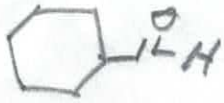
Student Name_____ Student ID# _____ Key

Chemistry 3331
Organic 2
Professor Eaton
Spring 2015

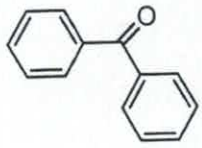
EXAM 2

1. (3 pts) Draw the structure of cyclopropanone.

2. (3 pts) Draw the structure for cyclohexanecarboxaldehyde.

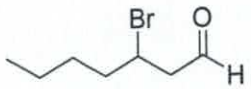


4. (4 pts) For the molecule drawn below, provide the common name.



Benzophenone

5. (4 pts) Name the drawn below according to the IUPAC rules.



3-bromo-heptanal

6. (3 pts) Draw the structure of acetone.

7. (5 pts) NBS is used:

a. as a catalyst for allylic bromination
b. to add hydroxyls to nitrobenzenes
c. to brominate pi-bonds
d. none of the above

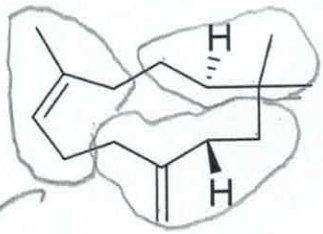
Student Name_____ Student ID# _____ Key

8. (5 pts) The first step in most reactions where an organometallic transition metal is a catalyst is:

a. Migratory insertion
b. Ligand substitution
c. Oxidative addition
d. Reductive elimination

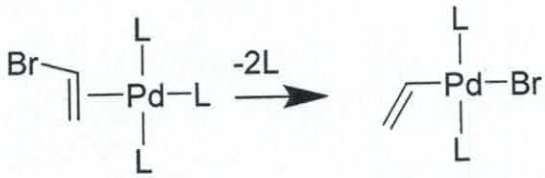
9. (3 pts) The molecule drawn below is a:

a. Monoterpene
b. Diterpene
c. Sesquiterpene
d. Catechol
e. Aniline



10. (5 pts) For the structure drawn in question 7 above, **redraw** it below and carefully label the isoprene units in the structure.

11. (5 points) The reaction step drawn below is from the:



L = A Triphenylphosphine

a) Heck reaction
b) Cyclotrimerization
c) Suzuki coupling
d) carboxamidation
e) a and c
f) a, c and d

Student Name_____ Student ID# Key

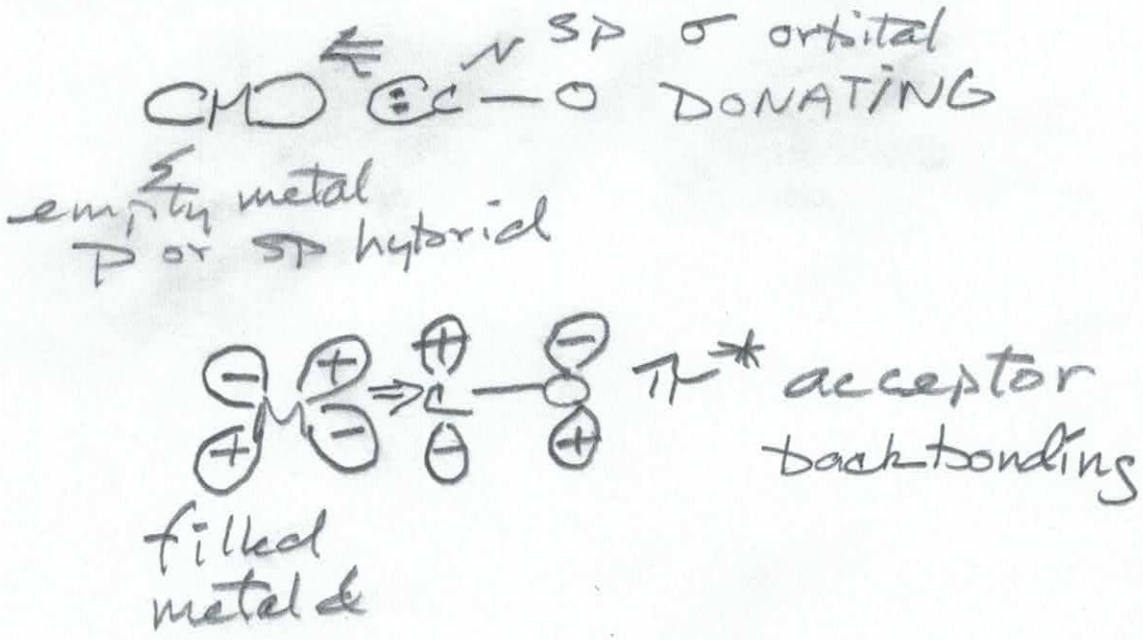
12. (5 pts) Cyclotrimerization is unique compared to other organometallic catalysis reactions because:

a) it does not undergo oxidative addition and reductive elimination
b) the reaction is catalytic in the transition metal
c) it performs a reversible [2 + 2 + 2] cycloaddition with alkenes
d) forms three new carbon-carbon bonds
e) none of the above

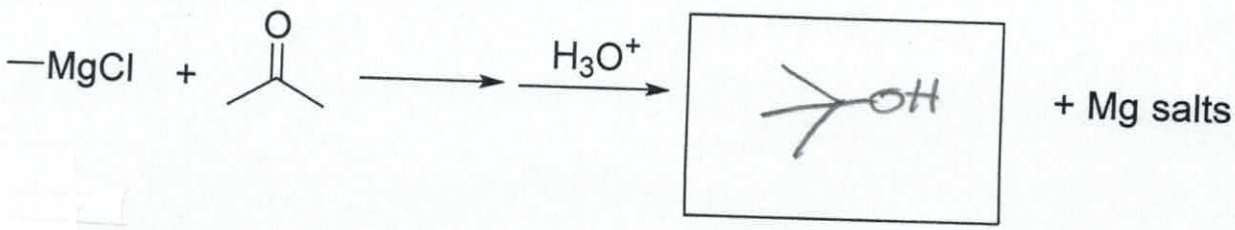
13 (5 pts) For electrophilic aromatic substitution, the rate determining step is:

a) Loss of a proton and formation of aromaticity
b) Radical attack of a benzene pi-system
c) Nucleophilic attack by the benzene sigma-system
d) Electrophilic attack by the benzene pi-system
e) None of the above

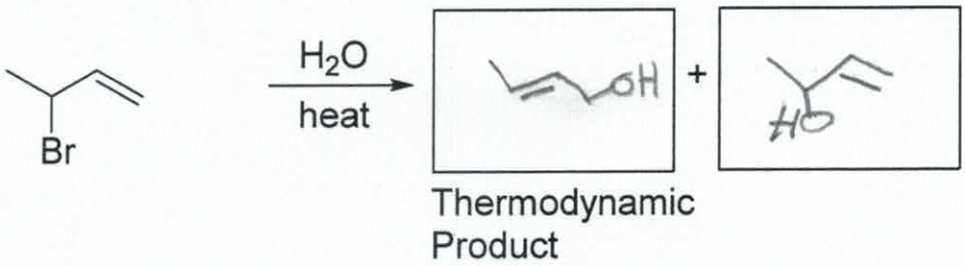
14. (8 pts) Draw a molecular orbital scheme for the sigma donor bonding AND pi-back-bonding of carbon monoxide to a transition metal. Draw one scheme for the sigma donor interaction and another for the pi-acceptor or back-bonding.



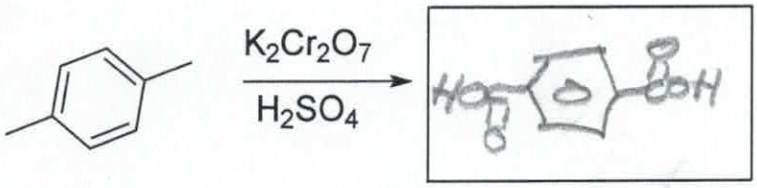
15. (42 pts) For the reactions shown below, fill in the box to complete the chemical equation by drawing the starting reagent or the product.

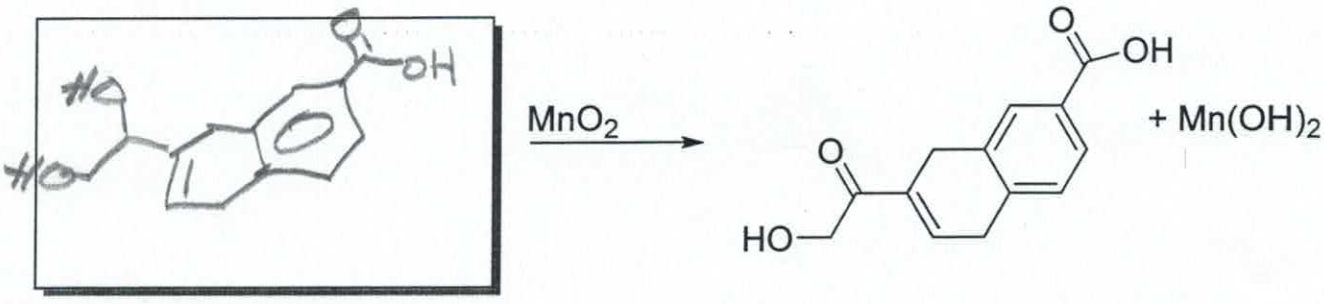


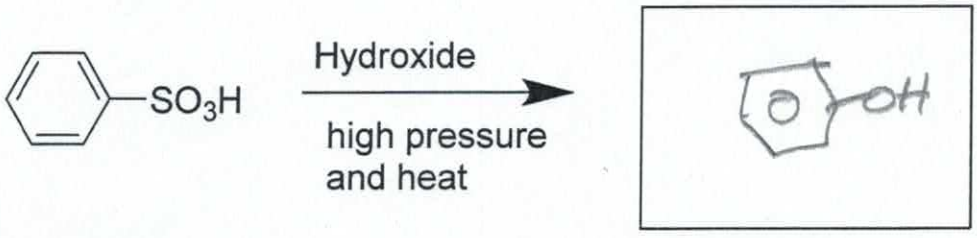
Student Name_____ Student ID# Key

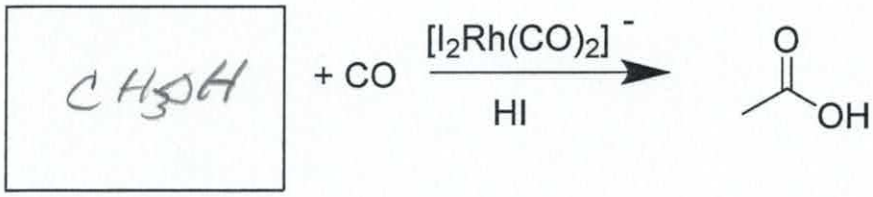


Thermodynamic Product









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