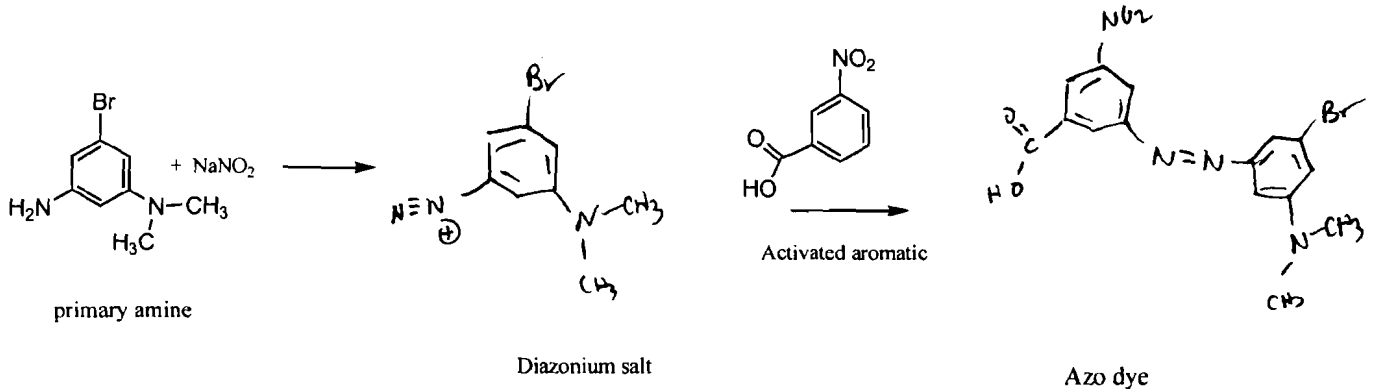


Chem 252 sample exam#1

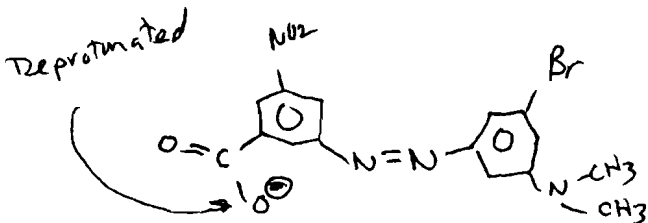
Key

1. For the following azo dye synthesis (reaction #1) fill in the missing structures of the diazonium salt and the azo dye.

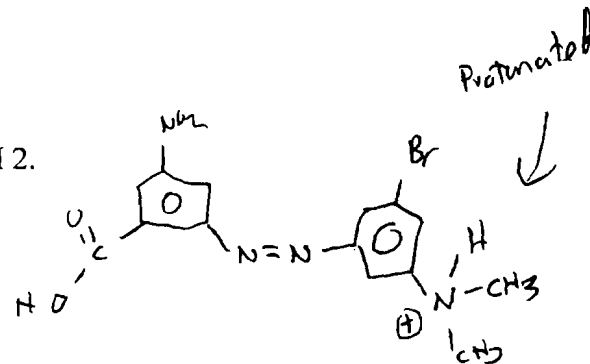
Reaction #1



b. (4 pts) For reaction #1, draw the structure of the Azo dye at pH 10.

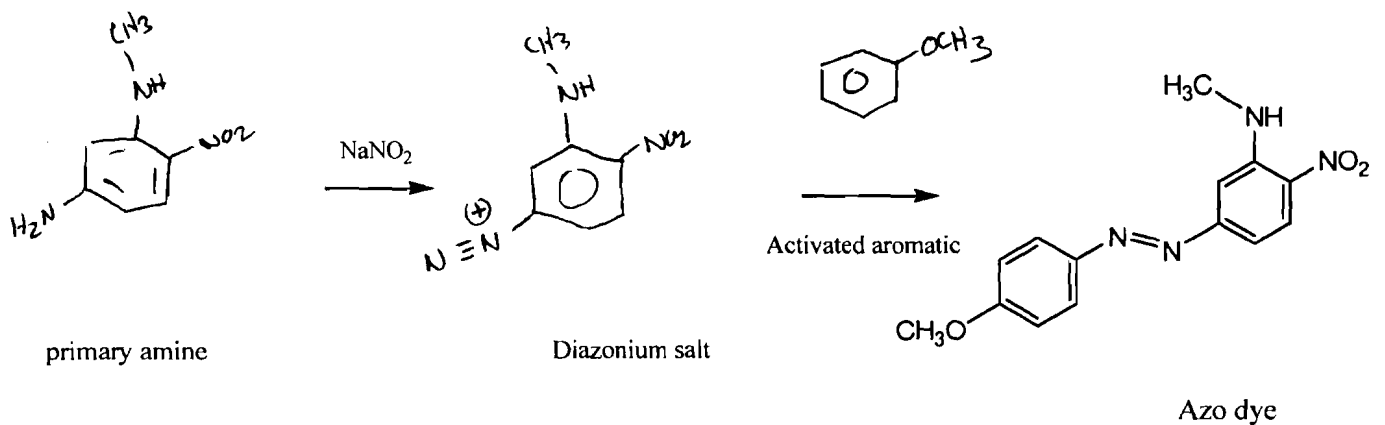


c. (4 pts) For reaction #1, draw the structure of the Azo dye at pH 2.

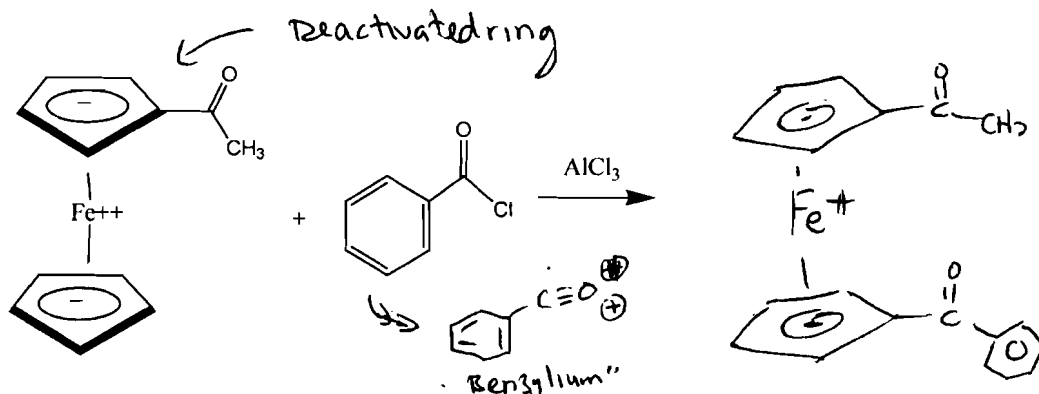


2. (12 pts) For the following azo dye synthesis (reaction #2) fill in the 3 missing structures of the primary amine, diazonium salt and the activated aromatic.

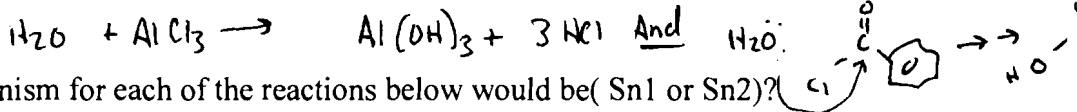
Reaction #2



2. Monoacetyl ferrocene is reacted with one equivalence of benzoyl chloride and aluminum chloride to generate a benzoylated acetylferrocene. Depict the most likely product of this reaction.



b) (4 pts) If water contaminated this reaction what would be the consequence of this? Show the reaction(s) that water would undergo.

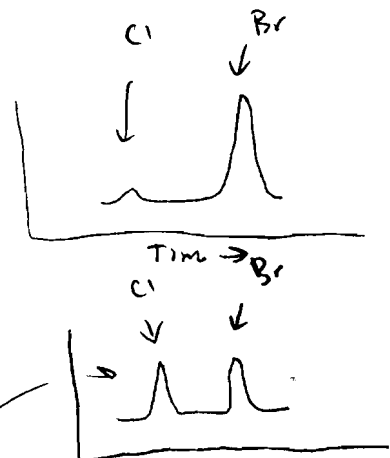
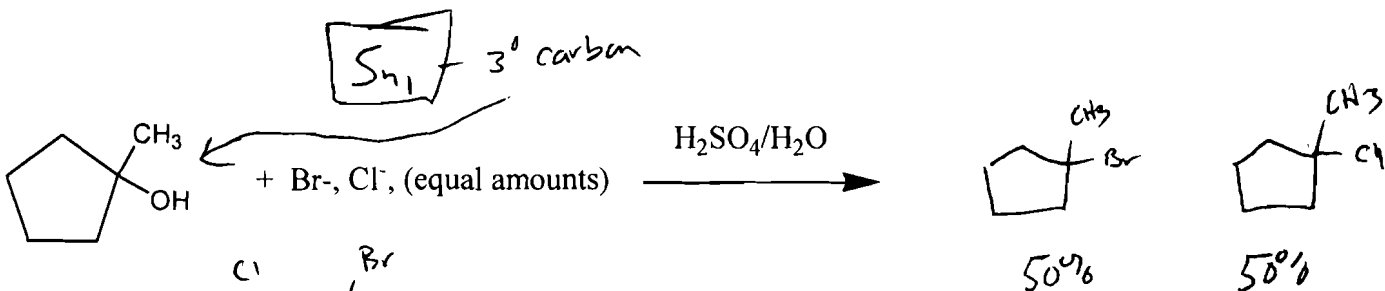
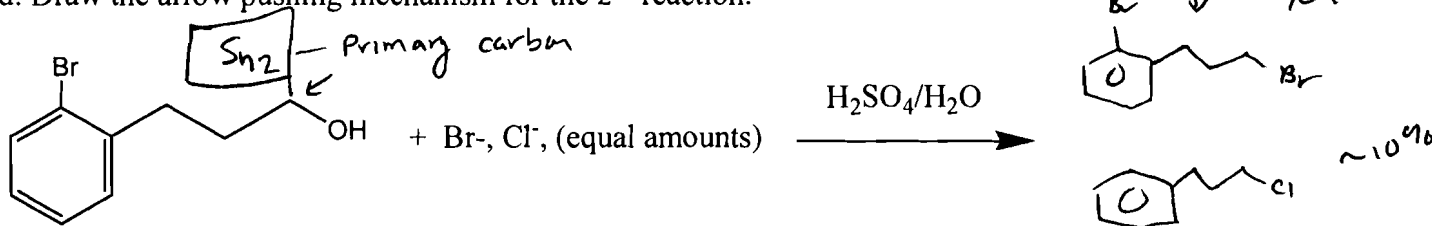


3.a Predict what the mechanism for each of the reactions below would be (Sn1 or Sn2)?

b. For each reaction draw the expected products that you would expect given the mechanism you choose. Give approximate % of each product that would be produced.

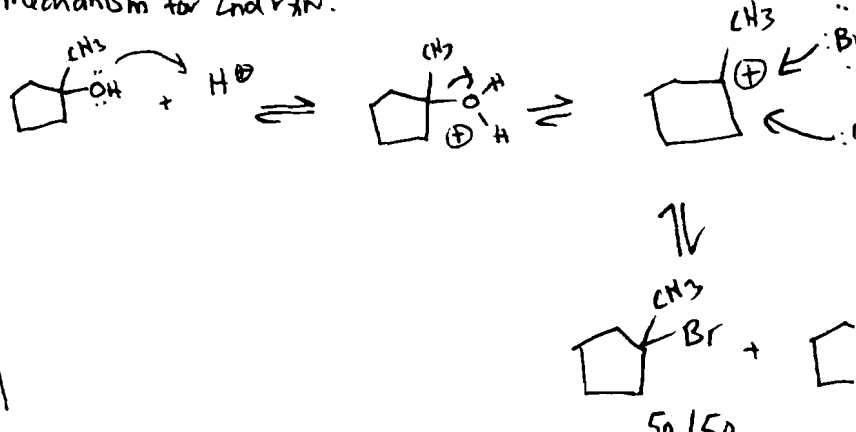
c. For Each reaction sketch what the GC data might look like for the product mixture.

d. Draw the arrow pushing mechanism for the 2nd reaction.

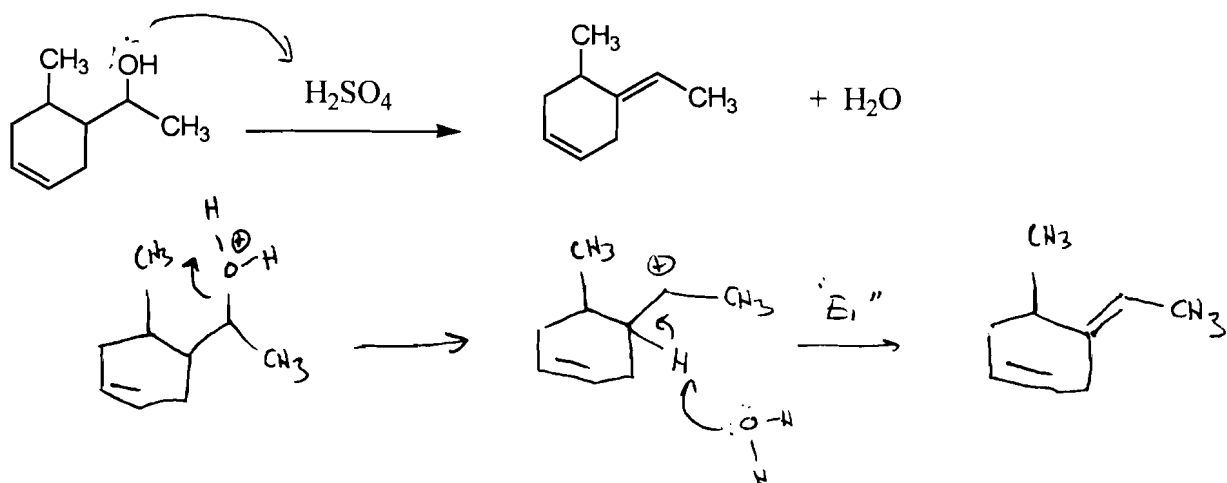


Cl lower boiling out first

Mechanism for 2nd rxn:



4. For the reaction below write the mechanism.



What would be the relative boiling points for alcohol reactant and alkene product?

Alcohol Bp > Alkene (lower boiling, easy to distill).

What would you look for on the IR and NMR to indicate that you made your product?

IR - O-H group at $\sim 3200 \text{ cm}^{-1}$ (lack of one for alkene)

$\text{C}=\text{C}$ stretch at $\sim 1600 \text{ cm}^{-1}$

$\text{C}=\text{C}-\text{H}$ stretch at above 3000 cm^{-1}