



CHE 2060: Summary of key concepts for Module 7, nucleophilic addition to carbonyl groups

- Recognize aldehyde and ketone groups in organic biomolecules.
- Draw/explain the bonding picture for aldehyde and ketone groups.
- Explain why the carbonyl carbon in an aldehyde or ketone is electrophilic.
- Draw complete curved arrow mechanisms for the following reaction types:
 - formation of a hemiacetal/hemiketal
 - collapse of a hemiacetal/hemiketal to revert to an aldehyde/ketone
 - formation and hydrolysis of an acetal/ketal
 - formation and hydrolysis of an N-glycosidic bond
 - formation and hydrolysis of an imine
 - transimination
- Explain how the carbocation intermediates in glycosidic bond formation and hydrolysis reactions are stabilized by resonance
- Explain the stereochemical considerations of a nucleophilic addition to an aldehyde/ketone, especially in the context of glycosidic bond formation.
 - Be able to identify the re and si faces of an aldehyde, ketone, or imine.
- In addition to these fundamental skills, you should develop your confidence in working with end-of-chapter problems involving more challenging, multi-step biochemical reactions.