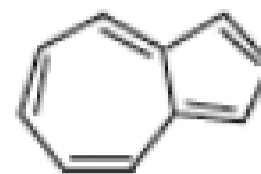
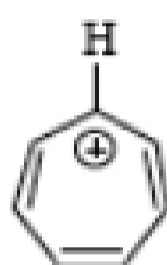


1. (15 points) Classify each of the following compounds and ions as being either aromatic, antiaromatic, or neither.



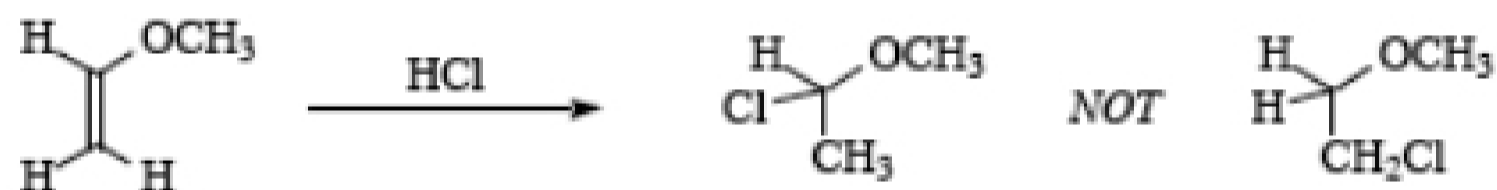






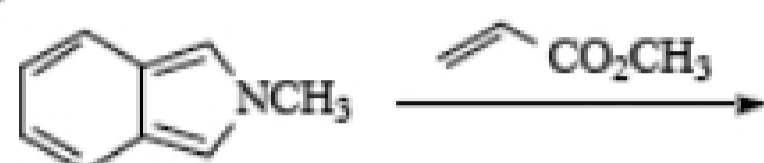


2. (5 points) When HCl is added to enol ethers (the reaction shown below), only one regioisomer is formed. Provide a brief explanation (in the space provided) for the regioselectivity of this reaction.



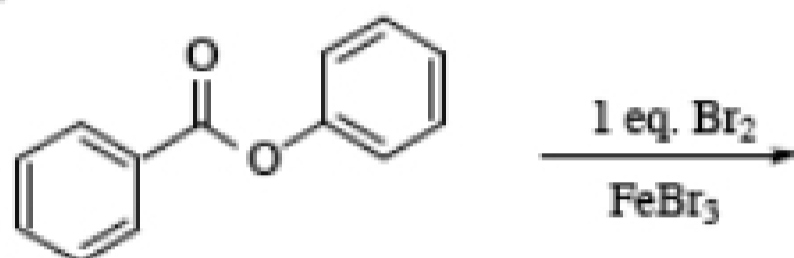
5. (30 points) Provide the expected products from the following reactions. If you believe that two products will be formed (such as *ortho* and *meta* isomers, 1,2 and 1,4 addition products, others), show both products. If you believe that no reaction will occur under the conditions given, write "NR."

a)

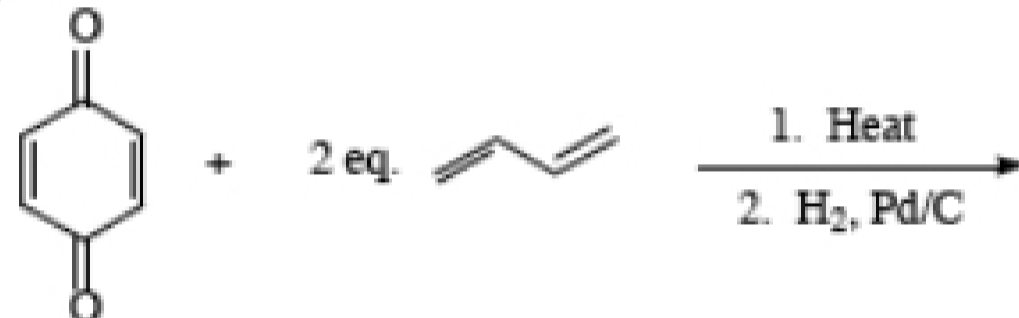


Note: Show stereochemistry

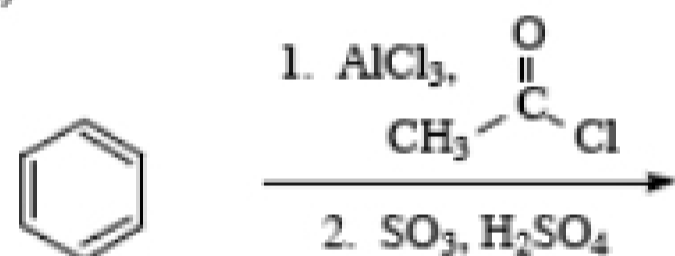
b)



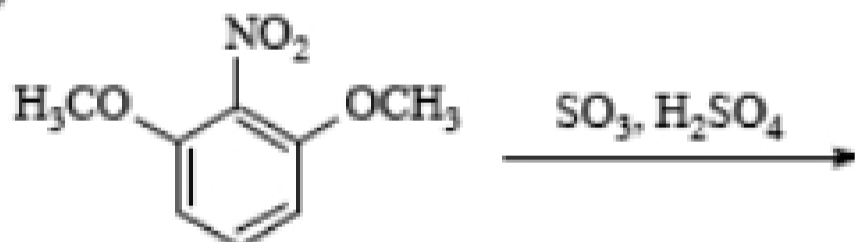
c)



d)



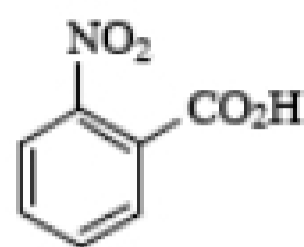
e)



f)



6. (10 points) Show how the compound below can be synthesized from *benzene* and any needed *reagents*. Assume that you can separate *ortho* and *para* isomers, if both are formed in any step. Note: More than one step may be (IS) required.



7. (10 points) Treatment of benzene with 1-chloropropane and AlCl₃ leads the formation of both propylbenzene AND isopropylbenzene. Draw mechanisms for the formation of each of these products.

