

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 _____/42

3 _____/14

4 _____/7

5 _____/10

6 _____/5

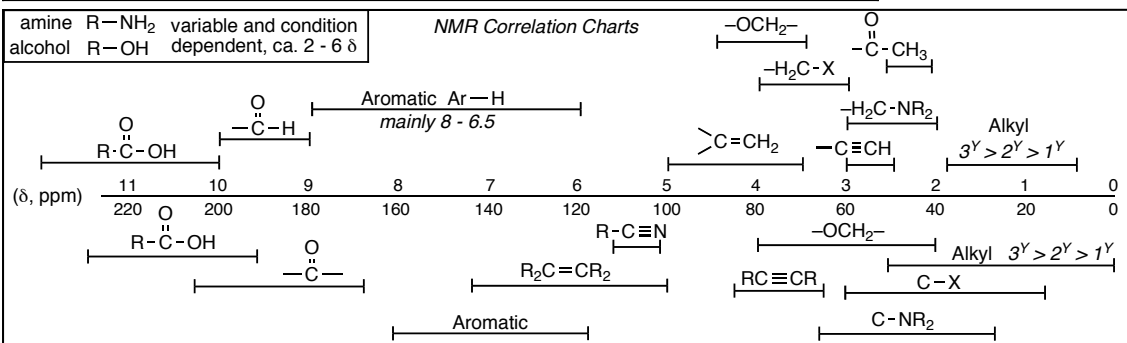
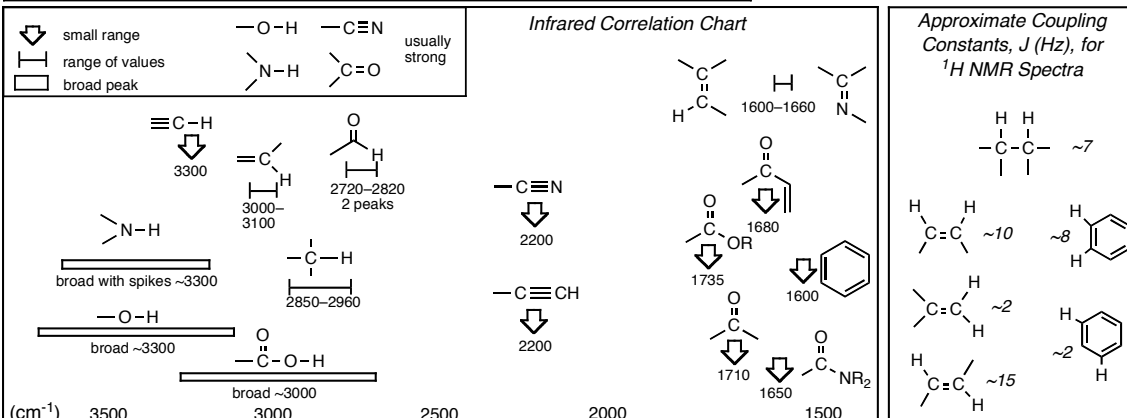
7 _____/36

8 _____/36

Extra Credit _____/5

Total (incl Extra) _____/175+5

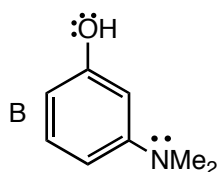
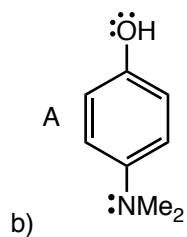
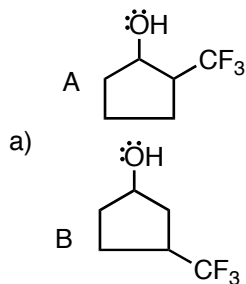
H Li Be Na Mg K Ca Sc Ti V Cr Mn Fe Co Ni Cu Zn Ga Ge As Se Br Kr Rb Sr Y Zr Nb Mo Tc Ru Rh Pd Ag Cd In Sn Sb Te I Xe Cs Ba Lu Hf Ta W Re Os Ir Pt Au Hg Tl Pb Bi Po At Rn	He Ne Ar Kr Xe Rn																				
B C N O F Al Si P S Cl	Interaction Energies, kcal/mol																				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: left;">Eclipsing</th> <th colspan="2" style="text-align: left;">Gauche</th> </tr> </thead> <tbody> <tr> <td>H/H</td> <td>-1.0</td> <td>Me/Me</td> <td>-0.9</td> </tr> <tr> <td>H/Me</td> <td>-1.4</td> <td>Et/Me</td> <td>-0.95</td> </tr> <tr> <td>Me/Me</td> <td>-2.6</td> <td>i-Pr/Me</td> <td>-1.1</td> </tr> <tr> <td>Me/Et</td> <td>-2.9</td> <td>t-Bu/Me</td> <td>-2.7</td> </tr> </tbody> </table>	Eclipsing		Gauche		H/H	-1.0	Me/Me	-0.9	H/Me	-1.4	Et/Me	-0.95	Me/Me	-2.6	i-Pr/Me	-1.1	Me/Et	-2.9	t-Bu/Me	-2.7
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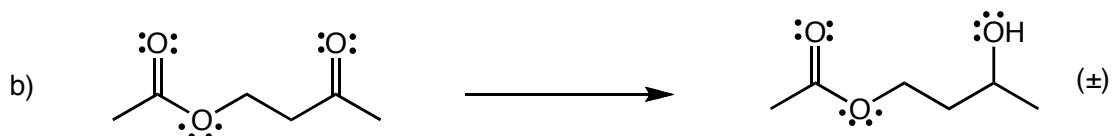
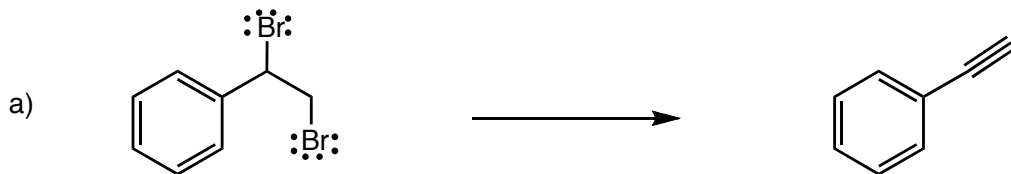
Question 1 (25 pts.) In each case give the STRONGER Bronsted acid of the two structures A and B and give a BRIEF explanation for your choice.

Give drawings of the conjugate base anions including ALL resonance contributors as appropriate

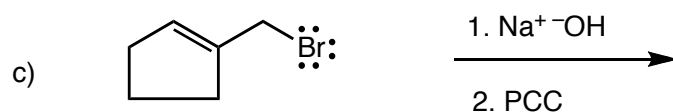
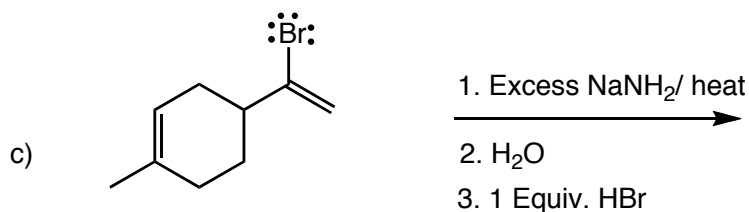
Each of your explanations MUST mention the possible roles of RESONANCE and the INDUCTIVE EFFECT, even if there is none in these particular cases



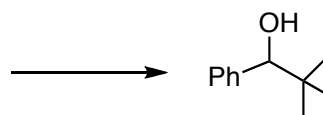
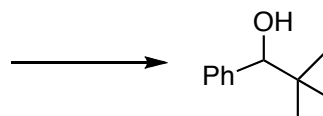
Question 2 (first part, 21 pts.) For each reaction

1) Provide the missing **reagents/conditions**2) **State** whether each reaction is an Addition, Elimination, Substitution or Rearrangement3) **State** whether each reaction is Reduction, Oxidation or Neither

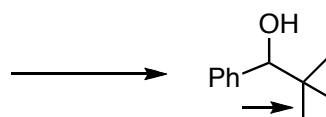
Question 2 (second part, 21 pts.) Give the major organic product of the following reactions

DO NOT STATE whether the reaction is Addition/Elimination/Substitution/Rearrangement**DO NOT STATE** whether each reaction is reduction/oxidation/neither

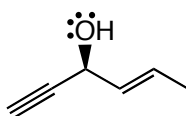
Question 3 (14 pts.) In the provided structure, identify TWO carbon-carbon bonds that can be made using a Grignard reaction, give the structures of the Grignard and molecule that it reacts with, acid workup steps are assumed you do not need to include them. **CLEARLY indicate the C-C bond you are making in each reaction with an arrow**



Question 4 (7 pts.) In the provided structure, explain why the bond indicated with the arrow can NOT be made in a Grignard reaction.



Question 5 (10 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. organic metals can be made by polymerizing.....

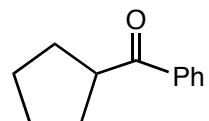
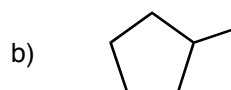
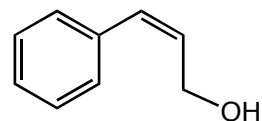
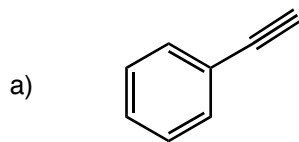
epoxides

alkenes

alcohols

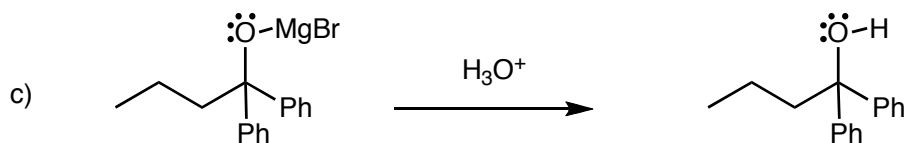
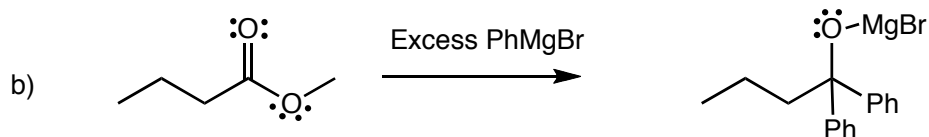
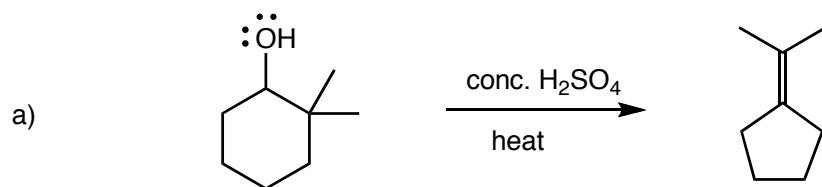
alkynes

Question 7 (36 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.



Question 8 (36 pts). For **EACH**, give a complete curved 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).



part c) is not a trick, it is a simple 1-step reaction, do the curved arrow-pushing for the one step