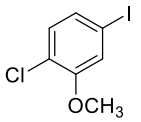
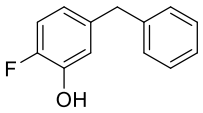
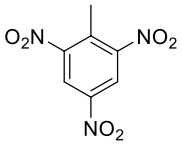
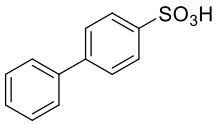
Chemistry 248A Hanson
EXAM 1
Feb. 20, 2012





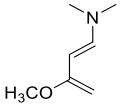
1. Name the compounds shown on the right:





2. Give an example of...
a) …an ortho-substituted aniline
b) …a bridged bicyclic compound with exo substitution
c) …a compound that would react slower than benzene but still give predominantly ortho/para substitution in an electrophilic aromatic substitution reaction
d) …the product of an intramolecular Friedel-Crafts acylation

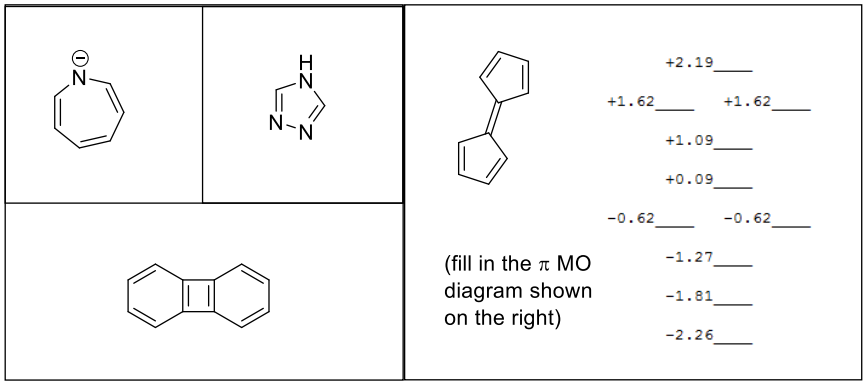
3. Draw **two** additional *significant* resonance contributors for each of the following species. In each case, *for the structures that you drew*, circle the one you think would be the more significant contributor:



4. Briefly explain…

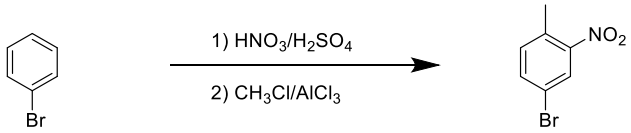
a) …the difference between a thermodynamic and a kinetic product in terms of energy and mechanism.
b) …why nitrobenzene is a strongly deactivating group, and why it is a meta director. Use structures, not just words.

5. Indicate in each of the four cases on the right if the compound is a*romatic* or *antiaromatic.* Also fill in the MO diagram (which will help you figure out that one, by the way).

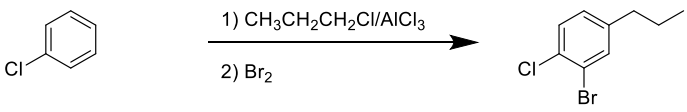


6.For each of the reaction sequences on the right, indicate **OK** if you think it will work. If it won't work, briefly explain why and what you would do differently to get the specified product:

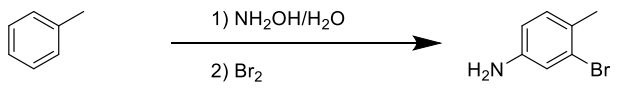
a)



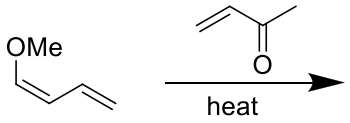
b)

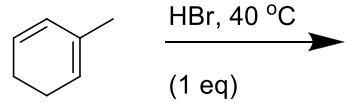


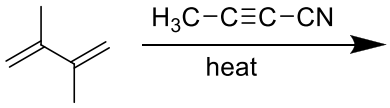
c)

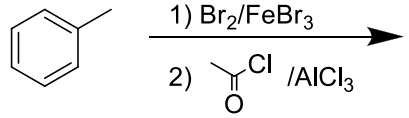


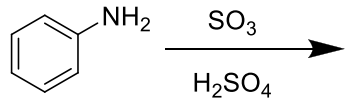
7.Indicate the required reagents or draw the structure of the major product for each reaction. In the case of *ortho/para* directors, assume *para* is favored over *ortho* unless only *ortho* is possible. For (g)-(i) number of steps is just a suggested number; you can use more or fewer if you wish.

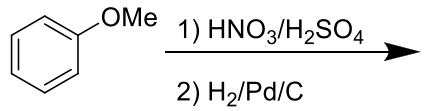
a) 

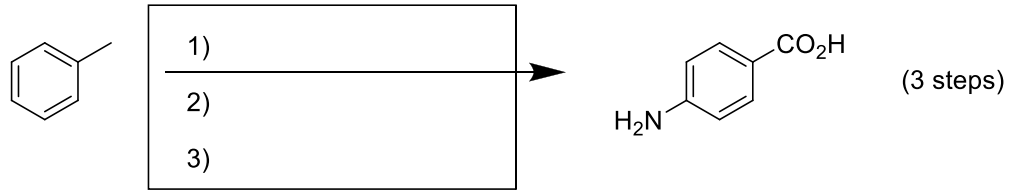
b) 

c) 

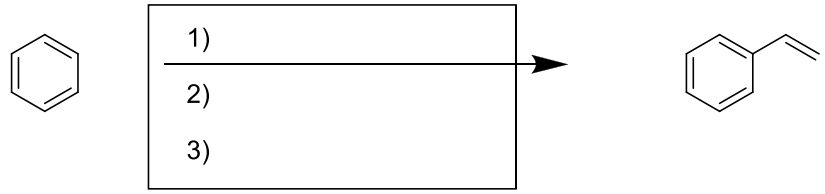
d) 

e) 

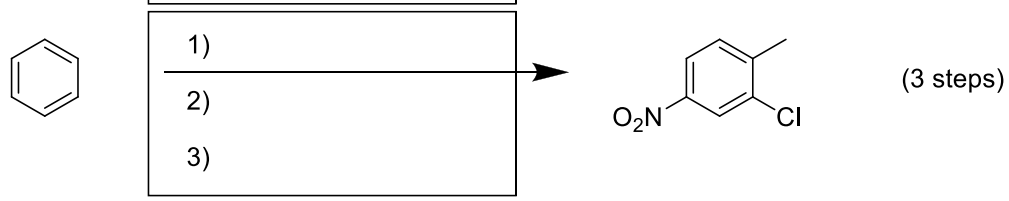
f) 

g) 

(3 steps)

h) 

(3 steps)

i) 

(3 steps)