

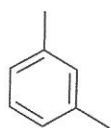
Chemistry 3331
Organic 2
Professor Eaton
Spring 2013

EXAM 2

1. (3 pts) Draw the structure of styrene

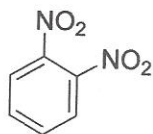


2. (3 pts) For the benzene derivative drawn below provide the IUPAC name



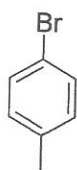
2,3-dimethylbenzene

4. (3 pts) For the molecule drawn below provide the IUPAC name



1,2-dinitrobenzene

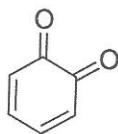
5. (3 pts) Name the compound drawn below according to the IUPAC rules



1-bromo-4-methylbenzene

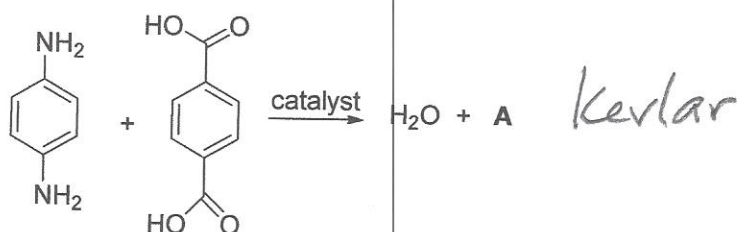
6. (3 pts) The compound drawn below is an example of:

- a) Terpene
- ☒ b) Quinone
- b) Catechol
- c) Coenzyme Q



Key

7. (5 pts) For electrophilic aromatic substitution reactions of benzene
- The benzene ring is the electrophile
 - The aromaticity of benzene makes reaction faster than an alkene
 - ☒ The benzene ring is the nucleophile
 - The rate determining step is the loss of a proton in the substitution of the ring
8. (3 pts) The reaction drawn below gives off water and polymer A. What is the name of A?

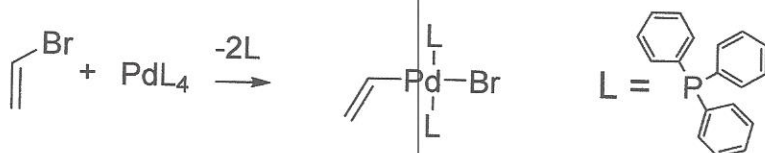


9. (5 pts) Explain in a couple of sentences why NBS is used in place of bromine for allylic bromination.

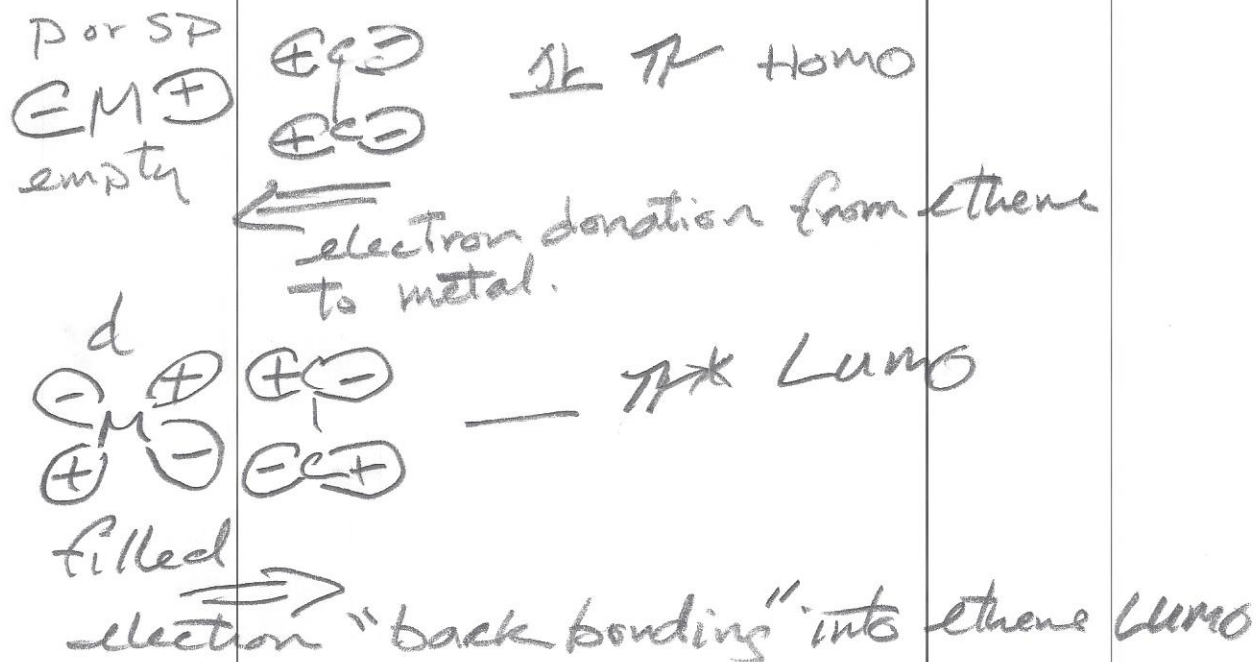
NBS is used to create a low constant concentration of Br^\bullet so that allyl hydrogen abstraction and radical chain allylic bromination takes place instead of bromination of the double bond.

10. (4 points) the reaction step drawn below is an example from the:

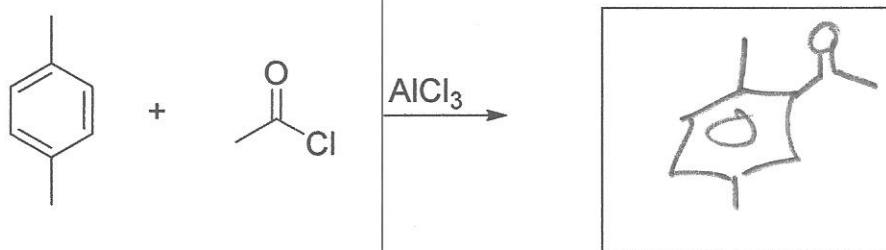
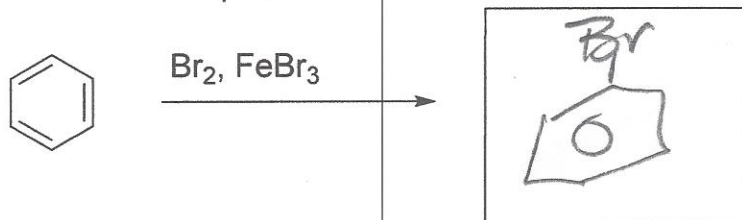
- Heck reaction
- Alkene metathesis
- Lapinski conjugative coupling
- carboxamidation
- ☒ a and d
- b and d

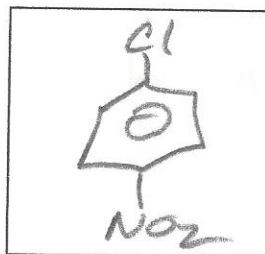
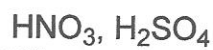
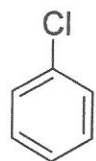


11. (8 points) For transition metal complexes used in catalysis to form carbon-carbon bonds the bonding of the organic substrates is an important aspect of the chemistry. Draw below two drawings for the bonding of ethene to a generic transition metal. Your drawings should clearly show the orbitals and their symmetry as well as indicate if they are filled or empty and which constitutes back bonding.

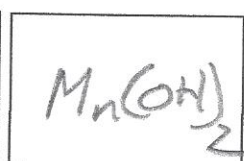
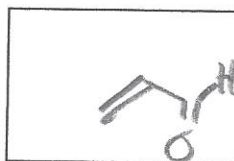
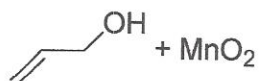
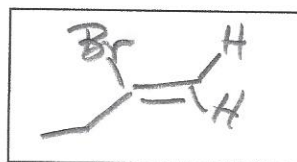
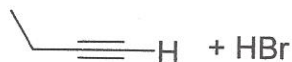
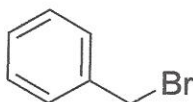
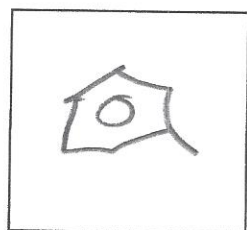
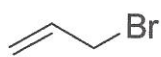
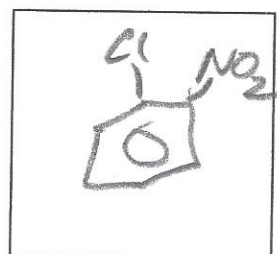


12. (51 points, 3 points per box) for the reactions shown below fill in the box to complete the chemical equation



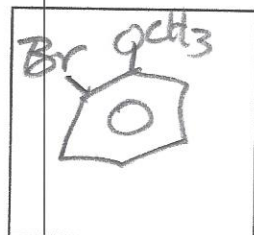
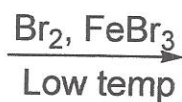
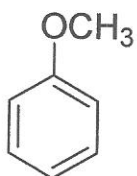
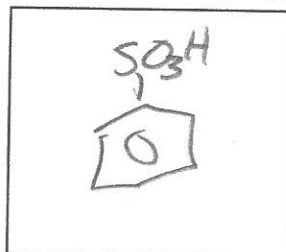
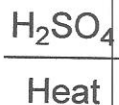


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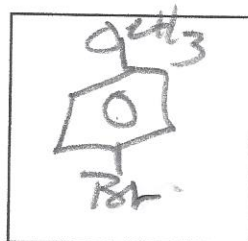


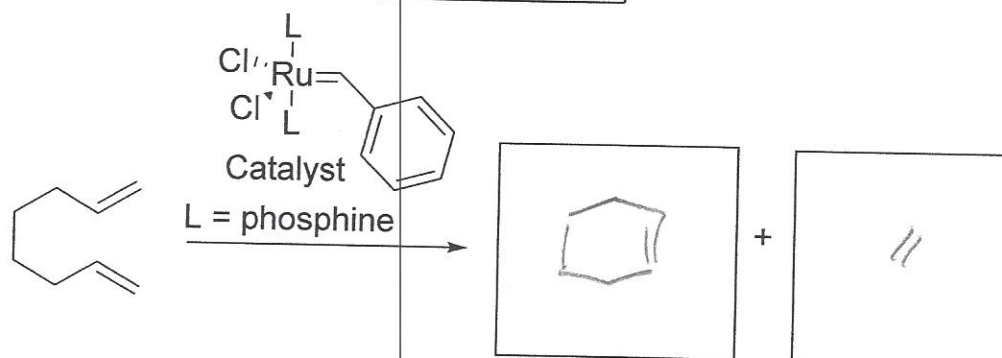
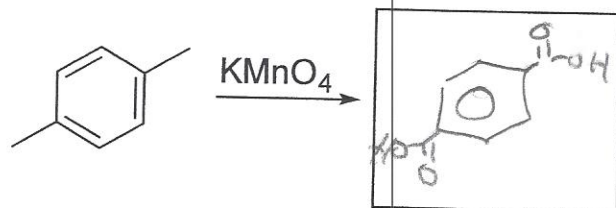
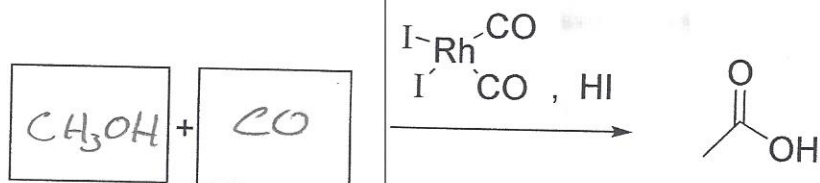
organic product

inorganic by product



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12. (9 points) Starting from ethyne (acetylene) and ethene (ethylene) as the only carbon source and any inorganic reagent or catalyst that you need, draw a synthetic scheme to make styrene in three steps.

