

PRINTED  
FIRST NAME \_\_\_\_\_PRINTED  
LAST NAME \_\_\_\_\_ASU ID or  
Posting ID \_\_\_\_\_Person on your **LEFT** (or Aisle)Person on your **RIGHT** (or Aisle)

- PRINT YOUR NAME ON EACH PAGE!
- READ THE DIRECTIONS CAREFULLY!
- USE BLANK PAGES AS SCRATCH PAPER  
work on blank pages will not be graded...
- WRITE CLEARLY!
- MOLECULAR MODELS ARE ALLOWED
- DO NOT USE RED INK
- DON'T CHEAT, USE COMMON SENSE!

1 \_\_\_\_\_/25

2 \_\_\_\_\_/35

3 \_\_\_\_\_/12

4 \_\_\_\_\_/27

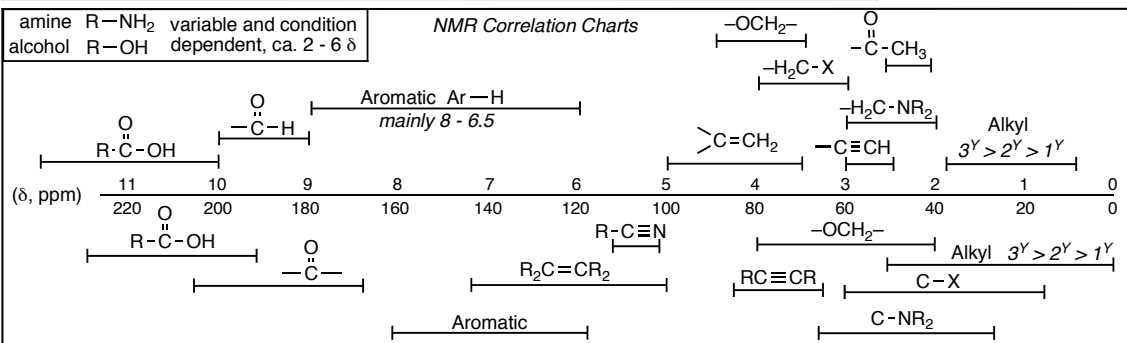
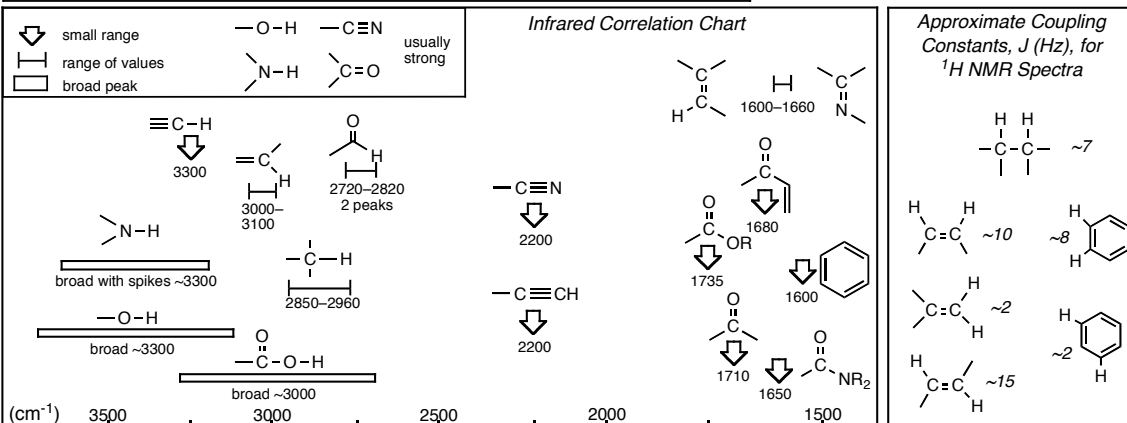
5 \_\_\_\_\_/40

6 \_\_\_\_\_/36

Extra Credit \_\_\_\_\_/5

Total (incl Extra) \_\_\_\_\_/175+5

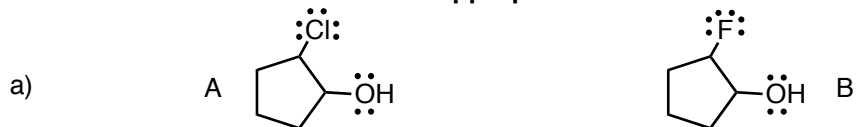
H																He																Interaction Energies, kcal/mol			
Li Be														B C N O F		Ne		Eclipsing		Gauche															
Na Mg														Al Si P S Cl		Ar		H/H	-1.0	Me/Me	-0.9														
K Ca		Sc Ti V		Cr Mn Fe Co Ni Cu Zn		Ga Ge As Se Br		Kr		H/Me	-1.4	Et/Me	-0.95																						
Rb Sr		Y Zr Nb Mo Tc Ru Rh Pd Ag Cd		In Sn Sb Te I		Xe		Me/Me	-2.6	i-Pr/Me	-1.1																								
Cs Ba		Lu Hf Ta W Re Os Ir Pt Au Hg		Tl Pb Bi Po At Rn				Me/Et	-2.9	t-Bu/Me	-2.7																								



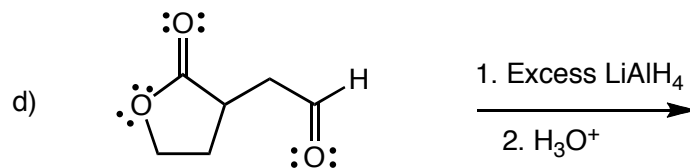
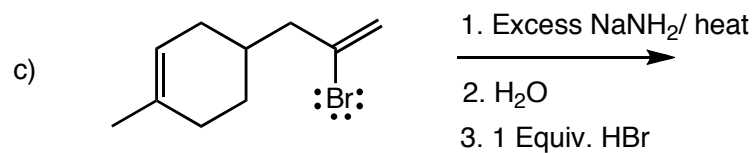
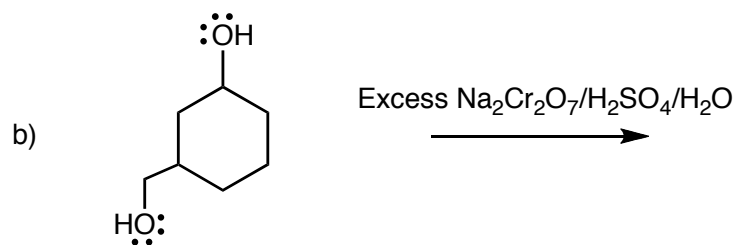
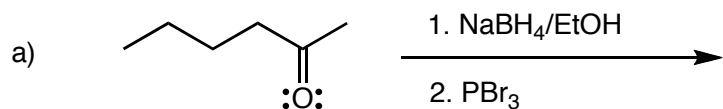
Question 1 (25 pts). For each of the following 2 pairs of alcohols A and B:

1) Indicate the stronger Bronsted acid **AND** which would have the stronger conjugate base

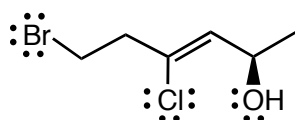
2) Explain your reasoning using drawings of all of the conjugate base anions, and **include ALL relevant resonance contributors as appropriate.**



Question 2 ( 35 pts.) Provide the missing **major organic products**, **ignore stereochemistry**



Question 3 (12 pts.) Give the IUPAC name for the following compound. Be sure to use cis/trans, E/Z or R/S where appropriate.



5 pts Extra Credit. Which functional group can be polymerized to form an organic metal?

alcohol

alkene

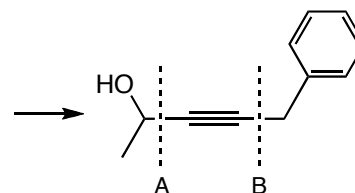
alkyne

epoxide

Question 4 (27 pts.) For each structure:

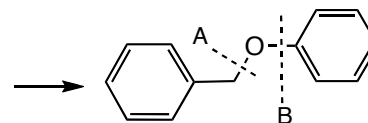
1. Decide which of the indicated bonds A and B is possible, or is preferred one, to make.
2. In the provided boxes, give the reactant/reagents/conditions you would use to make that bond (step 2 is for acid or water workup steps if they are necessary, if not, leave step 2 blank).
3. Briefly state why the other bond can not be made, or is not the preferred bond to make.

this structure	+ these reagents/conditions
	1.  2.



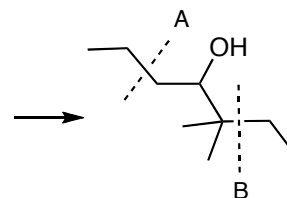
The problem with making bond \_\_\_ is:

this structure	+ these reagents/conditions
	1.  2.



The problem with making bond \_\_\_ is:

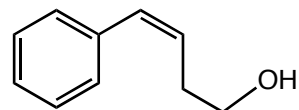
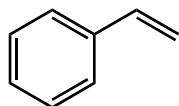
this structure	+ these reagents/conditions
	1.  2.



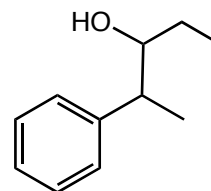
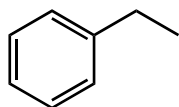
The problem with making bond \_\_\_ is:

Question 5 (40 pts.) Show how you would synthesize the target compounds on the right from the starting compounds on the left. Show reagents and conditions, and the structures of important intermediate compounds. Do not show any (arrow pushing) mechanisms.

a)



b)



Question 6 (36 pts). **READ THIS QUESTION CAREFULLY!**For **EACH** reaction, give a complete arrow pushing mechanism, and...1) Show **ALL** important resonance contributors for all intermediates.

2) Add non-bonding electrons and C-H bonds to the line-angle structures as required.

3) Indicate the Lewis acid/Lewis base (LA, LB) at each step as appropriate, and whether they are also Brønsted acids/bases (LA/BA, LB, BB).

