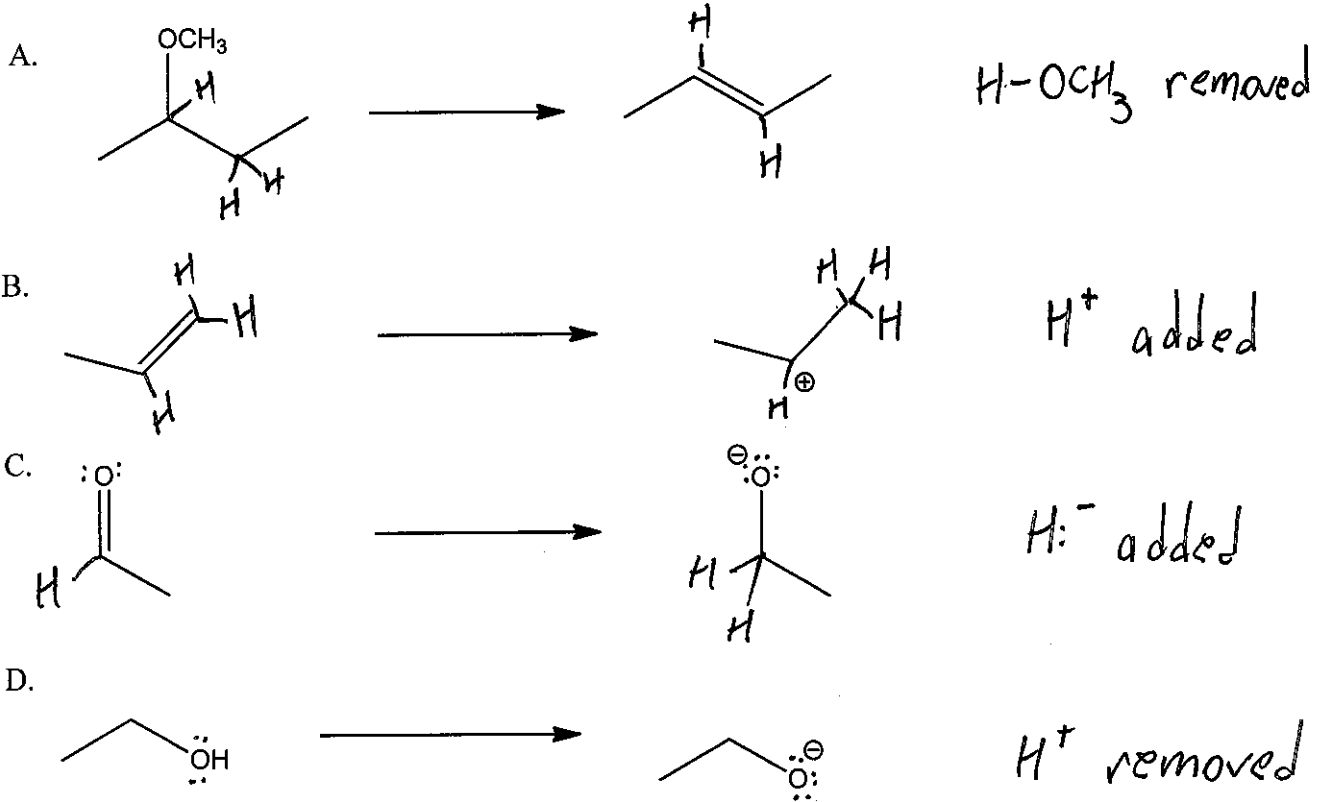
Oxygen is  
Lewis basic

4. (10pts) Draw all significant resonance structures for these compounds:



part from Hmuck

5. (8pts) In each of these reactions, something was added or removed. (It may or may not be charged.) Indicate what it was.



from Hmuck

6. (12pts) Why is cyclopropene less stable than cyclopropane? Explain why there is no such thing as E-cyclopropene.



vs



Typical  $\text{sp}^2$  carbon  
should be  $120^\circ$   
but is compressed to  
 $60^\circ$

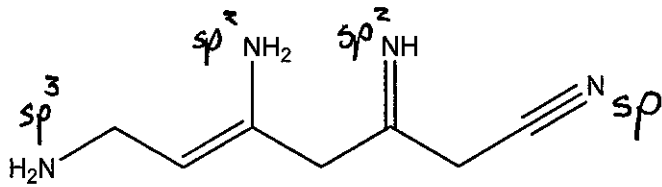
Typical  $\text{sp}^3$  carbon  
should be  $109.5^\circ$   
but is compressed to  
 $60^\circ$

More strain

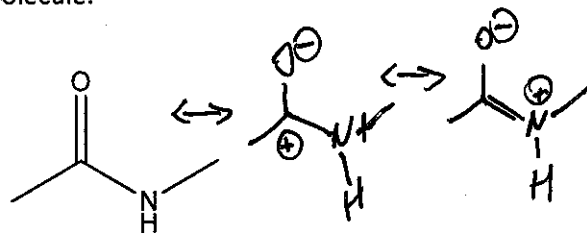
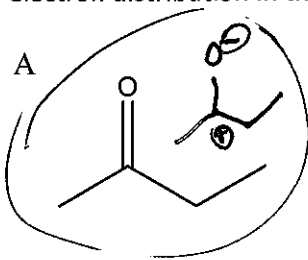
↖  
not on  
this test

adjusted homework

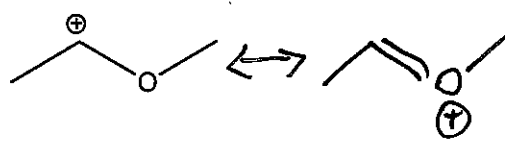
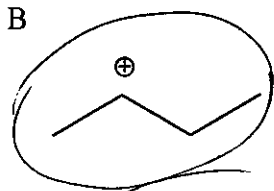
7. (8pts) Label each of these nitrogen atoms with its correct hybridization.



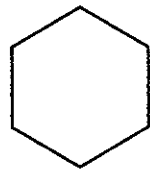
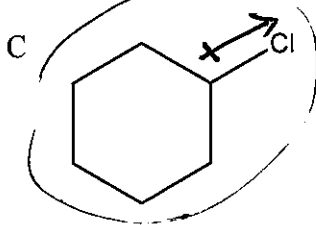
8. (15pts) Which of these compounds is a more reactive Lewis acid? Explain based on a good model of electron distribution in the molecule.



The first compound has a carbon atom with more  $\oplus$  character.



In second molecule, the  $\oplus$  is stabilized by delocalization so less stable

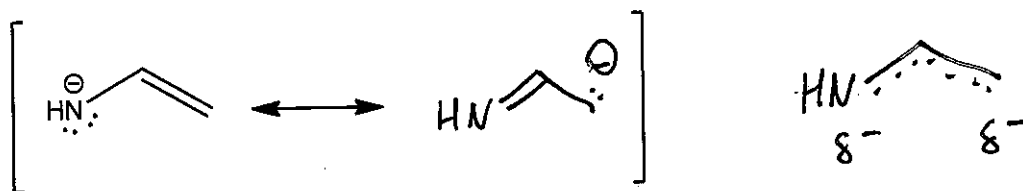


Because of induction, one carbon is  $\delta^+$  in the first molecule. The cyclohexane is not a Lewis Acid.

Adjusted  
hwmk

9. (15pts) Although the two lone pairs on the anion of aminoethene look the same in the Lewis Dot structure, they are very different.

A. Draw a significant resonance structure, then draw the resonance hybrid.



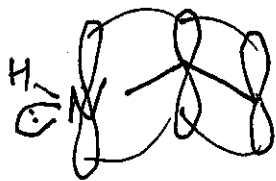
B. Draw an orbital overlap picture for the pi system in this anion.

C. How many electrons are in the pi system?

D. Indicate what types of orbitals the two lone pairs are in. Which lone pair is more localized?

E. Which carbon atom is more reactive? Explain.

B.



correct answer must show  
three p-orbitals overlapped  
and orthogonal  $sp^2$  with lone pair

C.  $4e^-$  in pi system

D. One lone pair is in  $sp^2$  hybridized. This is a localized orbital. The other is in a p orbital that is part of delocalized system.

E. The hybrid shows that one carbon is partially charged, so it is more reactive

