

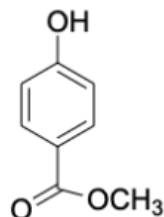
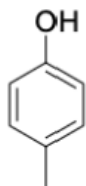
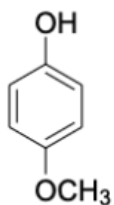
## Benzene Substituents: Reactions, Concepts, and Synthesis Practice

Hey, gang! Welcome to the worksheet for the benzene substituent chemistry unit. Although there are a bunch of videos in this section, this one worksheet contains all the practice. It might be a lot, but I know you all are up to the task.

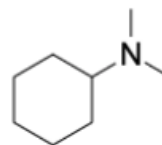
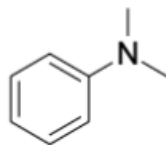
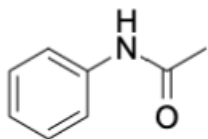
We'll cover everything from acid-base properties of phenols to cope rearrangements and back. If anything is confusing, check out the solutions and/or solutions walkthrough video 😊!

1.) To get this party started, let's hit some acid-base & concept questions:

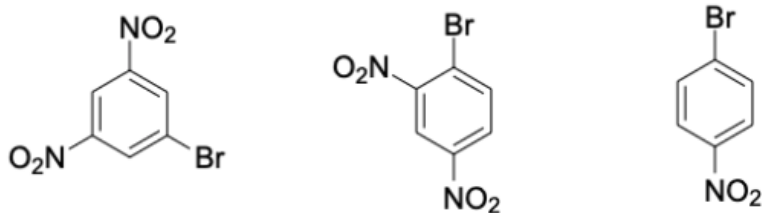
a.) Given the following three molecules, rank them 1 – 3 with 1 being the **weakest acid** and 3 being the **strongest acid**.



b.) Given the following three molecules, rank them 1 – 3 with 1 being the **weakest base** and 3 being the **strongest base**.

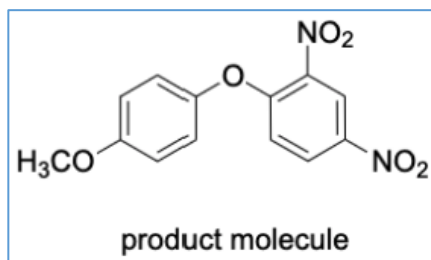


c.) Given the following three molecules, rank them 1 – 3 with 1 being the **least susceptible** and 3 being the **most susceptible** to **nucleophilic aromatic substitution**.

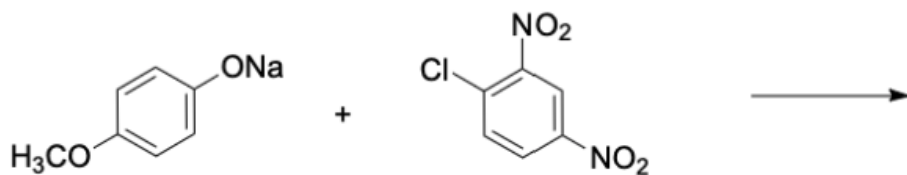


d.) Okay, let's shift away from ranking.

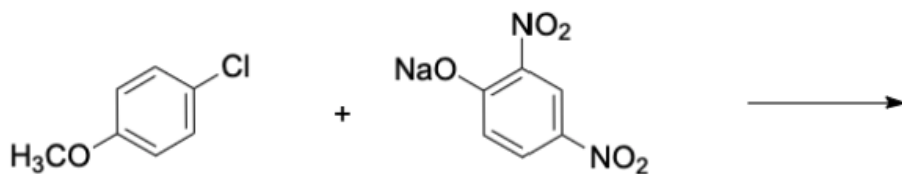
In this next problem, circle the reaction A, B, or C that will yield the product molecule (shown below) in the highest yield:



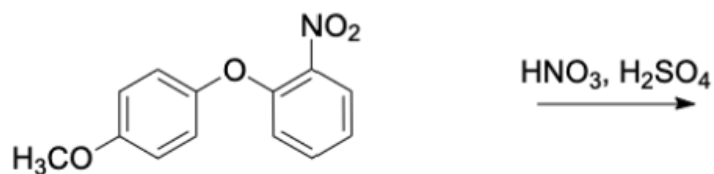
A



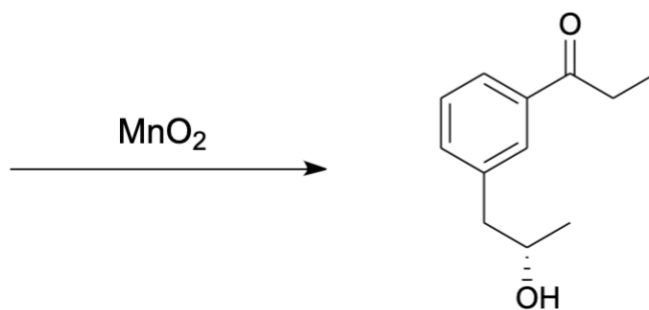
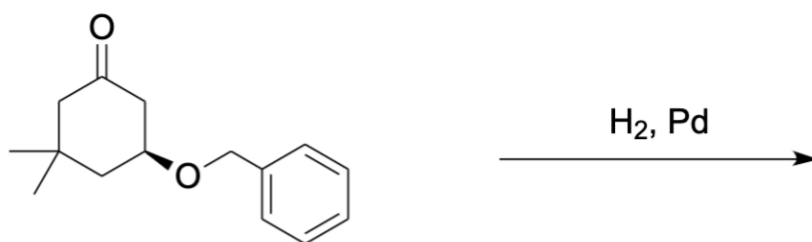
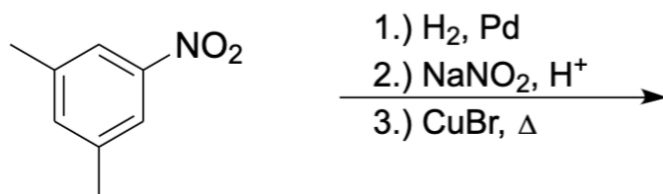
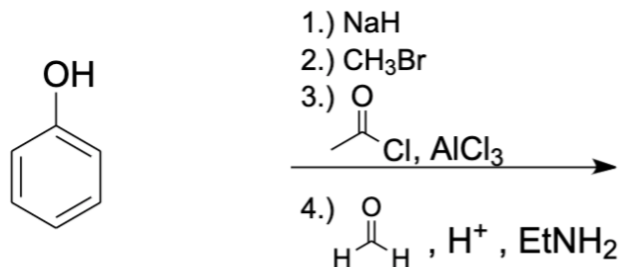
B

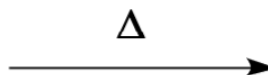
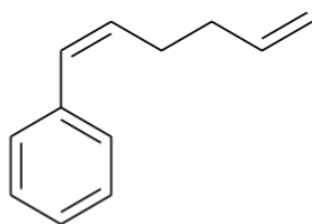
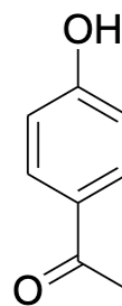
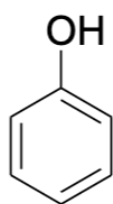
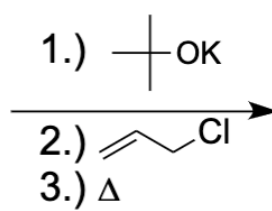
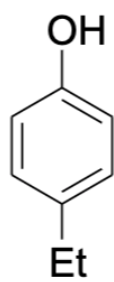


C



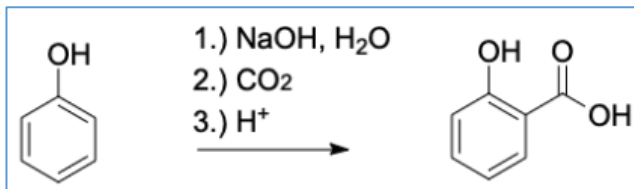
2.) Okay—enough of looking at and ranking reactions, let's complete some of our own! For the reactions below, you know the drill: either complete the reaction by predicting the major organic product, providing the reactant(s), or providing the reagent(s).



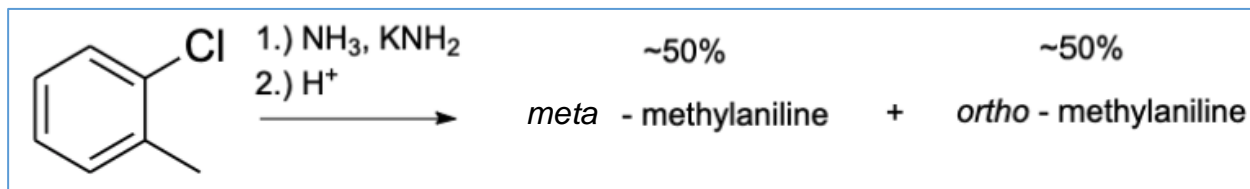


3.) Now that we've completed *plenty* of reactions, let's transition to mechanism mode.

a.) Draw the full arrow pushing mechanism for the reaction displayed below

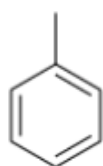


b.) Justify the observed reaction below with a mechanism

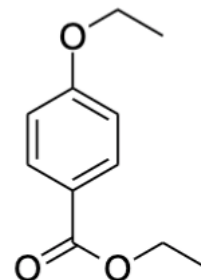


Okay, gang, we're close to the end. After this synthesis question below there's one more question, which is more of a bonus.

- 4.) Using benzene and ethanol as your only carbon source, synthesize the target molecule shown below.



EtOH



5.) BONUS QUESTION: Draw a mechanism to illustrate the reaction displayed below.

