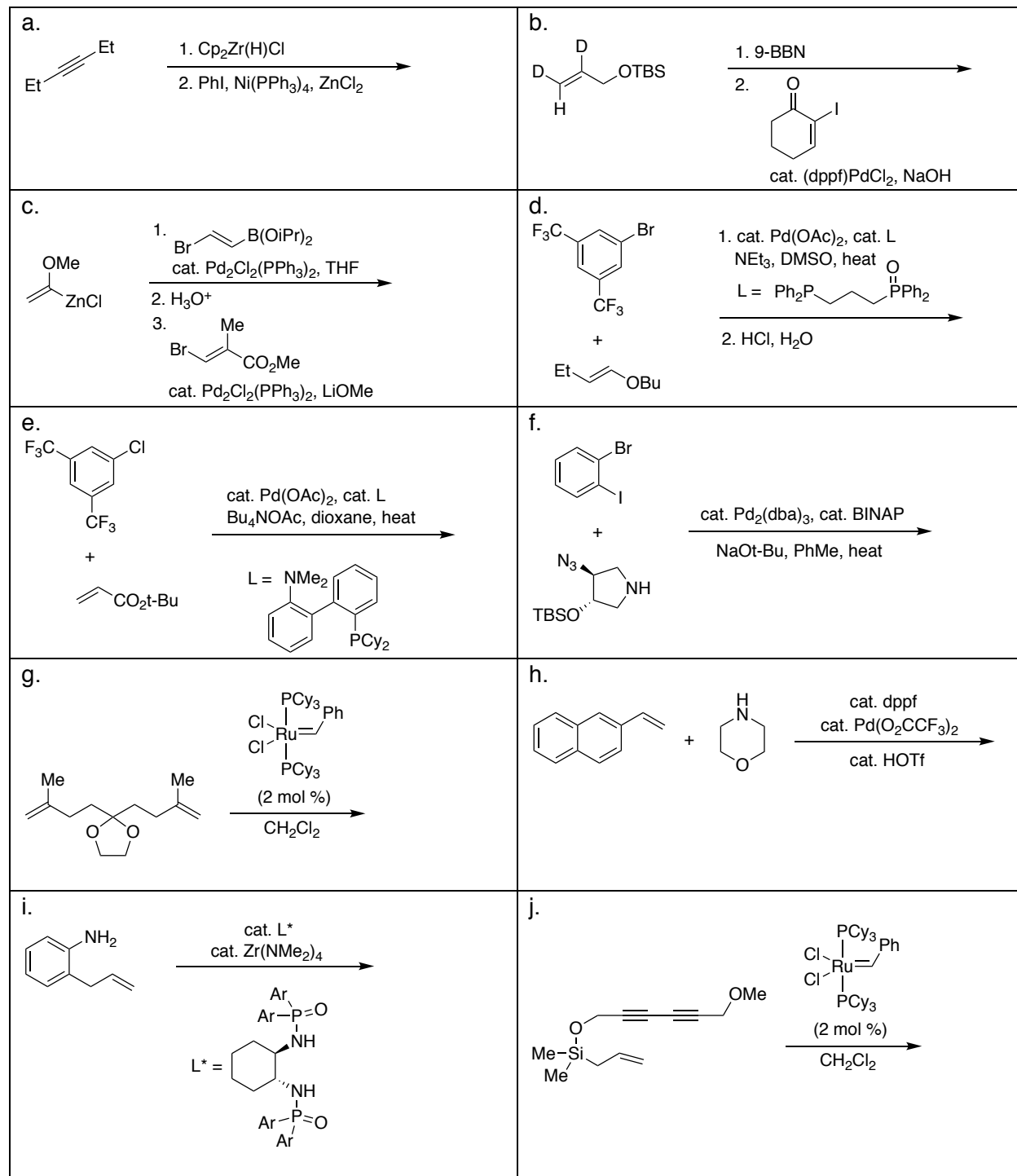


Organic Cume – May 2017

Metal-catalyzed and -mediated transformations are important tools for synthetic organic chemists. This exam will focus these types of reactions.

1. (30 pts) Predict the product(s) of the following transformations.



2. (20 pts) Short answer.

a. What is the role of  $\text{ZnCl}_2$  in problem 1a?

b. What determines the chemoselectivity of the reaction in 1c?

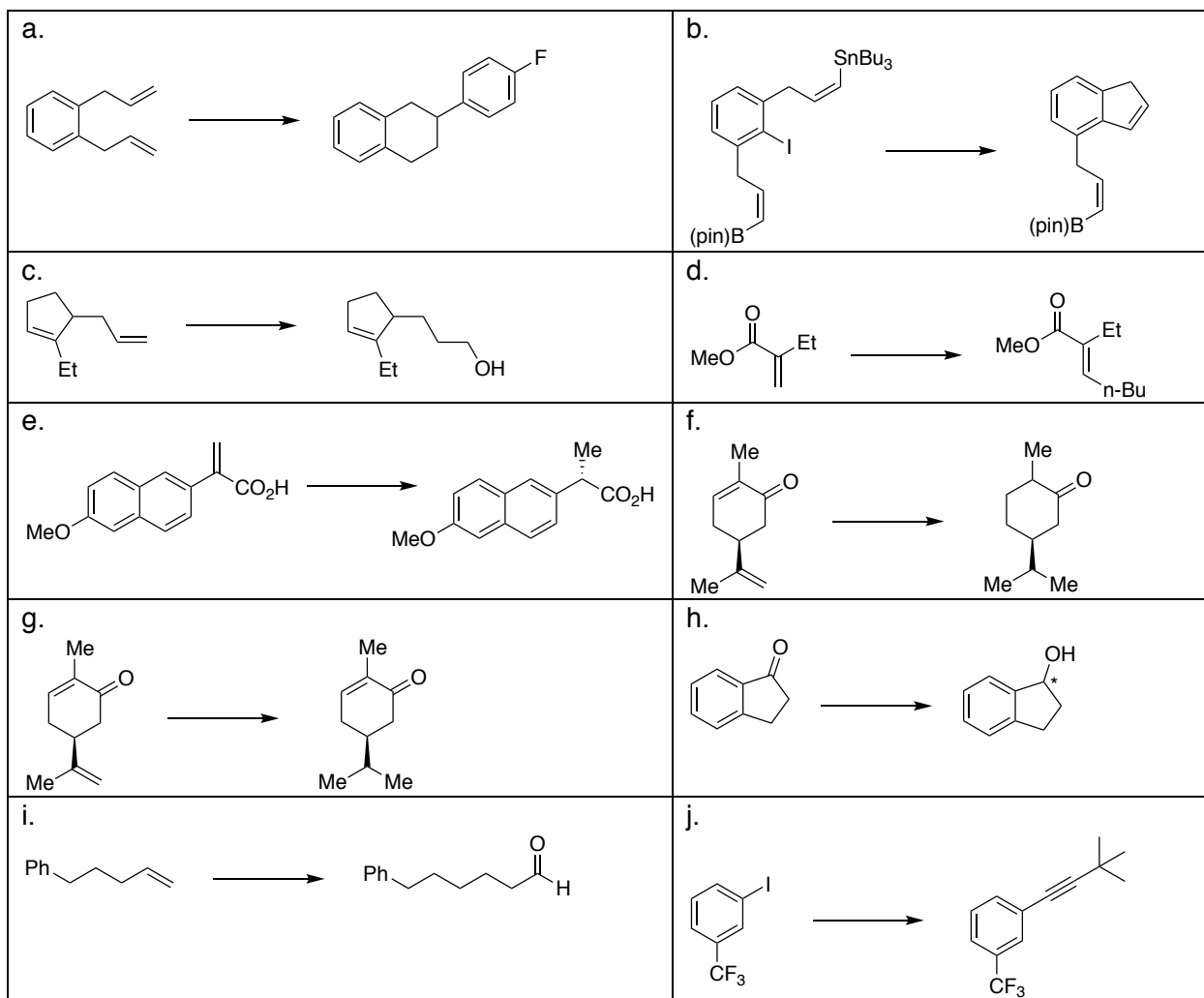
c. What is the role of  $\text{NEt}_3$  in problem 1d?

d. Explain the difference in regioselectivity between 1d and 1e.

e. What is the role of  $\text{NaOtBu}$  in 1f?

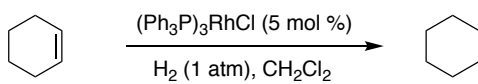
f. What volatile side product is formed in 1g?

3. (30 pts) Provide the appropriate catalyst and/or reagents to accomplish the following transformations.

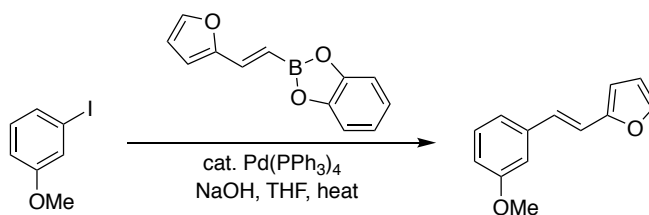


3. (30 pts) Draw a mechanism/catalytic cycle for the following transformations.

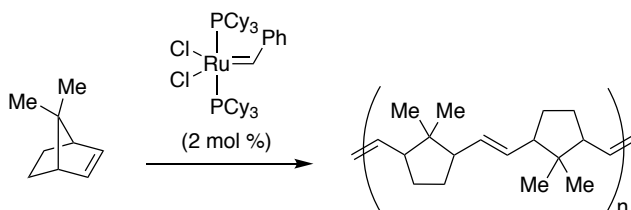
a.



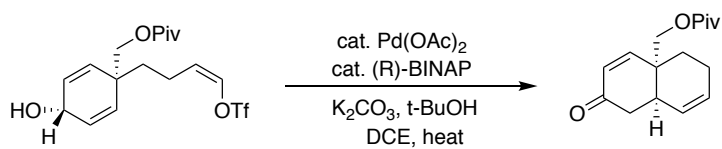
b.



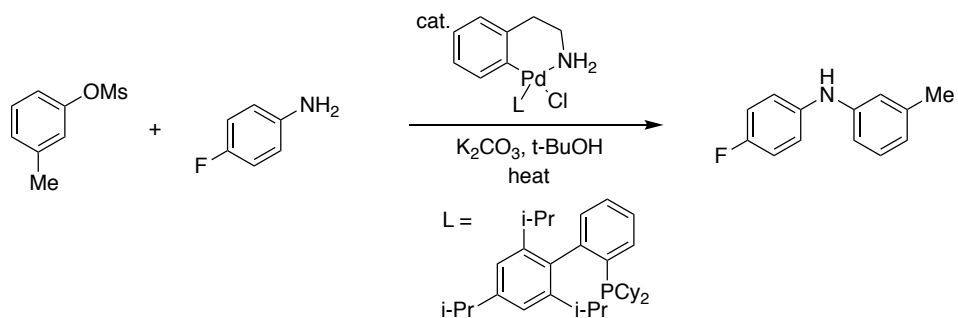
c.



d.

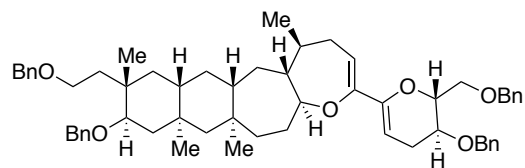


e.



4. (15 pts) Suggest a retrosynthesis for the following molecules using cross coupling reactions.

a.



b.

