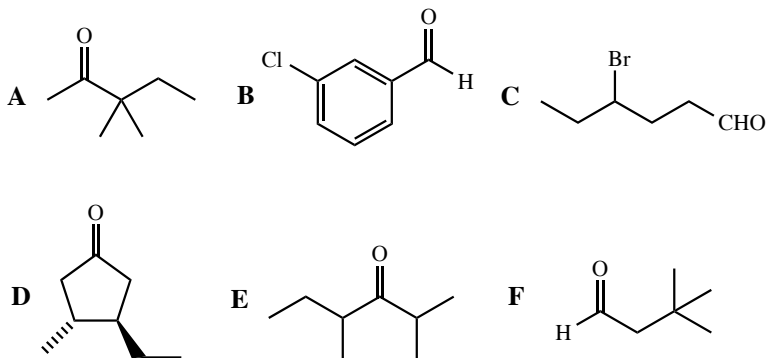
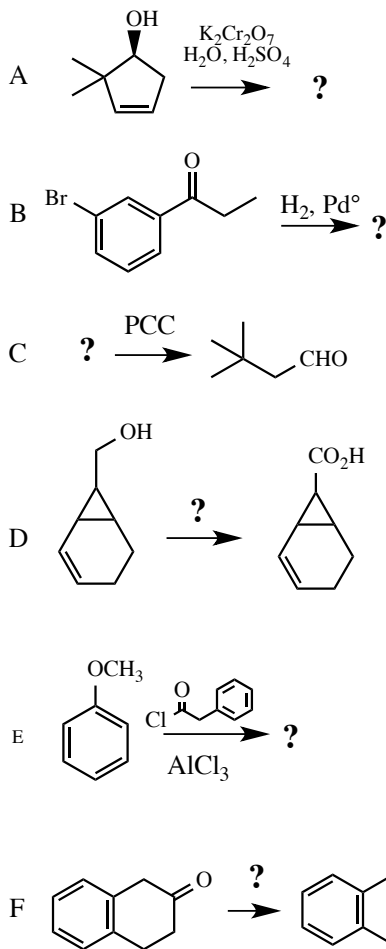


# Chapter 20 Practice Problems

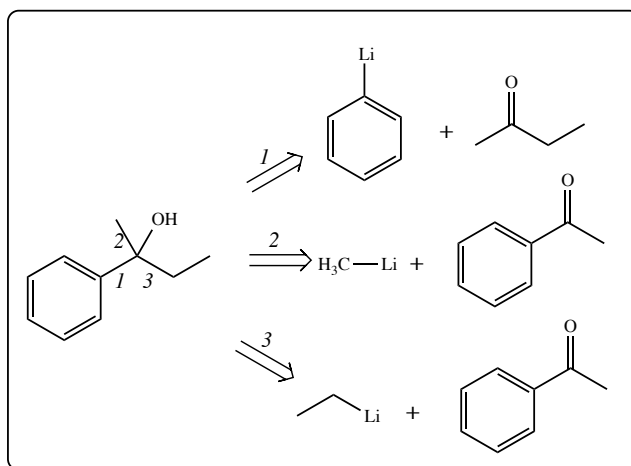
1. Provide IUPAC names for the following molecules



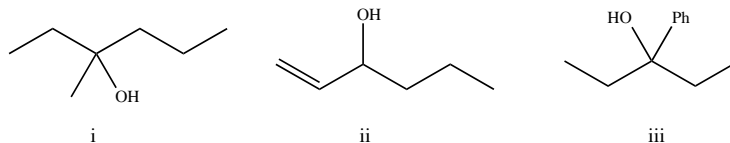
2. Provide the necessary starting material, reagent or product as needed for the following reactions:



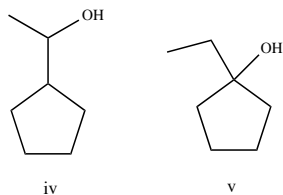
3. There are often more ways than one to make the same compound by combining an organometallic compound with a carbonyl compound. Consider the example below for the synthesis of Compound A. each of the C–C bonds to the carbon bearing the OH group (bonds 1, 2 and 3) could have been made by the corresponding nucleophilic addition of the organometallic agent with a carbonyl compound (convince yourself of that! Assuming neutralization after the addition of organometallic). All three pathways presented are plausible ways in which to make the compound of interest. Which pathway is chosen typically depends on the availability of starting materials.



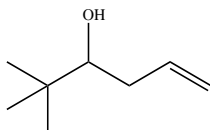
A. For the compounds below, determine how many routes could be used to form the product:



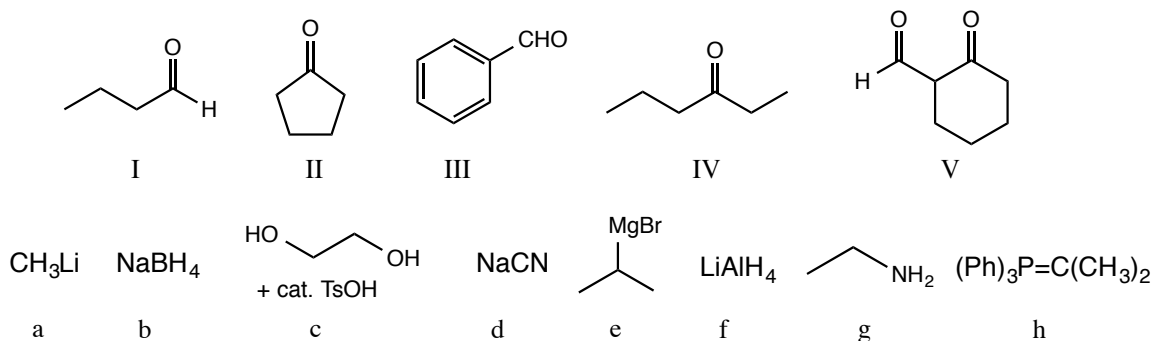
B. Generally, cyclic molecules must be made by using starting materials that already have the cyclic portion of the molecule intact. Consider ways in which to make the following two compounds:



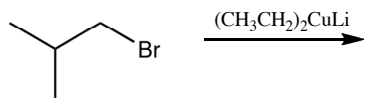
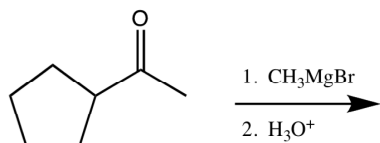
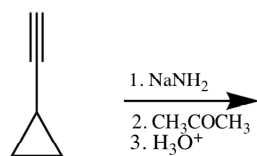
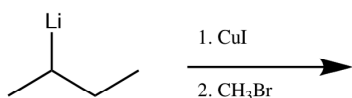
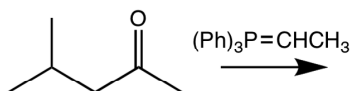
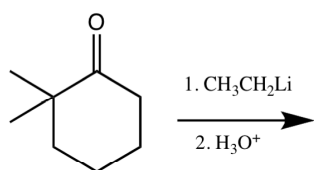
C. For the following molecule, are there theoretically there are two possible methods for its synthesis, only one is practical. Why?



4. Predict the product formed from each of the carbonyl compounds I–V with each of the reagents a–h. For compound V, draw the product resulting from addition of 1 equivalent of the reagent, and then from 2 equivalents of reagent. Assume that (if required),  $\text{H}_3\text{O}^+$  is added at the end of the reaction to neutralize products.



5. Draw the final product expected from each of the following reactions:



6. Bencyclane (see below) is a vasodilator (relaxes blood vessel walls to allow for greater circulation, and blood pressure lowering). We can consider a method for the synthesis of Bencyclane by providing the missing structures along the synthetic route given:

