

**Problem Set #1, 5.12 Spring 2003**

**Due Monday, 2/10 at 4pm**

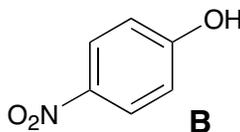
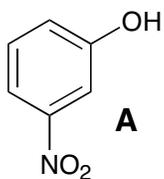
1. Draw out valid Lewis structures (lines or dots) for the following formulas. Circle structures that have ionic bonds. (Show lone pairs and formal charges.)



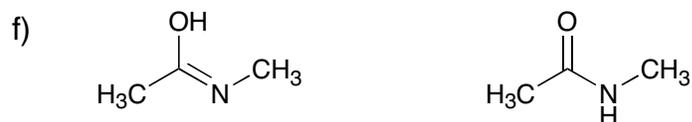
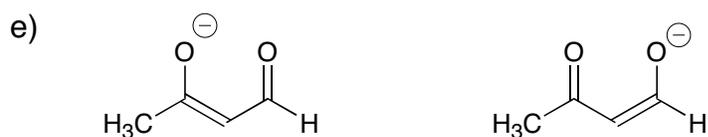
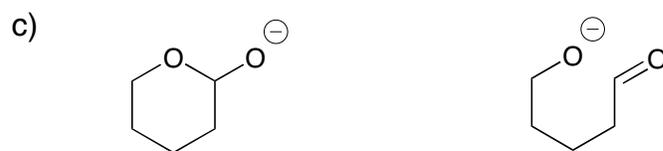
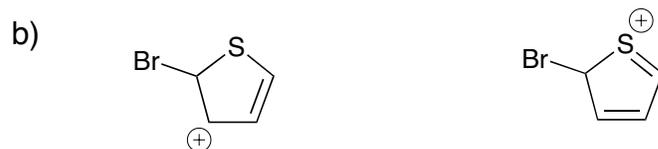
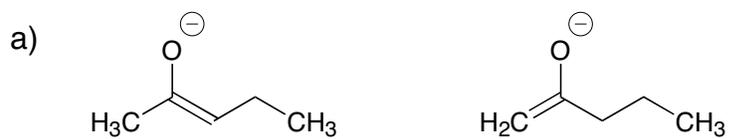
2. Draw a valid Lewis structure for AlF<sub>3</sub>. Would you expect the aluminum atom to be electrophilic or nucleophilic? Why?

3. You learned in lecture that phenol is more acidic than cyclohexanol because its conjugate base (phenoxide ion) is stabilized by resonance. **Strong acids have stable conjugate bases.**

- a) Draw the relevant resonance structures for the conjugate bases of **A** and **B**.  
b) Which would you expect to be more acidic? Why?

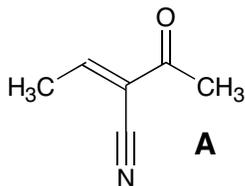


4. Circle the following pairs of structures that **do not** constitute resonance structures. For the proper resonance pairs, draw curved arrows to convert the first structure to the second. **Draw in all lone pairs that you move.**



5. a) Draw all of the relevant resonance structures for **A**, and rank them by energy (1 = lowest energy). **If two or more resonance structures are similar in energy, give them the same ranking.**

b) Label the electrophilic atoms in **A**.



c) Draw all of the relevant resonance structures for **B**, and rank them by energy (1 = lowest energy). **If two or more resonance structures are similar in energy, give them the same ranking.**

d) Label the nucleophilic atoms in **B**.

