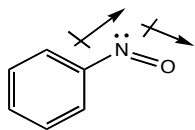


Additional Problems for practice:

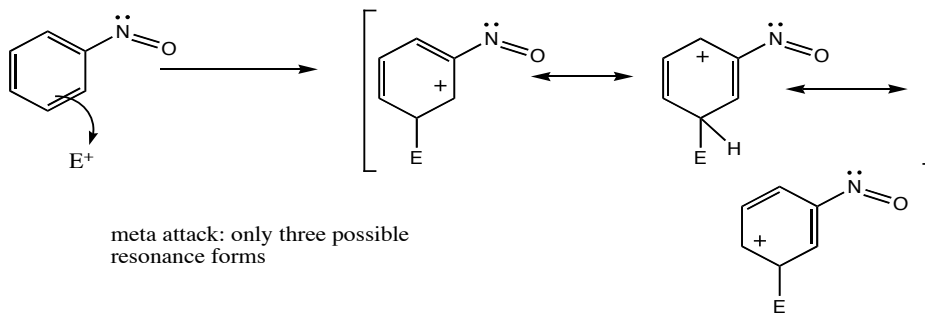
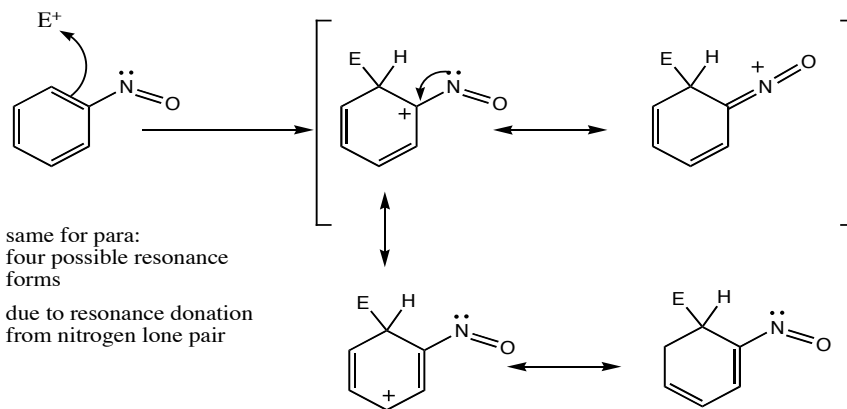
- The nitroso group is one of the very few non-halogens that is an ortho-para directing deactivating group. Draw resonance structures of intermediates in ortho and para electrophilic attack on nitrosobenzene, and explain why they are favored over the intermediate from meta attack:



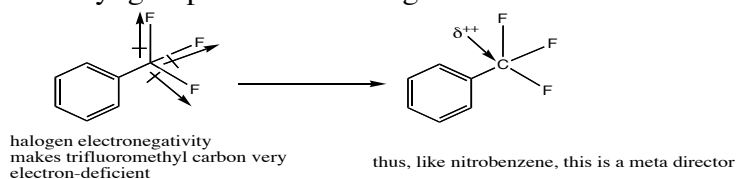
Nitrosobenzene

electronegativity of oxygen
makes N partially positively charged: deactivated ring

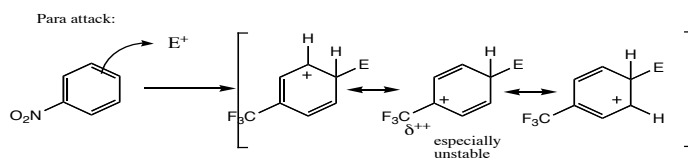
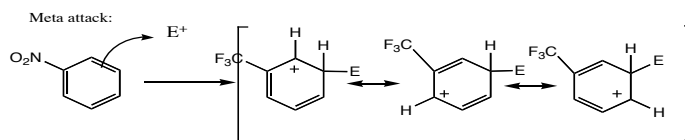
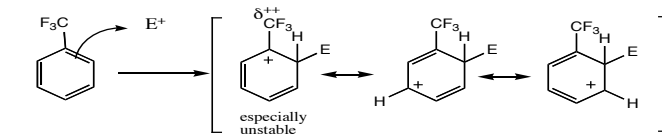
ortho:



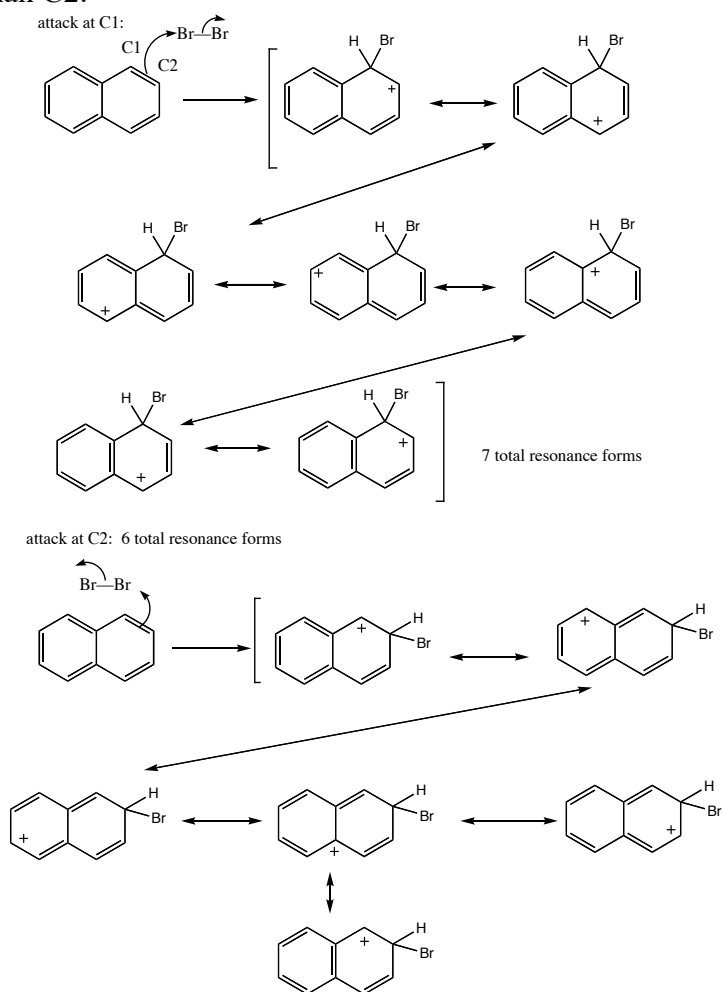
2. Which compound would you expect to be more reactive toward electrophilic aromatic substitution, toluene or trifluoromethyl benzene? To which position(s) of the aromatic ring does the trifluoromethyl group direct? Benzene is more reactive. The trifluoromethyl group is a deactivating meta director:



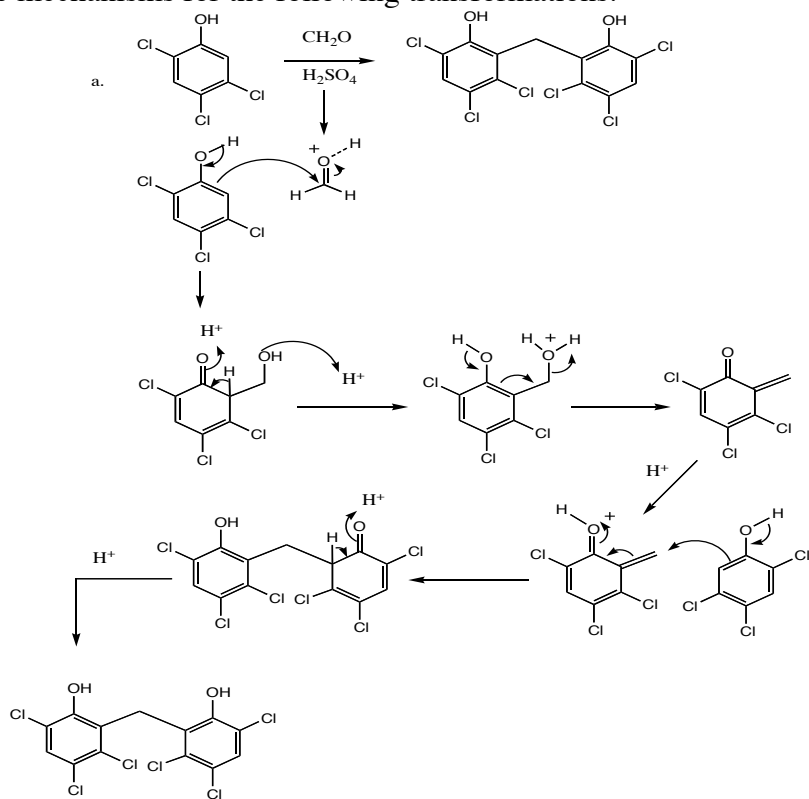
meta position is deactivated to a less extent than ortho or para:

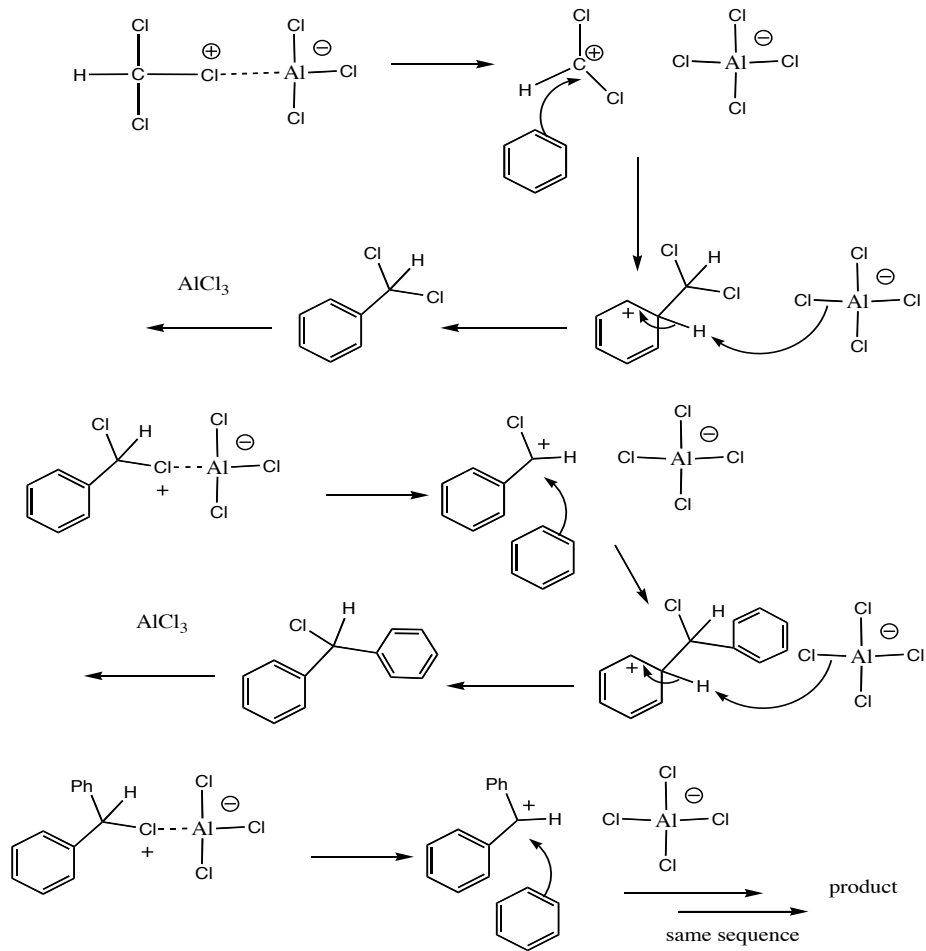
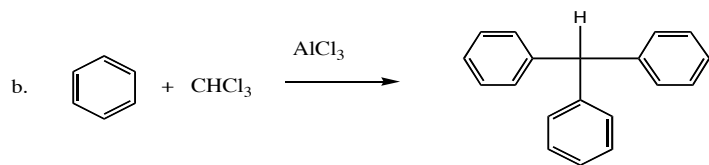


3. Draw resonance structures of the intermediate carbocations in the bromination of naphthalene, and account for the fact that naphthalene undergoes electrophilic attack at C1 rather than C2:



1. Propose mechanisms for the following transformations:





2. Propose syntheses of the following substances from benzene or toluene. More than one step is needed:

