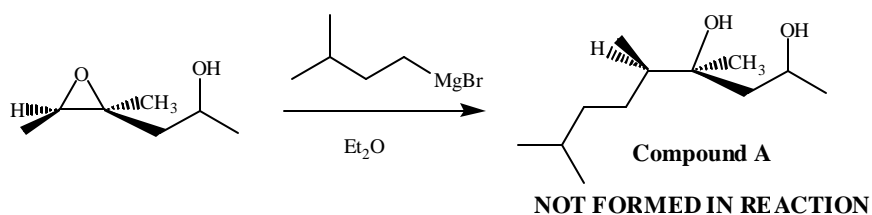


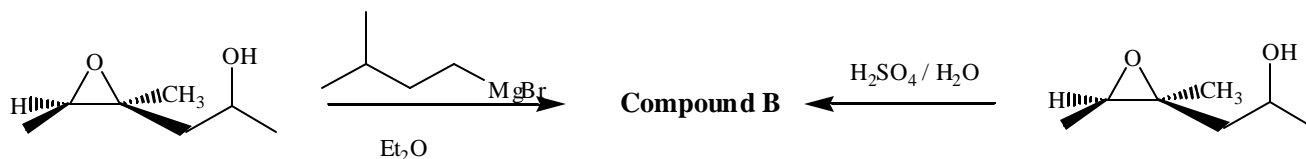


- 1d. What are the definitions of aromatic, anti-aromatic and non-aromatic compounds? Provide an example of each and evidence that supports your example.

2. Bob and Jane wanted to do the following reaction and predicted that they would observe compound A as the major product. (30 points)



Instead of observing the formation of Compound A, a new compound, Compound B, was observed with molecular formula,  $C_7H_{14}O_2$ . It was also observed that the same starting material upon treatment with sulfuric acid in water yield the same product, Compound B:



The compound had the following spectral data:

IR Spectral Data for Compound B

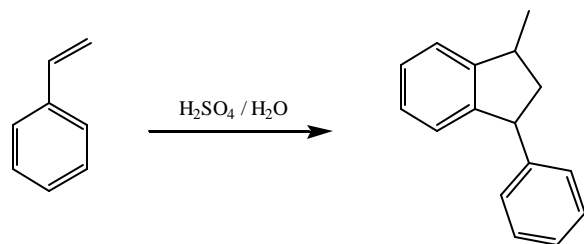
Wavenumber ( $cm^{-1}$ )	Intensity	Wavenumber ( $cm^{-1}$ )	Intensity
3625 – 3173	Strong and Broad	1390	Medium
2976	Strong	1120	Strong
2965	Medium	1075	Strong
2832	Medium	925	Weak
1485	Medium		

NMR Spectral Data for Compound B

Frequency (ppm, d)	Integration (cm)	Coupling
1.15	5.41	Doublet
1.21	5.36	Triplet
1.25	5.52	Singlet
1.52	3.41	Triplet
2.65	1.77	Broad singlet
3.65	1.85	Sextet
3.92	1.73	Quartet

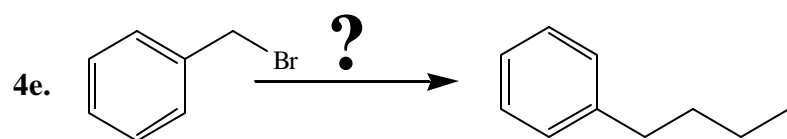
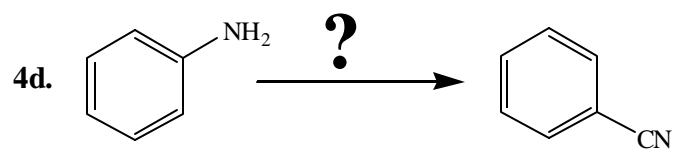
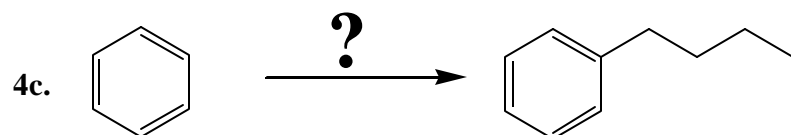
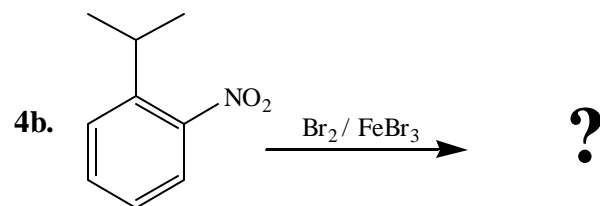
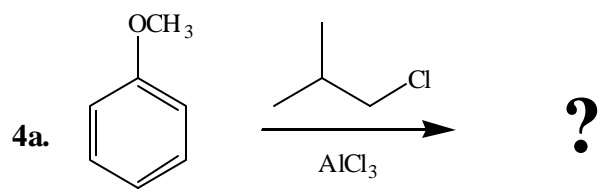
- 2a. What is the structure of the product?
- 2b. Why did the reaction fail to produce the predicted product, Compound A?
- 2c. What is the mechanism for formation of the observed product via either the 1<sup>st</sup> or 2<sup>nd</sup> reaction conditions, Compound B? (Write only one mechanism)

3. Provide a mechanism that accounts for the following reaction: (15 points)

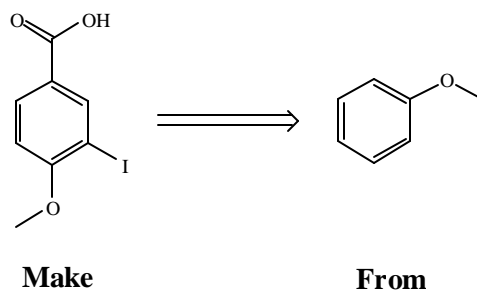


Hints: What are the most reactive parts of the molecules? What has changed?

4. Fill in the Blank. Provide reagents, starting materials, or products for the following reactions as determined by the question mark (?). (40 points)

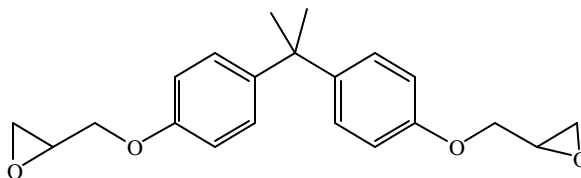


5. Provide a reasonable synthesis for 3-Iodo-4-methoxy benzoic acid from anisole: (20 points)



Extra Credit: (10 points)

Epoxy resins, such as DGEBA epoxy resin, upon reaction with NaOH form an extremely hard polymeric solid. Given the structure of DGEBA, provide a mechanism that accounts for the formation of this polymer.



**Diglycidyl ether of bisphenol A (DGEBA)**