Aromaticity and Benzene #4: Synthesis Practice with EAS

Phew. I knew that last worksheet was a lot of problems, but you all handled it like the organic champs I know you all are. Okay, here we go: This is the last worksheet dealing with Aromaticity and Benzene, so let's end strong. Thus far, we've mastered how to identify and use directing groups to do Complete the Reaction problems and we know our mechanisms for the basic set of EAS reactions. Now let's do some Synthesis problems.

Remember what we talked about in the last video dealing with EAS Synthesis problems:

- Identify substituent relationships with one another in the product (ortho, meta, para)
- Use a sequence of a reactions that is the most practical/efficient—avoid bad steric effects
- Ensure to use a sulfonyl protecting group (where appropriate) to block certain positions to maximize yield (for example, blocking para to force a substituent to go ortho)
- Acetylate $-NH_2$ groups when acid is involved to avoid accidental protonation

Other than that, it's trial and error. The nice part is, we're only working on a benzene ring, so I feel like these types of Synthesis problems are less intimidating than others. Let's get to work and start synthesizing some organic stuff ☺. List the reagents needed to complete the synthesis above the arrow provided.

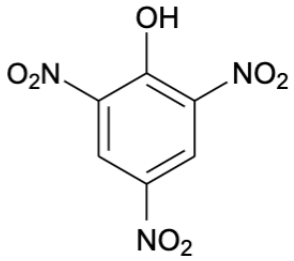
**If you need a carbon piece (like an acyl halide or alkyl halide), feel free to draw it up: It doesn't have to be given).


O
O

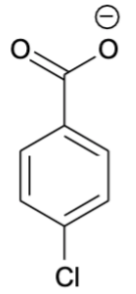

O
HN
Cl
SO3H

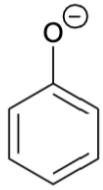
Taking a break from synthesis, here are a few other problems I wanted to include in the last worksheet but pushed to this one (in the interest of worksheet length).

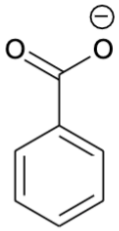
- The structure shown below has a **very low** pKa, ~0. Justify this structure's acidity.



- Rank the following three structures from most to least basic. Indicate the most basic structure with 1, while labeling the least basic structure (3).

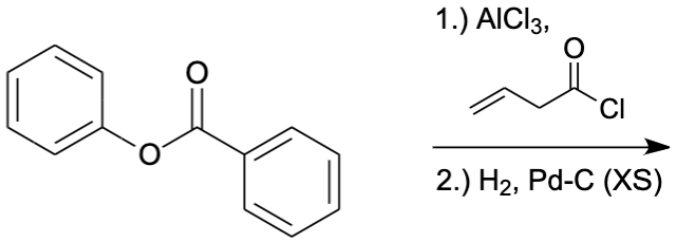


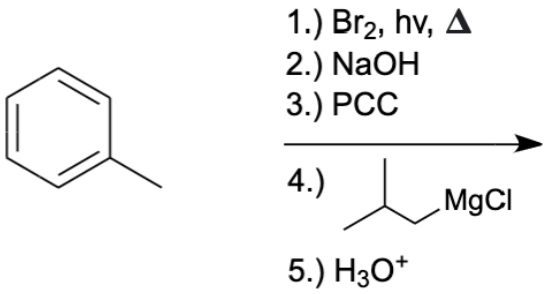


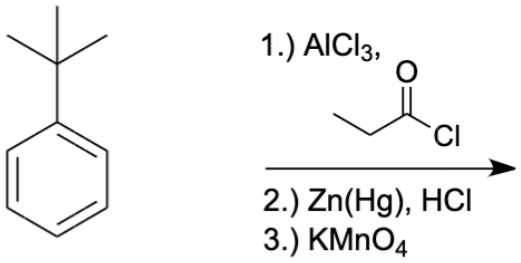


_____ _____ _____

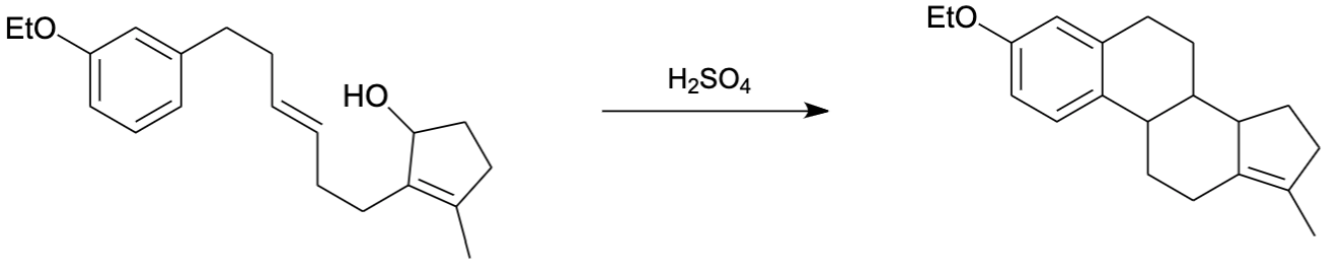
- Complete the following reactions:







- Draw the arrow pushing mechanism for the reaction depicted below:



- Okay, no arrow here, and you are limited to the carbons you can use based on the starting material indicated below.