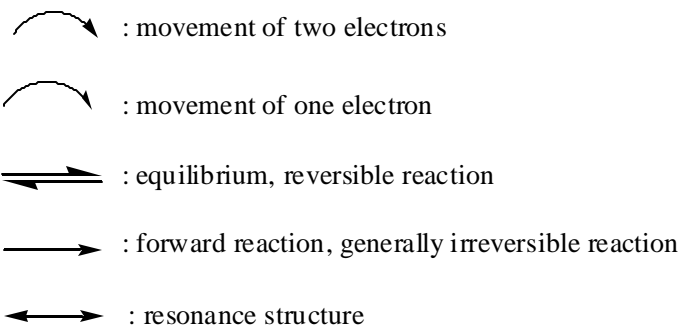


How to Propose a Reasonable Electron-pushing Mechanism

1. Use the arrow symbols correctly

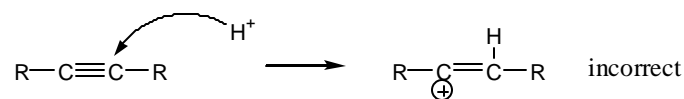
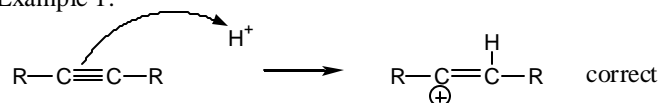


2. Move the electron(s) in correct direction

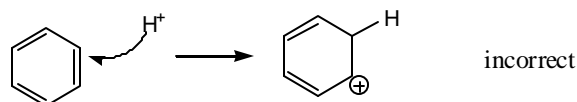
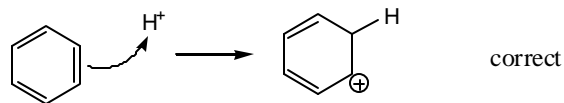
A. Always move the electron(s) from bond, electron pair to empty orbital.

B. Never use empty orbital to attack the electron pair.

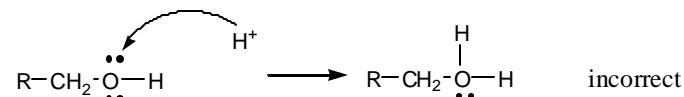
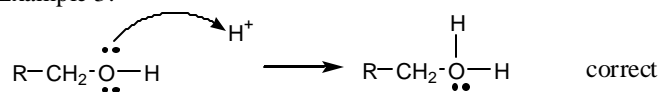
Example 1:



Example 2:



Example 3:



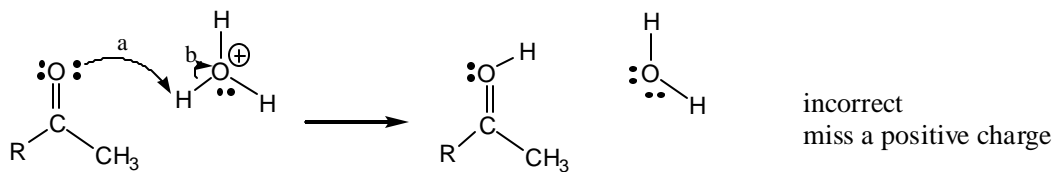
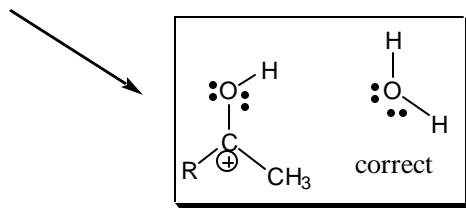
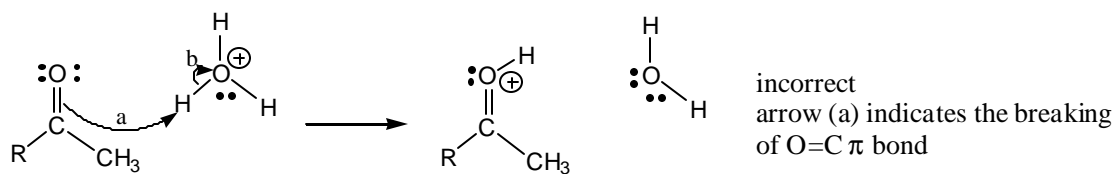
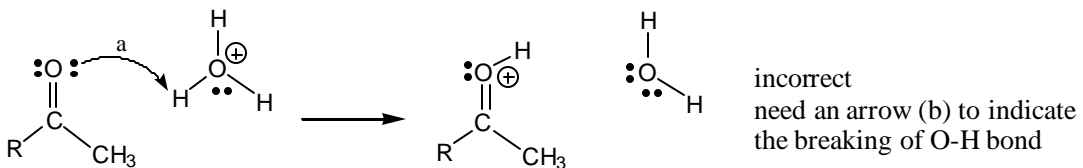
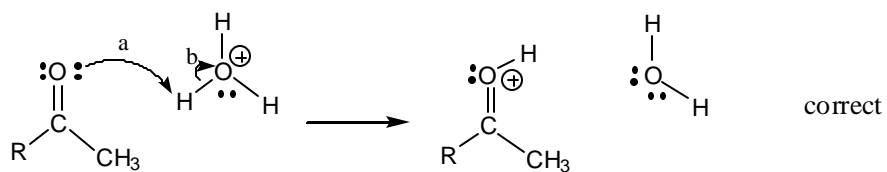
3. Know the product from the movement of electron(s)

A. At the beginning, always draw H atoms, charges, and electron pairs.

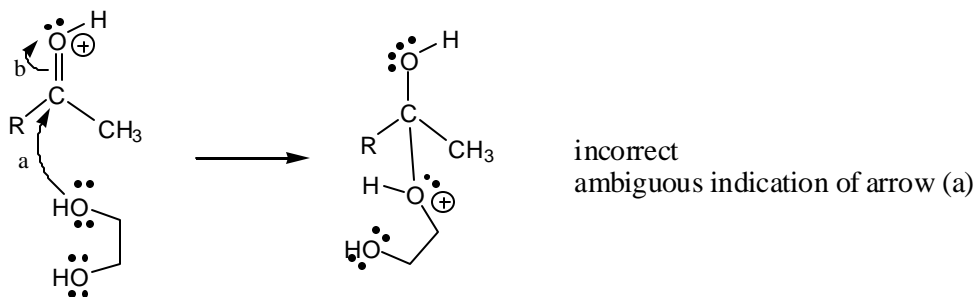
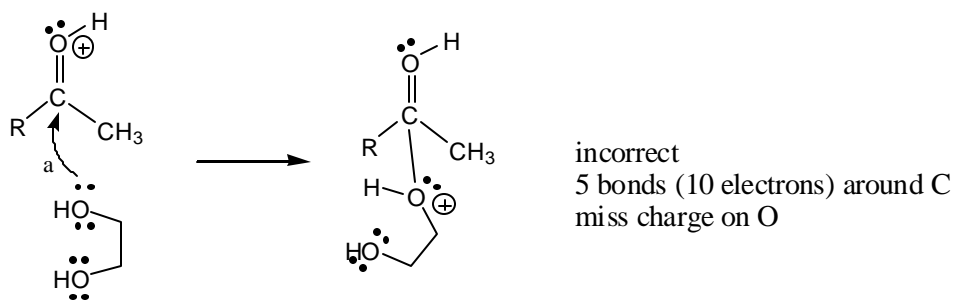
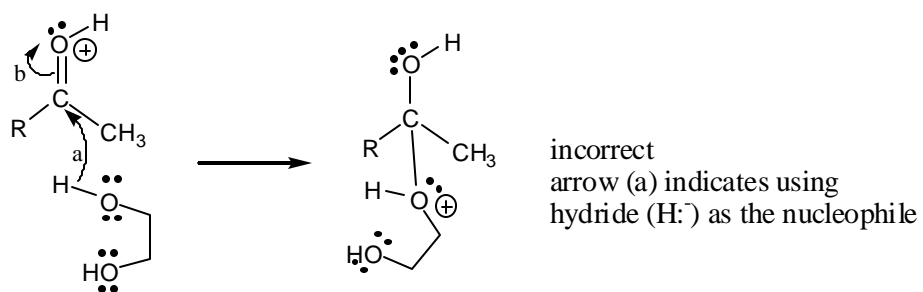
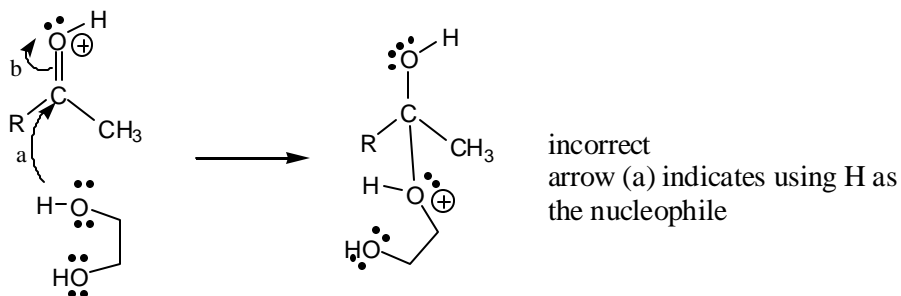
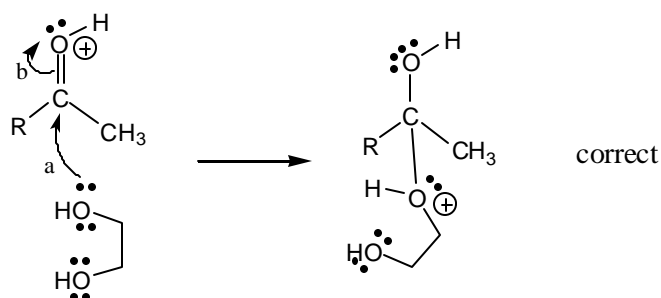
B. Movement of electron(s) results in forming or breaking chemical bond.

C. Never put more than **eight electrons** around the 2nd row elements (C, N, O) and more than two electrons around H.

Example 1:



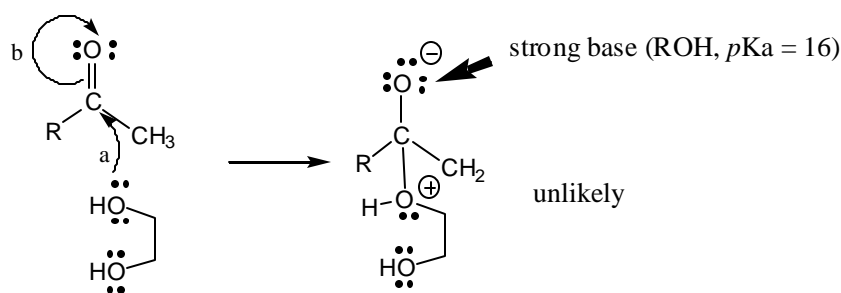
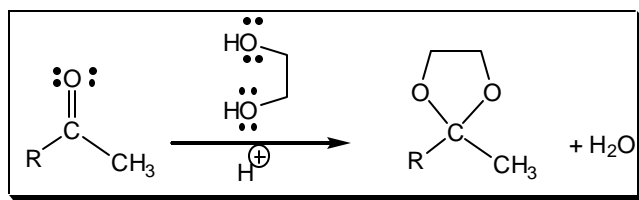
Example 2:



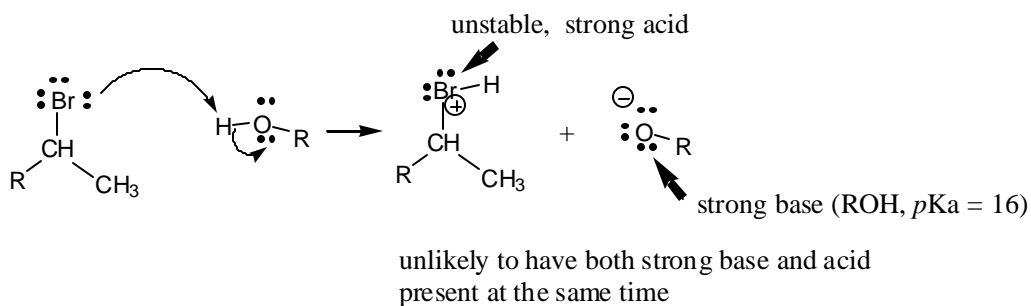
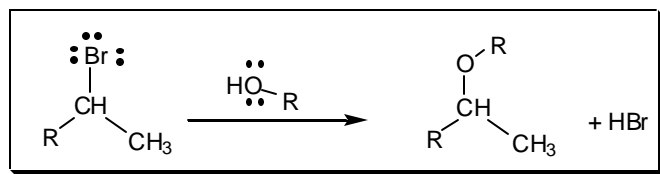
4. Judge what is the reasonable transformation

- A. Negatively charged species from C, H, N, O should not appear in reaction that is carried out in acidic condition.
- B. Positively charged species from C, H, N, O should not appear in reaction that is carried out in basic condition.
- C. Derive the mechanism in the fashion that use strong base (or acid) to generate weak base (or weak acid). Use the pK_a values as the reference.
- D. Use electronegativity as the index for placing the electron (charge).
- E. Use resonance structure to help the analysis of regio- and stereoselectivities.
- F. H^+ transfer is generally the fastest reaction

Example 1: formation of ketal



Example 2: Substitution with weak base



Example 3: Isomerization of hydroxyketone

