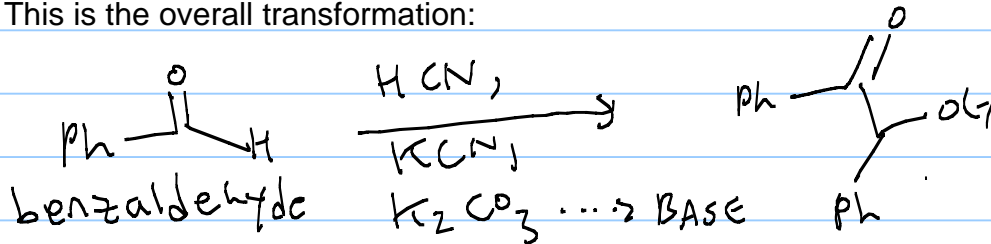


BENZOIN CONDENSATION

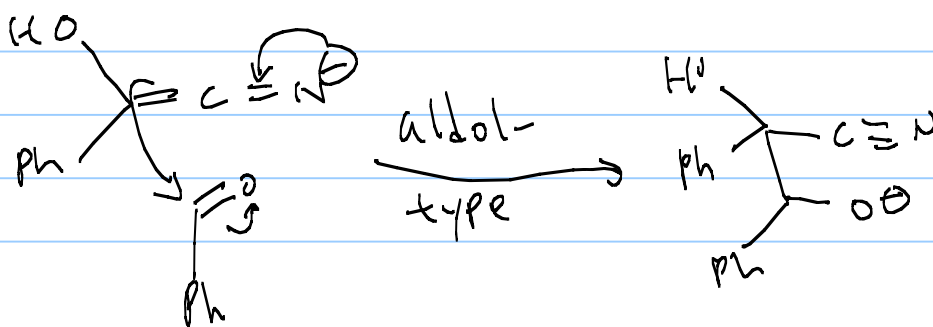
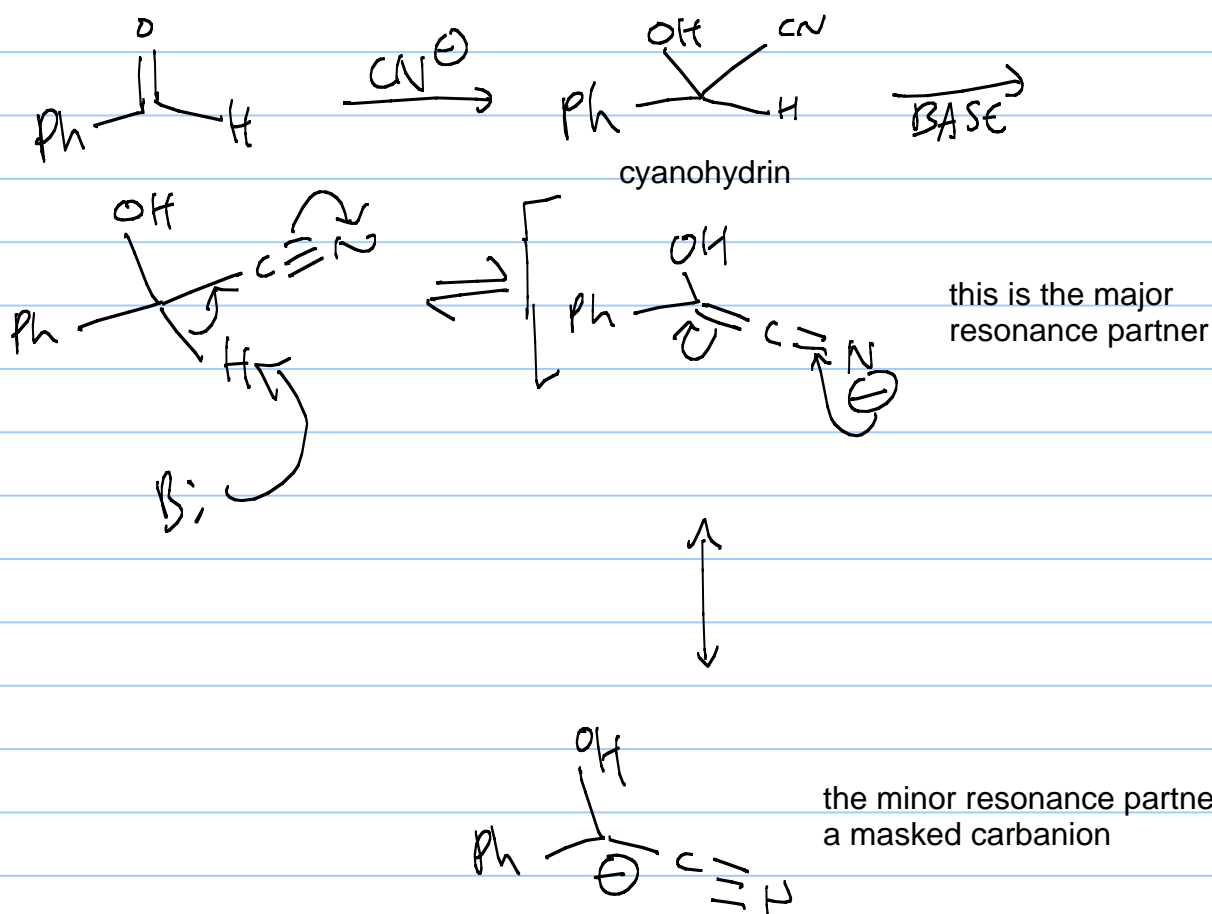
Note Title

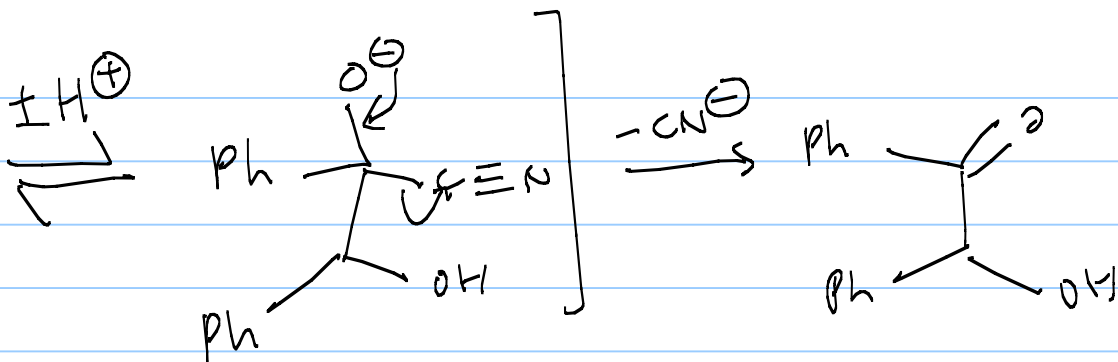
24/03/2004

This is the overall transformation:



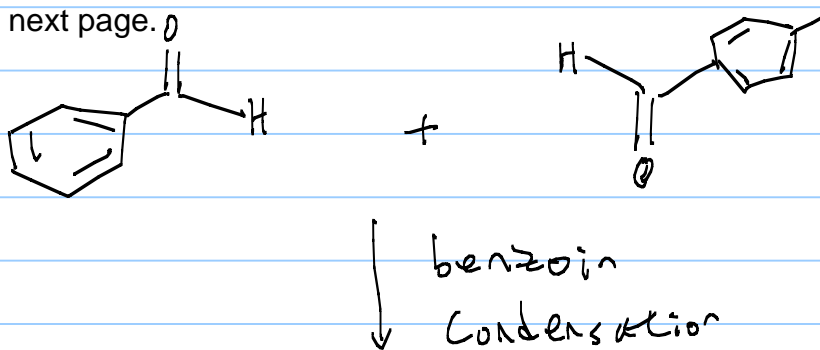
Here is the correct mechanism:



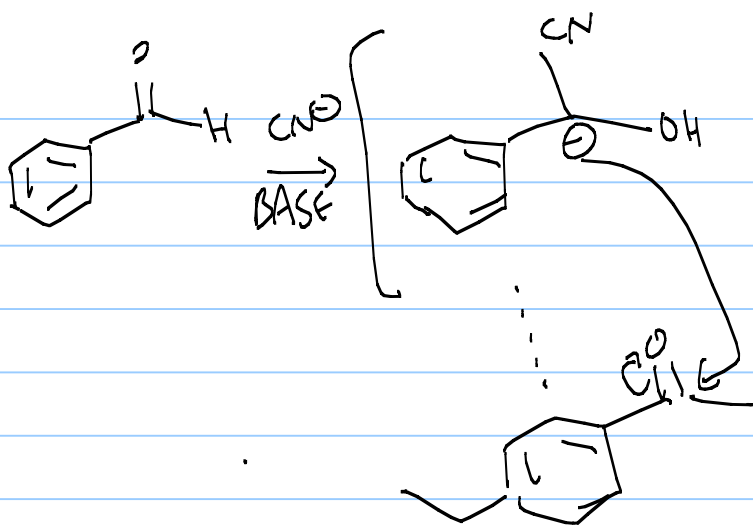


Practice question:

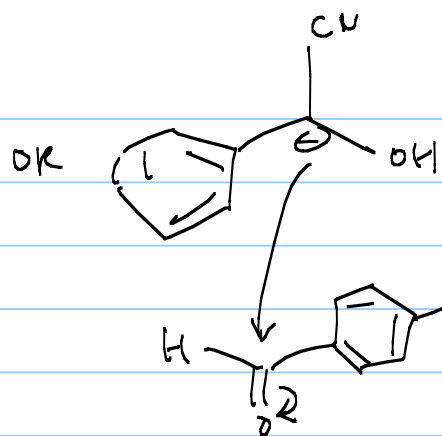
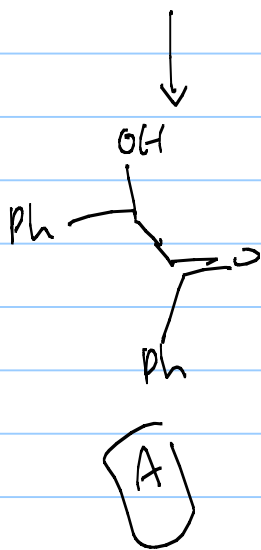
You will recall that it is unwise to react unsymmetrical ketones together in the aldol condensation because a mixture of "self-condensation" and "cross-condensation" products. Can you draw all four possible products of the following "unwise" benzoin condensation? Write out the mechanism of their formation. A brief answer is given on the next page.



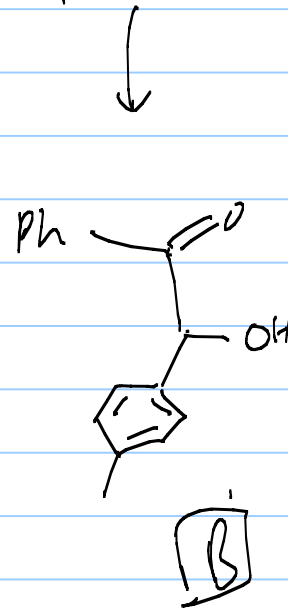
A, B, C, D



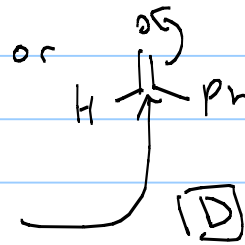
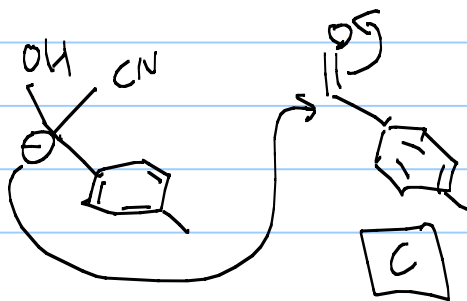
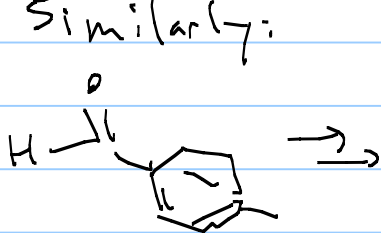
Self-condensation product



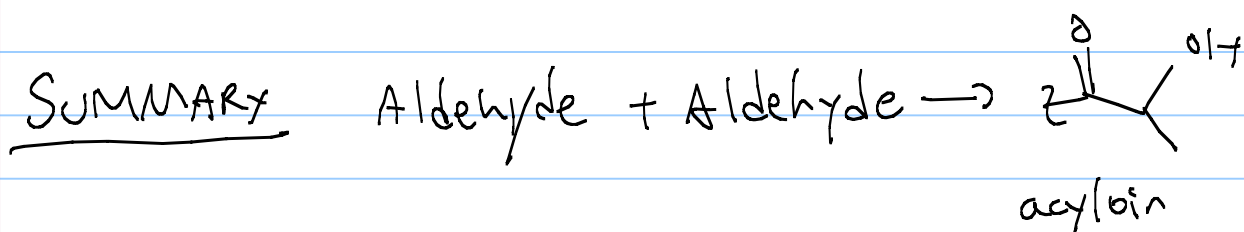
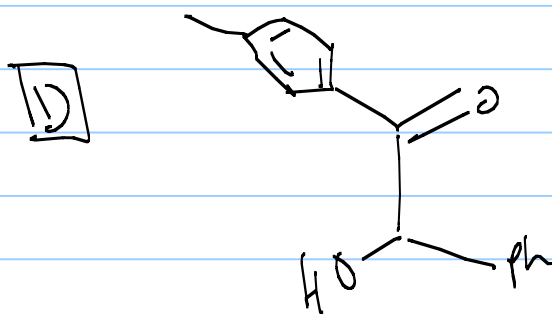
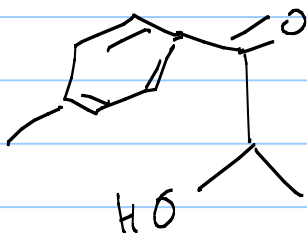
Cross-condensation product



Similarly:



[C] Self-condensation product



The benzoin condensation is an example of "umpolung"--a case in which the usual reactive polarities have been reversed. The carbonyl carbon, usually electrophilic, has been made nucleophilic. One might imagine that this reaction has two major problems:

- 1) competing aldol condensation
- 2) use of the nasty reagent, cyanide

Nowadays, people use thiamine hydrochloride rather than cyanide ion. Apparently, the thiamine-catalyzed reaction is a bit slower, but then the catalyst is edible.

EUGENE