Problem Session
February 4, 2011

1. Draw all important resonance forms
   
   a. 
   
   b. 
   
   c. What are bond orders

2. Draw all important resonance forms demonstrating the distribution of lone pairs/charge
3. Write a complete mechanism for the following reaction. Show ortho, meta and para attack and explain your choice(s) for the major routes.

\[
\begin{align*}
\text{a.} & \quad \text{HNO}_3, \quad \text{H}_2\text{SO}_4 \\
\text{O} & \quad \text{S} = \text{O} \\
\text{OCH}_3 & \quad \text{O} \\
\text{b.} & \quad \text{Cl} \quad \text{fuming Sulfuric acid}
\end{align*}
\]
C. \[ \text{HNO}_3 \rightarrow \text{H}_2\text{SO}_4 \]

\[ \text{N} \longrightarrow \text{C} \]

1. \( \text{CO} \longrightarrow \text{AlCl}_3 1.1 \text{ equiv (why)} \)

2. \( \text{CH}_3\text{Br} \longrightarrow \text{AlCl}_3 \)
Answers Problem Session
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1. 

2. 

3. 

Note: I drew it wrong
I think this is it.

These show C's are nucleophilic due to N donation.

You get the idea.
You get the idea
this shows all sites bearing + change

It shows how EWG renders Cl's electrophilic

Many structures can be drawn analogous to Donation example.

Does CF₃ stabilize + charge?
other attack

\[
\begin{align*}
\text{OCH}_3 & \quad \text{OCH}_3 \\
0 = S = 0 & \quad S_0^3H
\end{align*}
\]

only 3 forms

3 forms

one

with

\( ^{+} \) charge at site with

EWA

destabilized intermediate
b. \[ \text{Cl} \quad + \quad \text{H}_2\text{SO}_4 \quad \rightarrow \quad \text{Cl} \quad + \quad \text{H}_2\text{SO}_4 \]

\[ \text{Cl} \quad + \quad \text{H}_2\text{SO}_4 \quad \rightarrow \quad \text{Cl} \quad + \quad \text{H}_2\text{SO}_4 \]

4 forms

meta

3 forms
less favored

para

4 forms

ortho
Note naphthalene has 2 spots for attack. Which is best?

c. $\alpha$-attack

Generated as in other prob.

Favored forms complete $\mathbf{C}_4$ with benzene.

5 forms 3 $\omega$ complete benzene.
1 equivalent

Resonance stabilized
No rearrangement

Can't do EAS onset deactivated ring