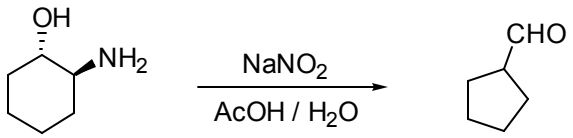
Paul Bracher
Chem 30 – Section 4

Section Problem Set

Carbonyl Chemistry I: Electronic Structure and Additions

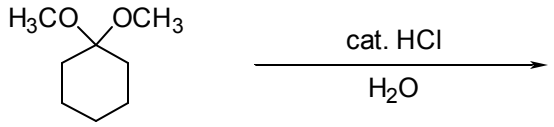
Problem 1 (from Fall 2003 Chem 30 Exam III Review Session). The amine below undergoes the following reaction when treated with sodium nitrite in the presence of acid.

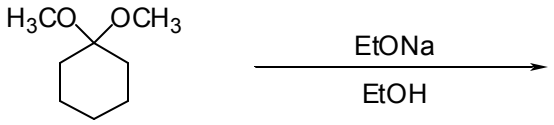


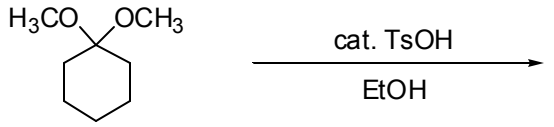
a) Provide an arrow formalism mechanism for this transformation

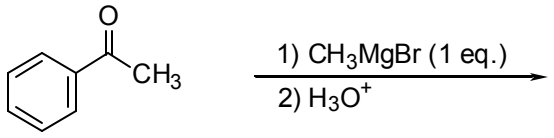
b) Draw a Newman projection showing the orbitals that interact in the step where the nitrogen atom attached to the ring is lost.

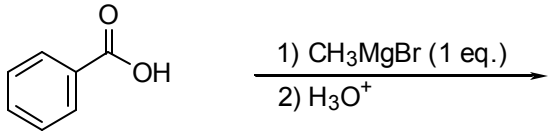
Problem 2. Predict the major product for each of the following reactions. Beware of non-reactions.

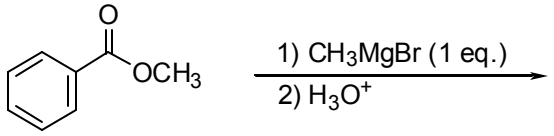


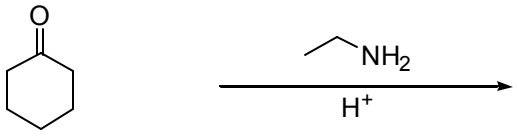


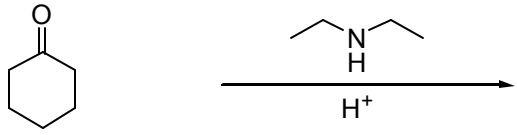


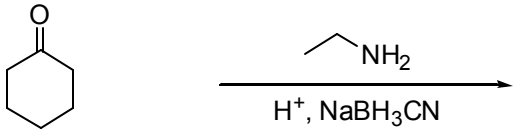




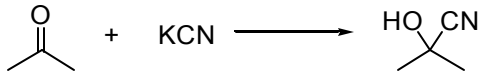




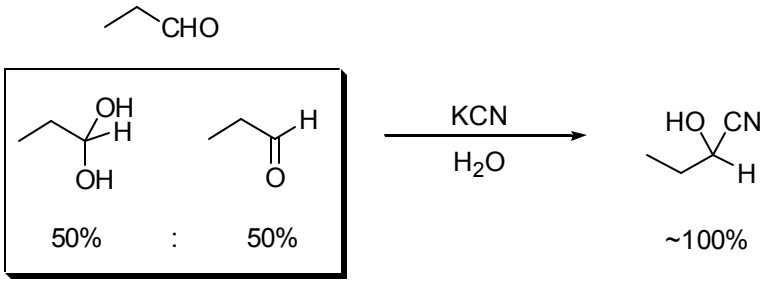




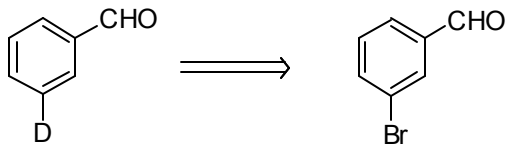
Problem 3 (based on a problem in *Organic Chemistry* by Maitland Jones). Cyanide ions readily add to carbonyl groups in water to form cyanohydrins:



When dissolved in water, propionaldehyde exists 50% in hydrated form. Despite this fact, when an aqueous solution of propionaldehyde is treated with potassium cyanide, the cyanohydrin forms in quantitative yield. Why isn't the maximum possible yield 50%?



Problem 4. Provide a concise synthetic route to compound **C** from starting material **B**.



C **B**