

English

Tuesday 5. June 2012
kl. 0900 – 1300

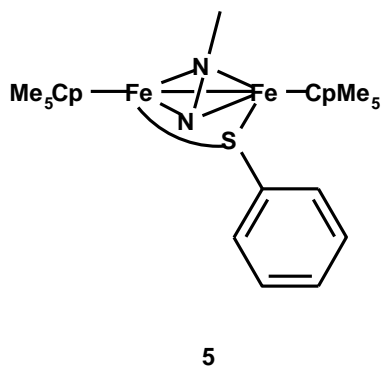
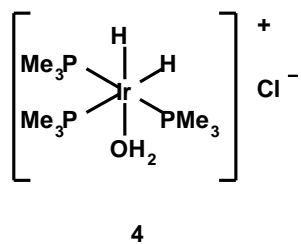
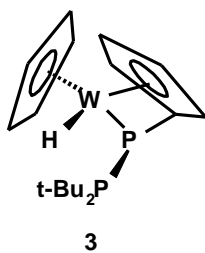
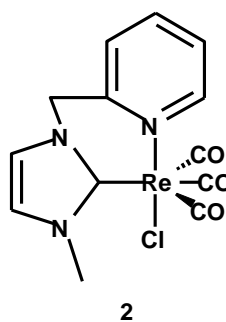
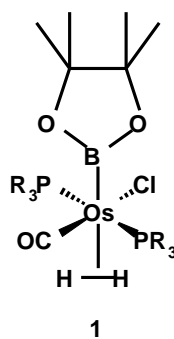
Permitted tools: D – No printed or written text is permitted.
Molecular models are permitted.

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Problem I (25 points)

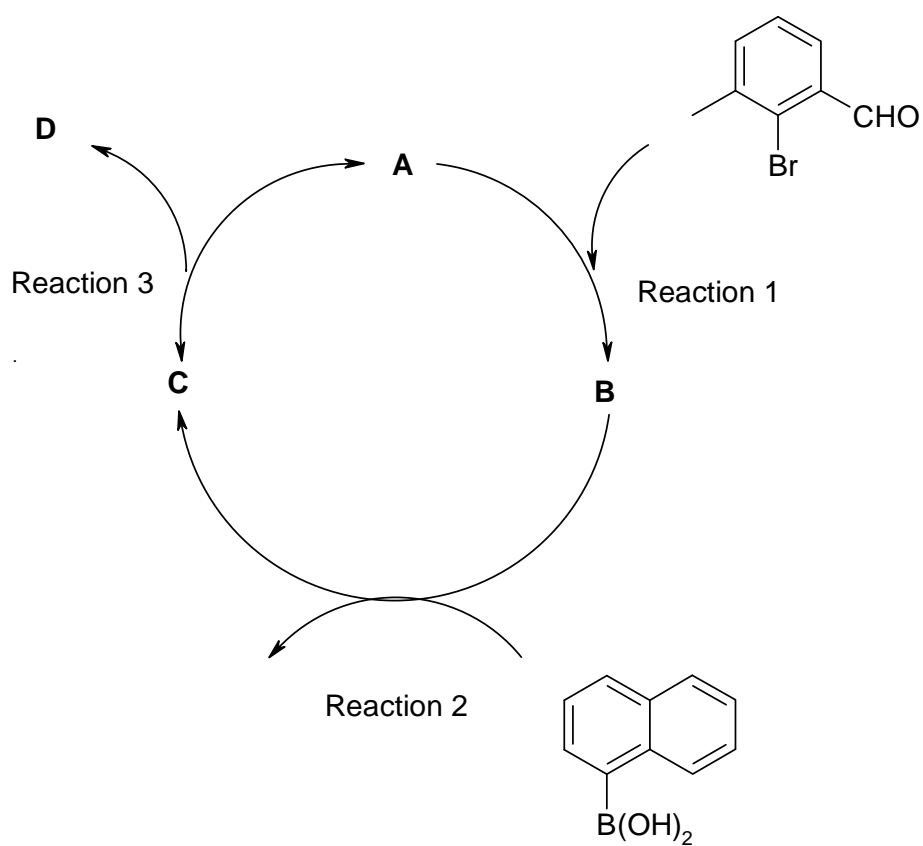
For each of the following compounds:

- (a) What is the number of electrons in the valence shell of the metal?
- (b) What is the oxidation state of the metal?



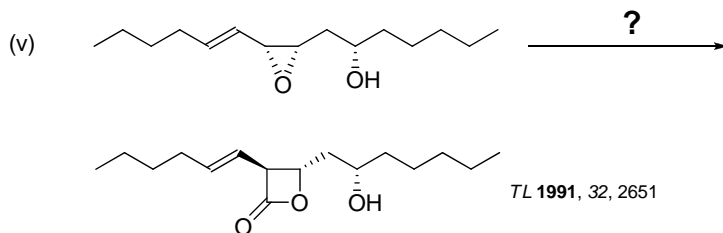
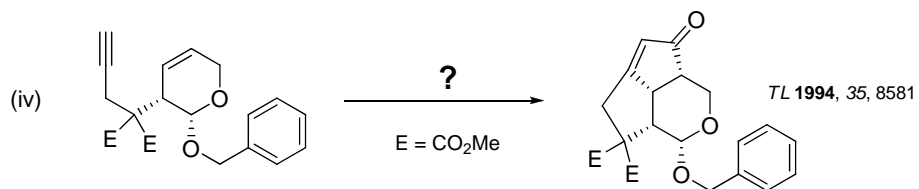
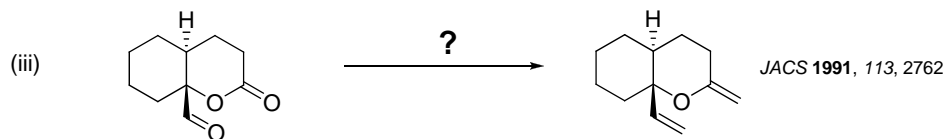
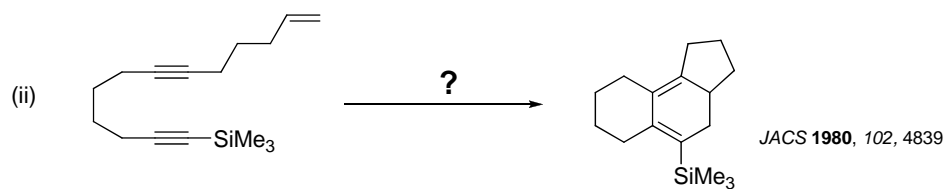
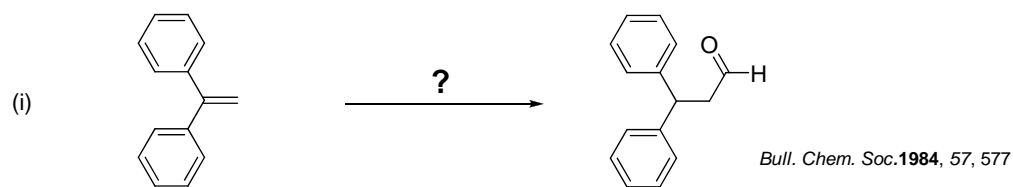
Problem II (25 points)

- (a) Name the elementary reaction shown for each of the steps in the catalytic cycle below.
- (b) What are the structures A – C?
- (c) What is the oxidation state for catalyst in the different complexes?
- (d) What is the name of the reaction?



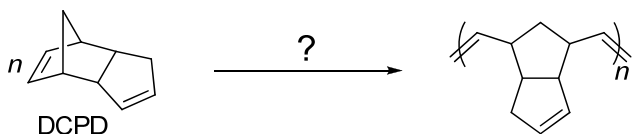
Problem III (25 points)

Give the reagents necessary for promoting the transformations shown below. Some of the reactions may involve several steps.



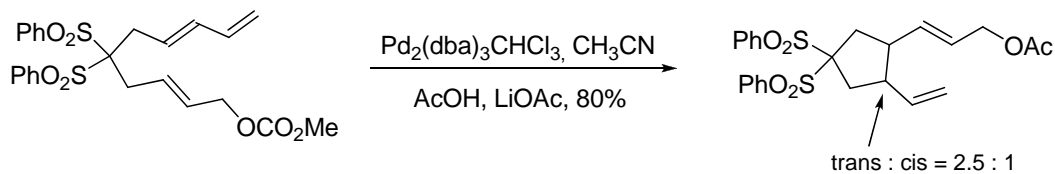
Problem IV (25 points)

- (a) Dicyclopentadiene (DCPD) is an attractive monomer for polymer production, as it is inexpensive, and the resulting polymer products are useful for a variety of applications. Give reagents and mechanism for the reaction shown below.



Angew. Chem. Int. Ed. **2006**, 45, 3760

- (b) Show the mechanism involved for the reaction shown below. Is the reaction catalytic regarding palladium?



dba = dibenzalacetone (= dibenzylideneacetone)

JACS **1988**, 110, 8239

Good Luck!

ORG