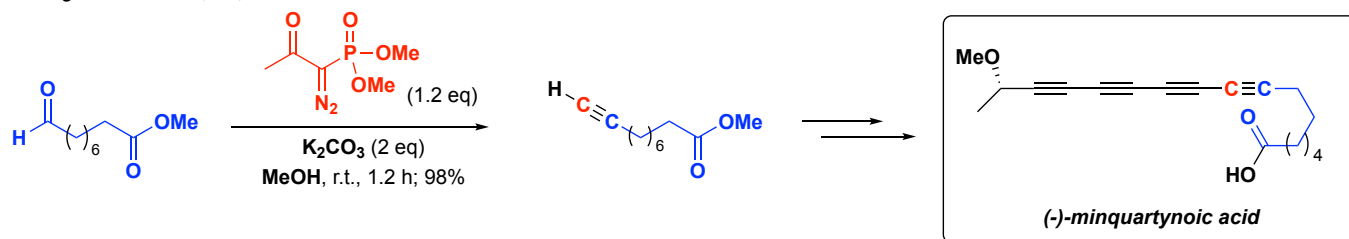


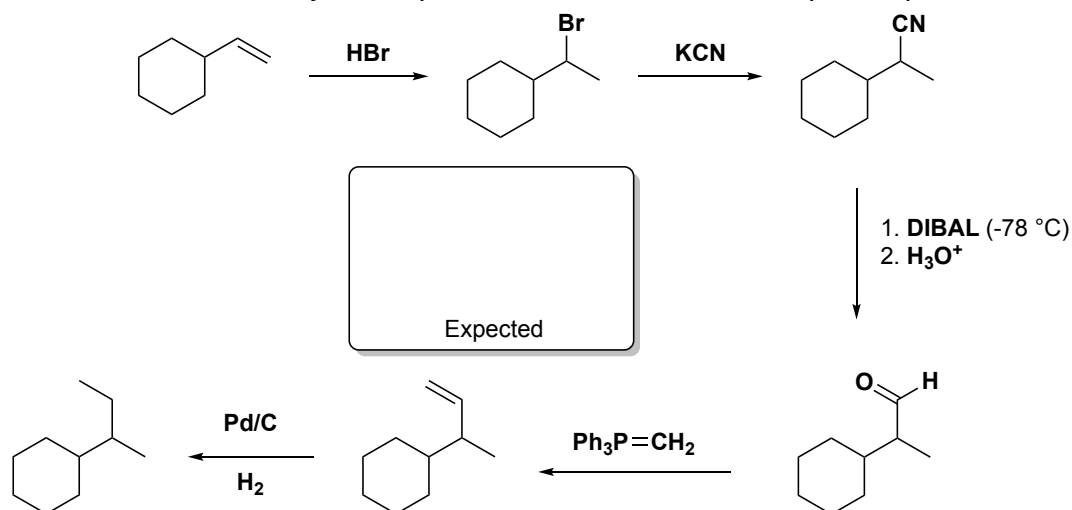
Team Name: _____

1. The natural product, (-)-minquartynoic acid, below shows strong anti-cancer and anti-HIV activity. In the lab of B. W. Gung one of the alkynes was prepared using the *Seyferth-Gilbert homologation*. The mechanism begins with the deacylation. Draw the mechanism.

J. Org. Chem. **1991**, *56*, 2590-2591.

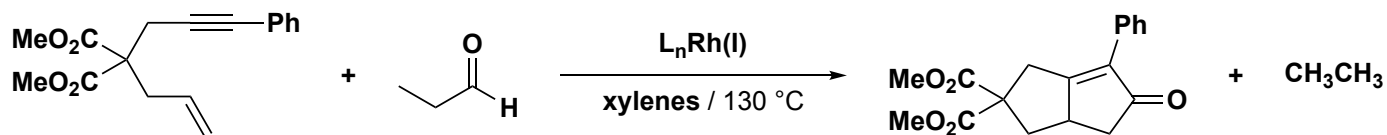


2. Find the mistake in the synthetic procedure below. Draw the expected product.



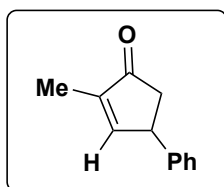
3. The Rh-catalyzed *Pauson-Khand* Reaction is below. An aldehyde can be used as the source of CO. Assuming the Rh catalyst is of the form $L_nRh(I)$ and the by-product of the P-K reaction is R-H.

Adapted from: T. Shibata, *Adv. Synth. Catal.*, **2006**, *348*, 2328; Spessard, G.; Miessler, G. *Organometallic chemistry*; Oxford Press University, 2016.



- a. Propose a reasonable catalytic cycle for the *carbonylation* of the Rh catalyst by RCHO *prior* to the P-K reaction.

- b. Consider the aldehyde not only as a source of CO, but also as one of the reacting partners in the P-K reaction. If so, what two reactants are necessary to synthesize the cyclopentenone molecule below.



4. Starting with cyclobutene synthesize succinic anhydride.

