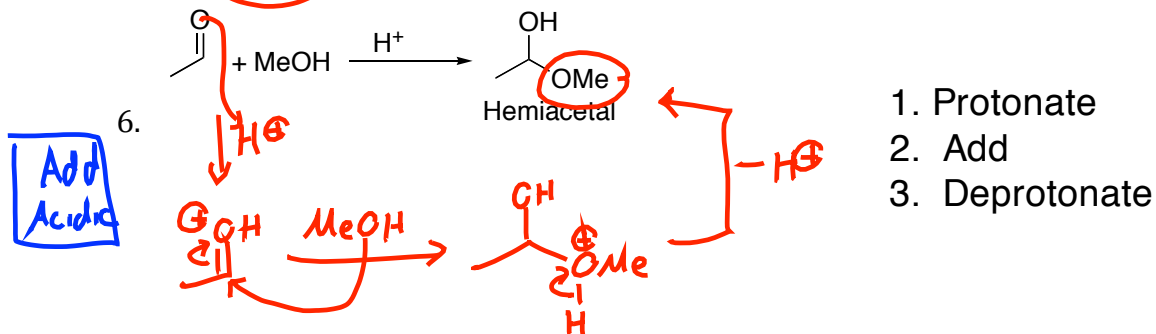
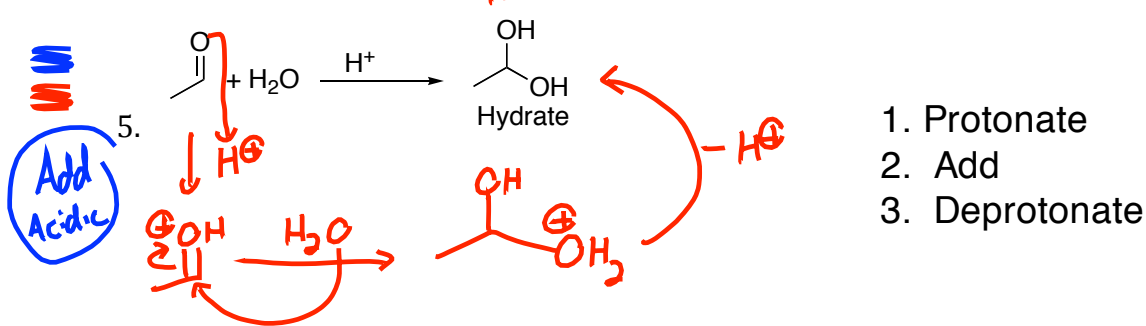
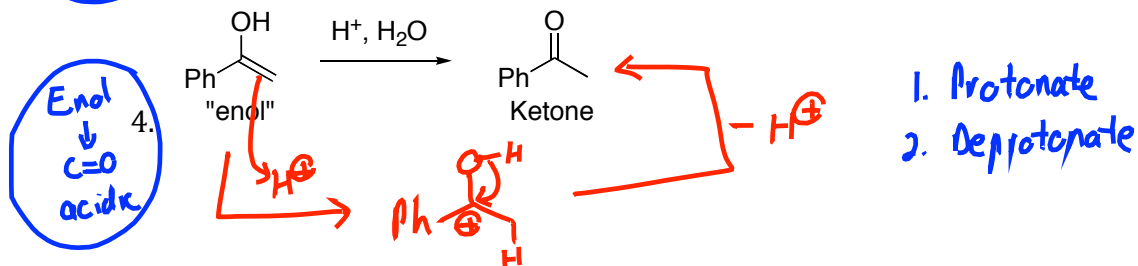
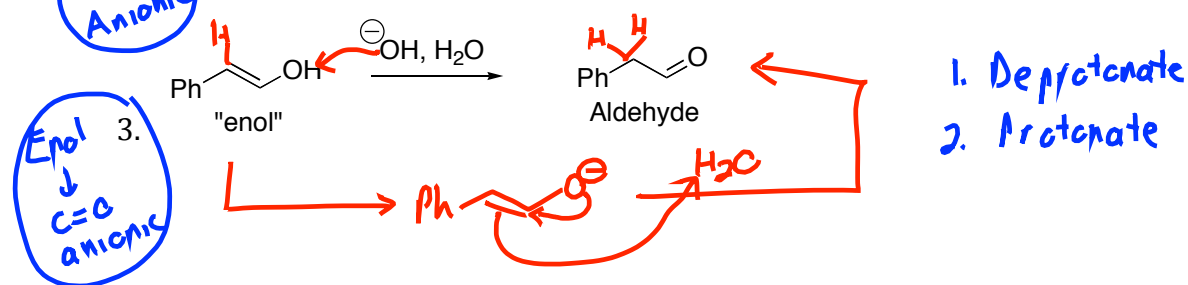
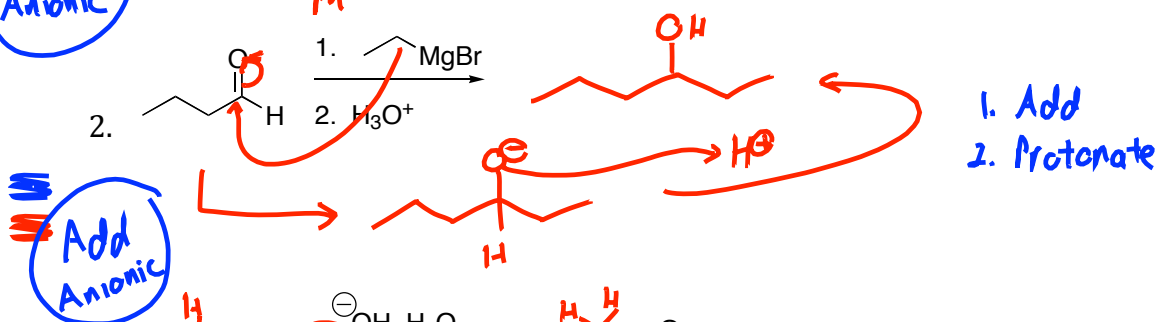
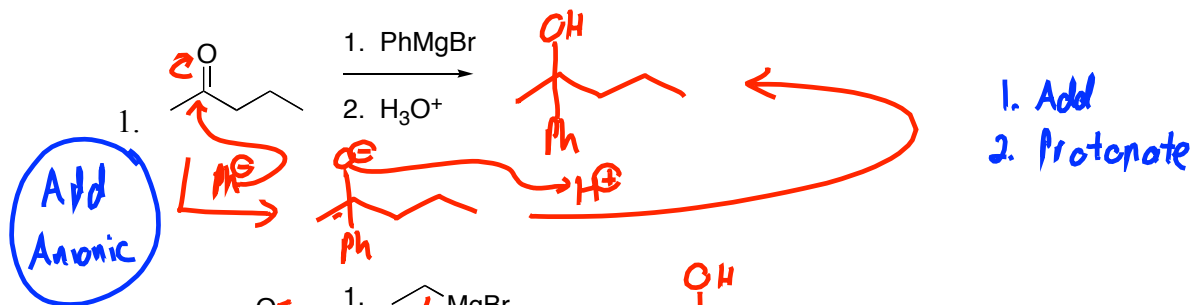
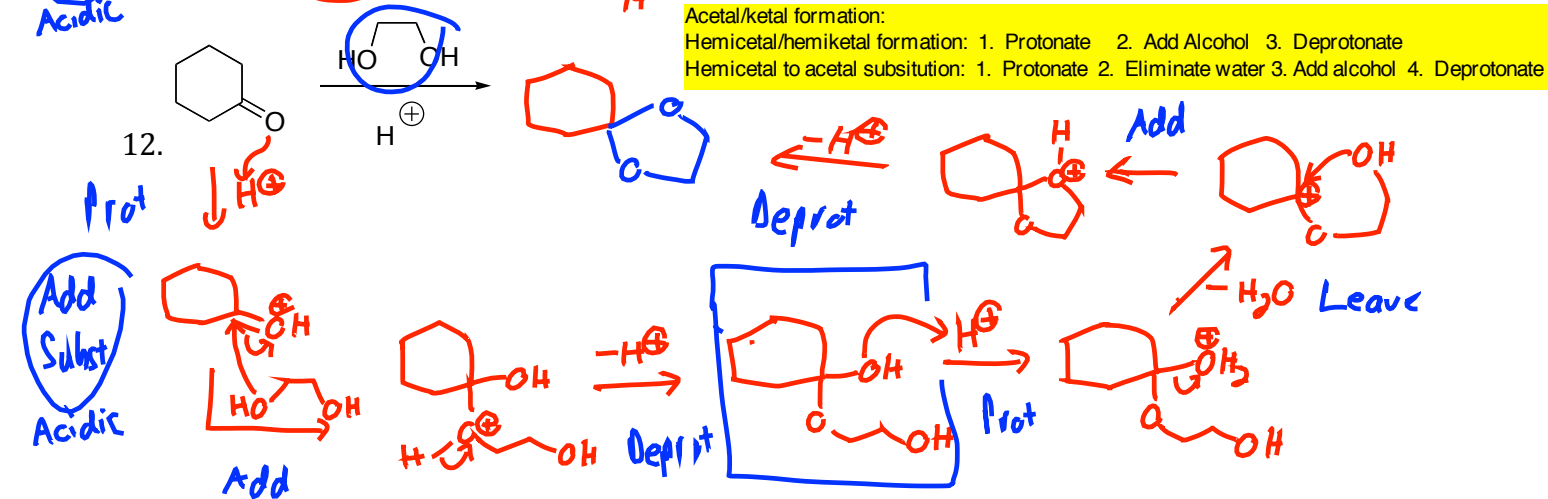
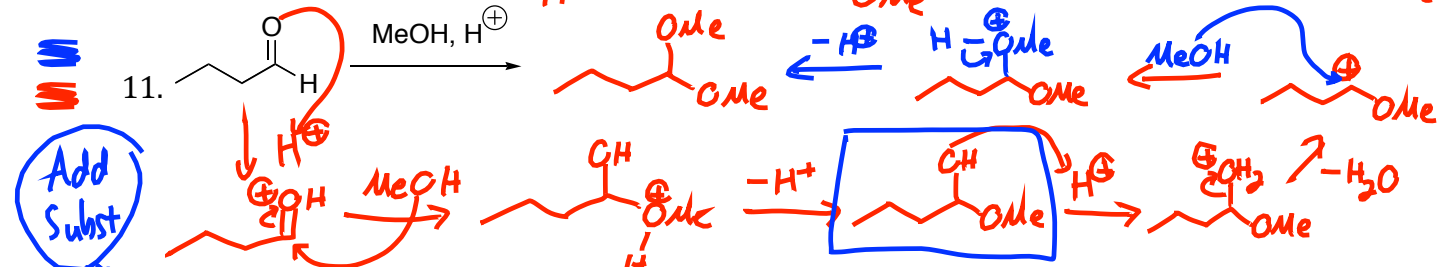
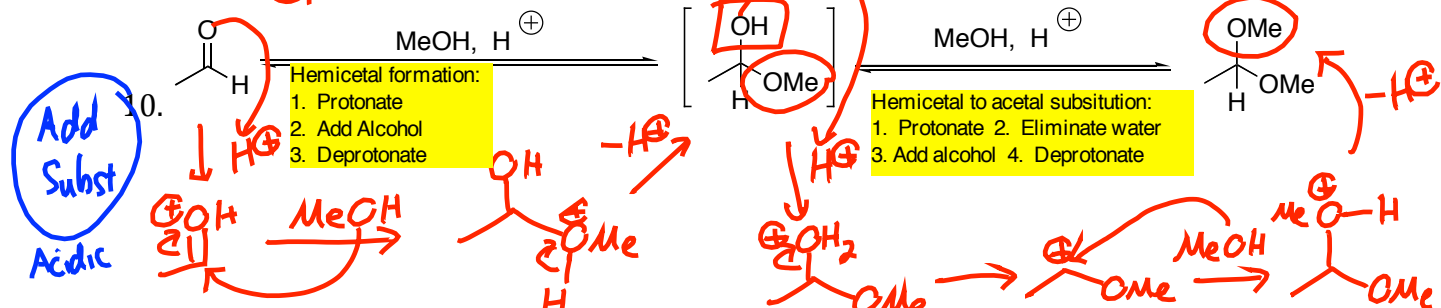
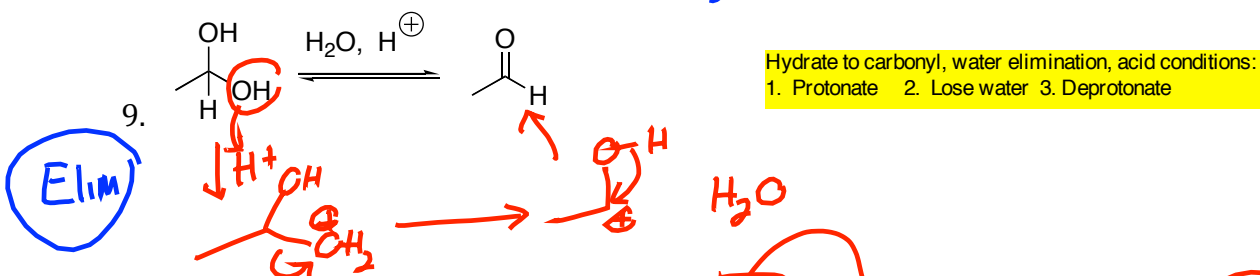
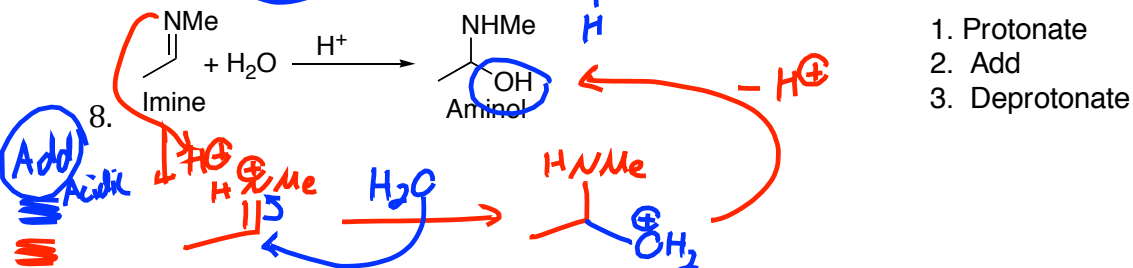
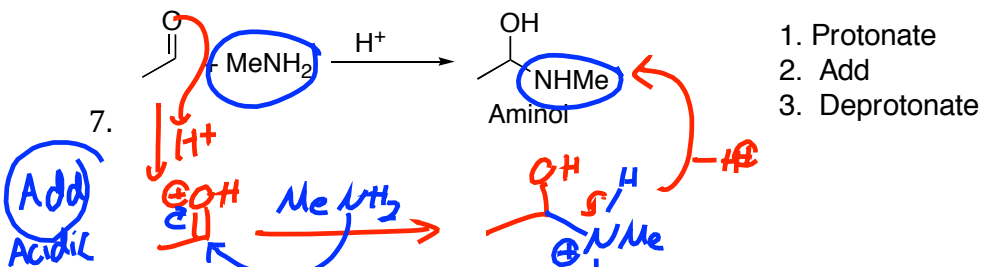
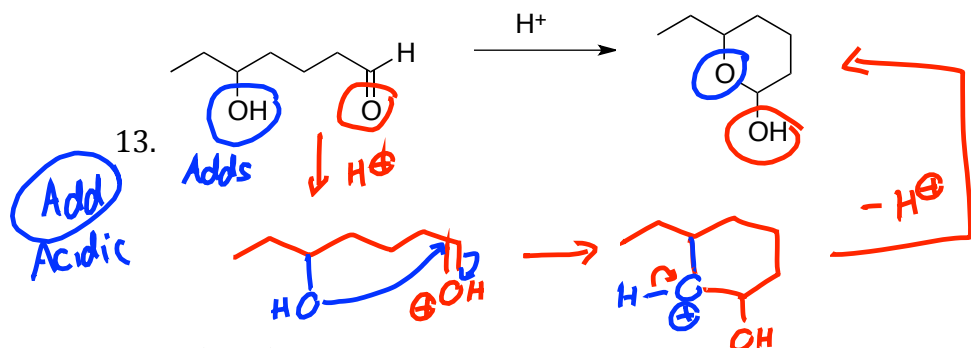


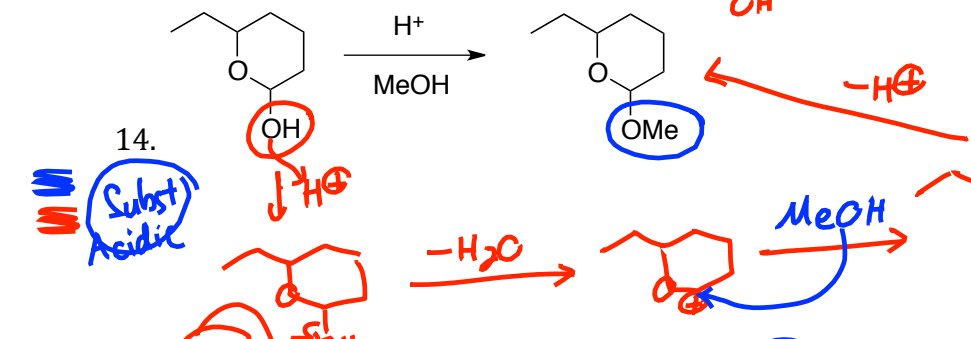
Some Practice Problems for the Carbonyls Test 3
 Draw the Products and Mechanisms for the following Reactions



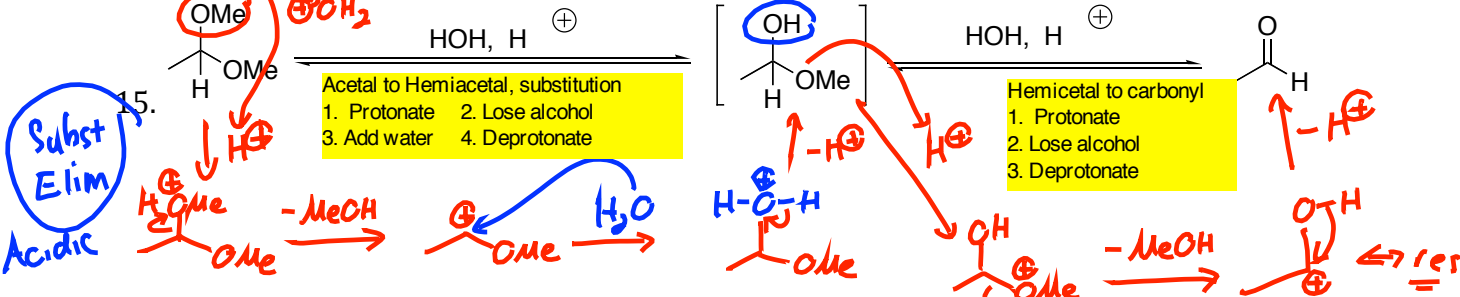




Carbonyl to hemiacetal/hemiketal addition, first stage in acetal/ketal formation:
 1. Protonate 2. Add alcohol 3. Deprotonate

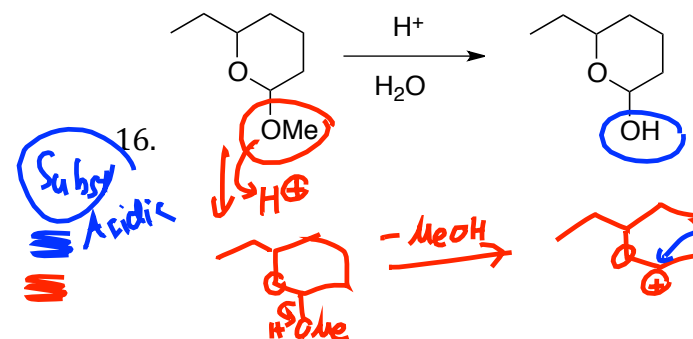


Hemiacetal/hemiketal to acetal/ketal substitution, second stage in acetal/ketal formation:
 1. Protonate 2. Lose water, 3. Add alcohol 4. Deprotonate

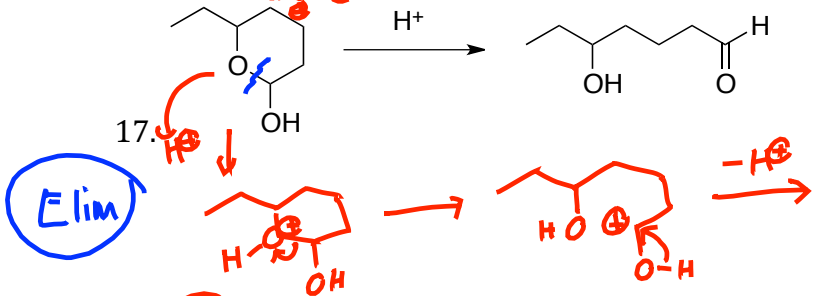


Acetal to Hemiacetal, substitution
 1. Protonate 2. Lose alcohol 3. Add water 4. Deprotonate

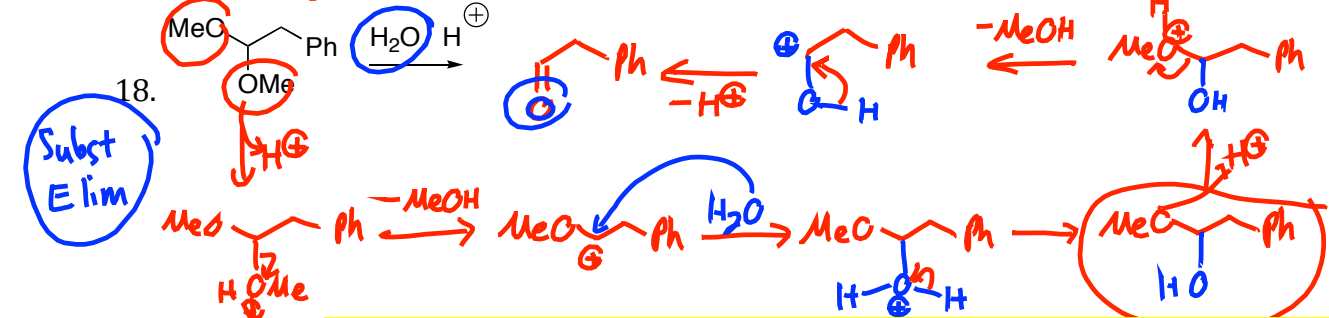
Hemiacetal to carbonyl
 1. Protonate 2. Lose alcohol 3. Deprotonate



Acetal to Hemiacetal, substitution, phase 1 in acetal hydrolysis
 1. Protonate 2. Lose alcohol 3. Add water 4. Deprotonate



Hemiacetal/hemiketal to carbonyl, second phase of acetal/ketal hydrolysis
 Hemicetal/hemiketal to carbonyl elimination:
 1. Protonate 2. Eliminate alcohol 3. Deprotonate

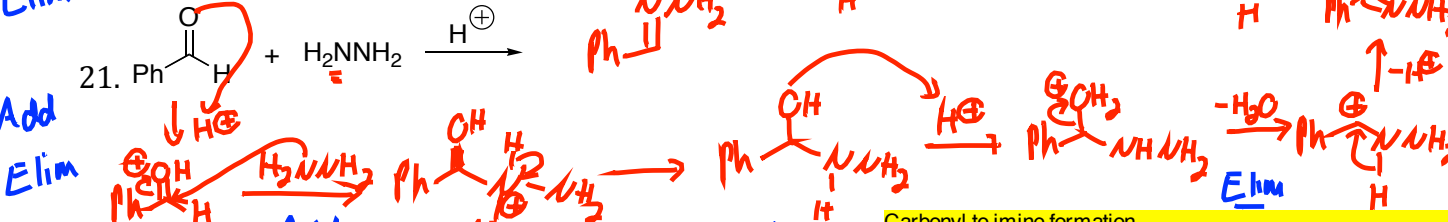
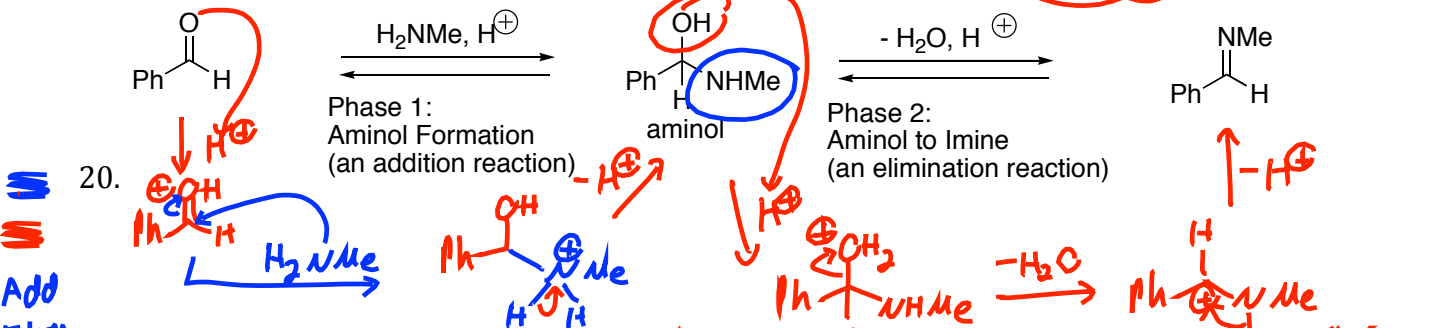
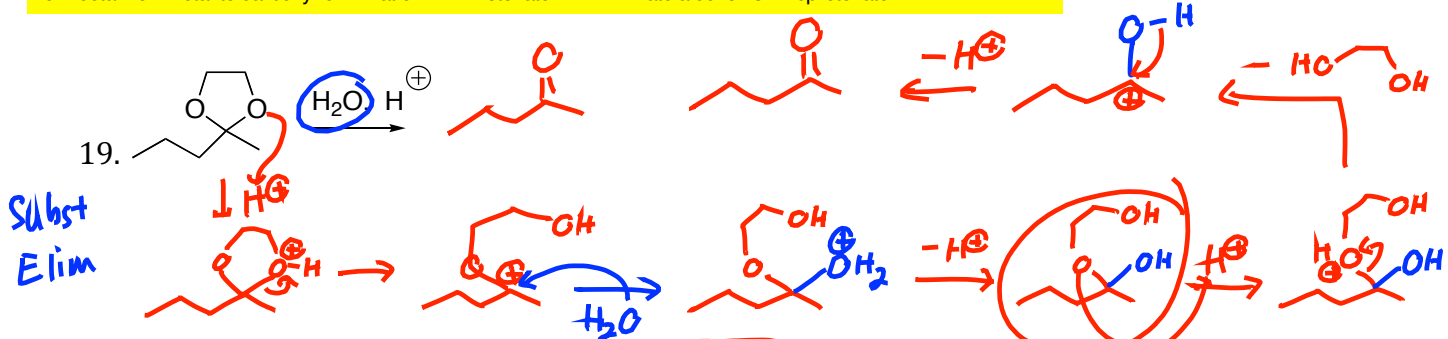


Acetal/ketal to carbonyl, acetal/ketal hydrolysis
 Acetal/ketal to hemiacetal/hemiketal substitution: 1. Protonate 2. Eliminate Alcohol 3. Add water 4. Deprotonate
 Hemicetal/hemiketal to carbonyl elimination: 1. Protonate 2. Eliminate alcohol 3. Deprotonate

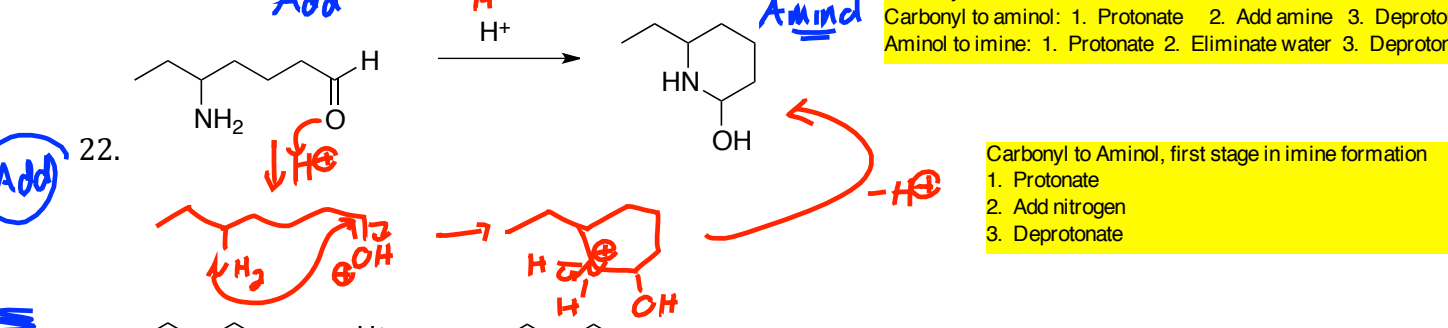
Acetal/ketal to carbonyl, acetal/ketal hydrolysis

Acetal/ketal to hemiacetal/hemiketal substitution: 1. Protonate 2. Eliminate Alcohol 3. Add water 4. Deprotonate

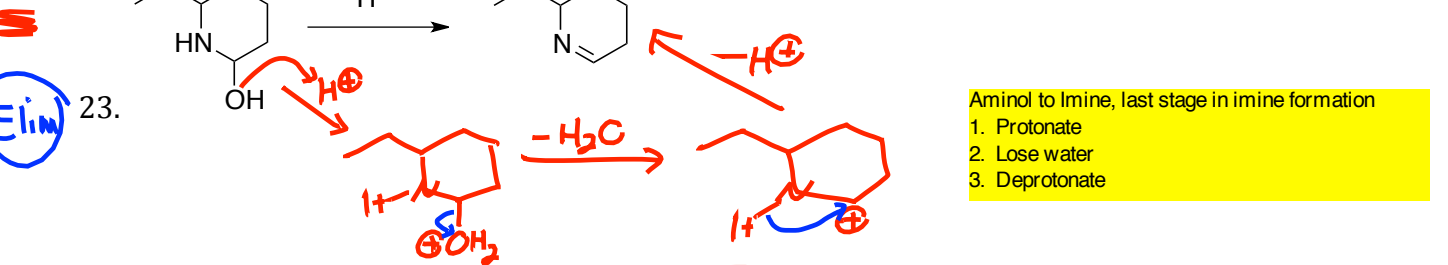
Hemiacetal/hemiketal to carbonyl elimination: 1. Protonate 2. Eliminate alcohol 3. Deprotonate



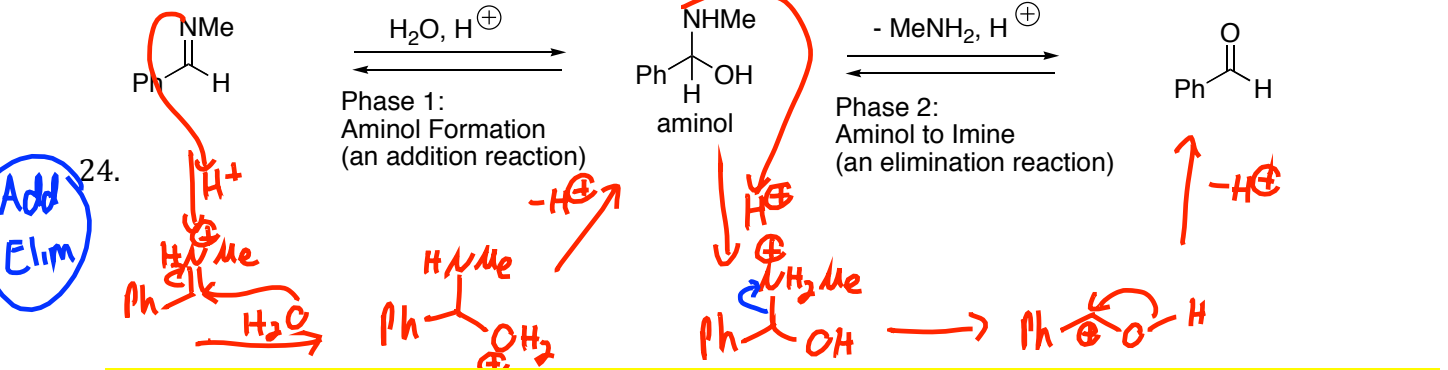
Carbonyl to imine formation
Carbonyl to aminol: 1. Protonate 2. Add amine 3. Deprotonate
Aminol to imine: 1. Protonate 2. Eliminate water 3. Deprotonate



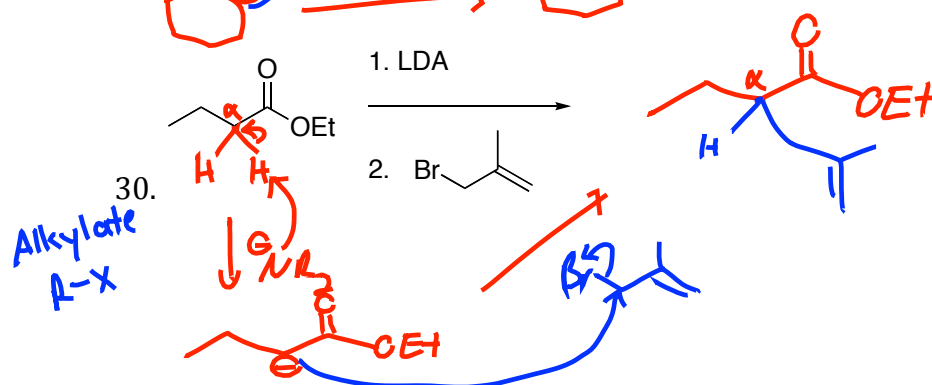
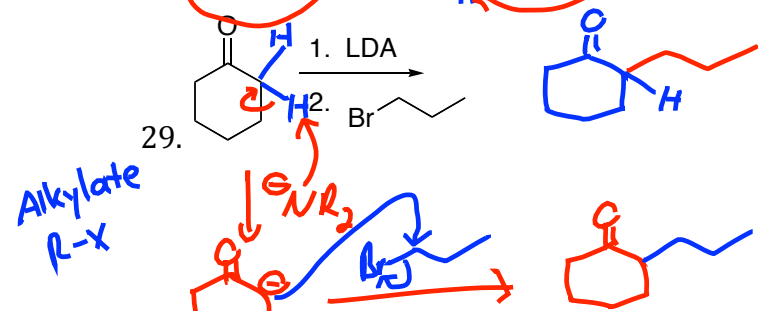
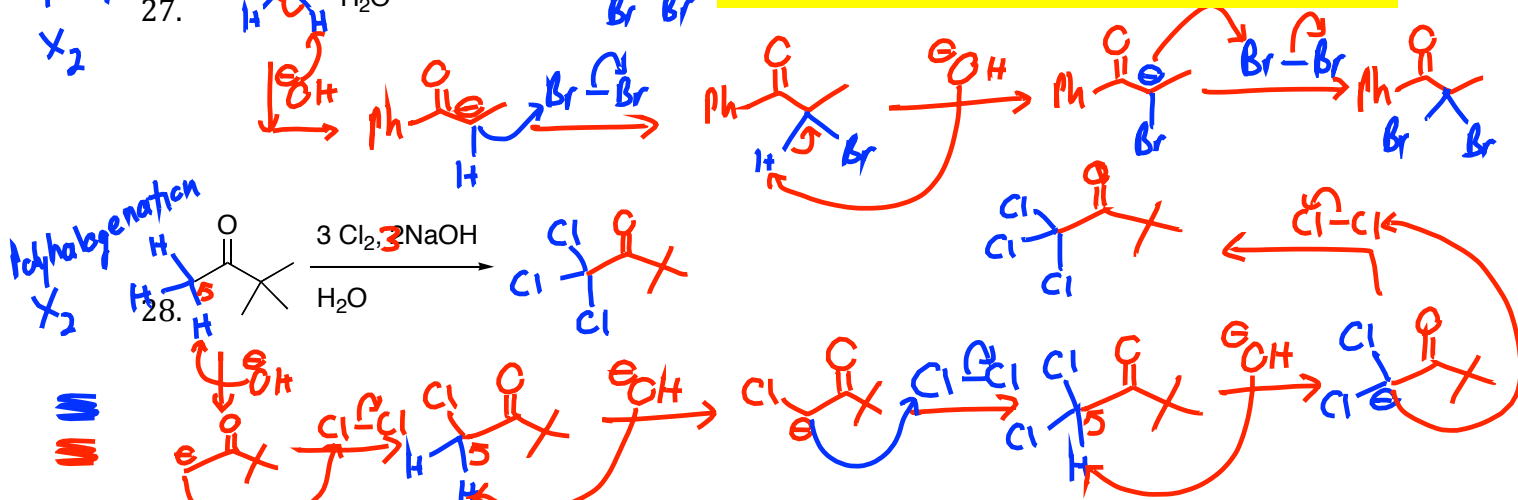
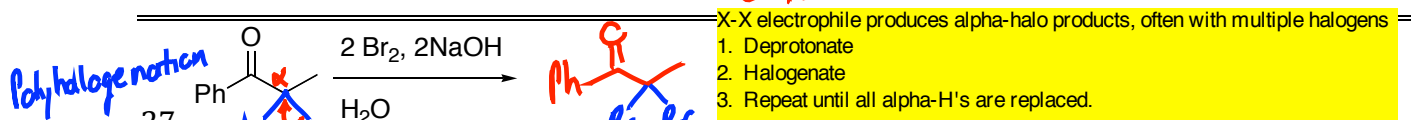
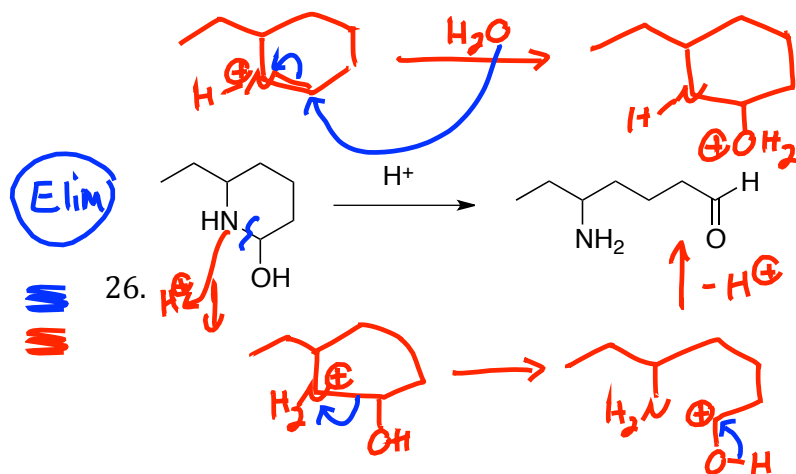
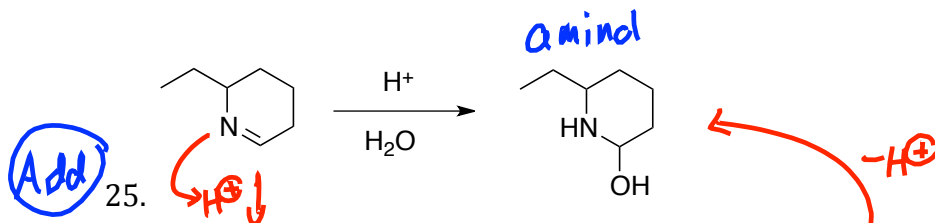
Carbonyl to Aminol, first stage in imine formation
1. Protonate
2. Add nitrogen
3. Deprotonate

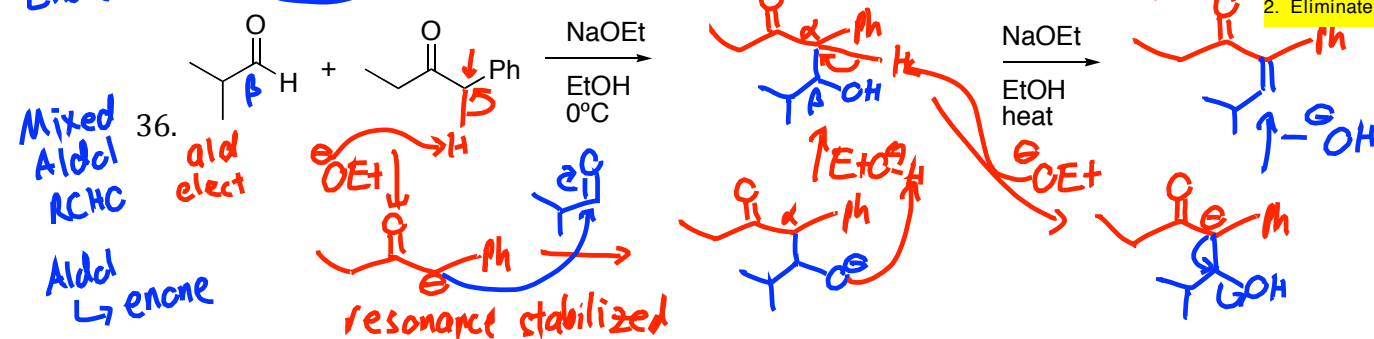
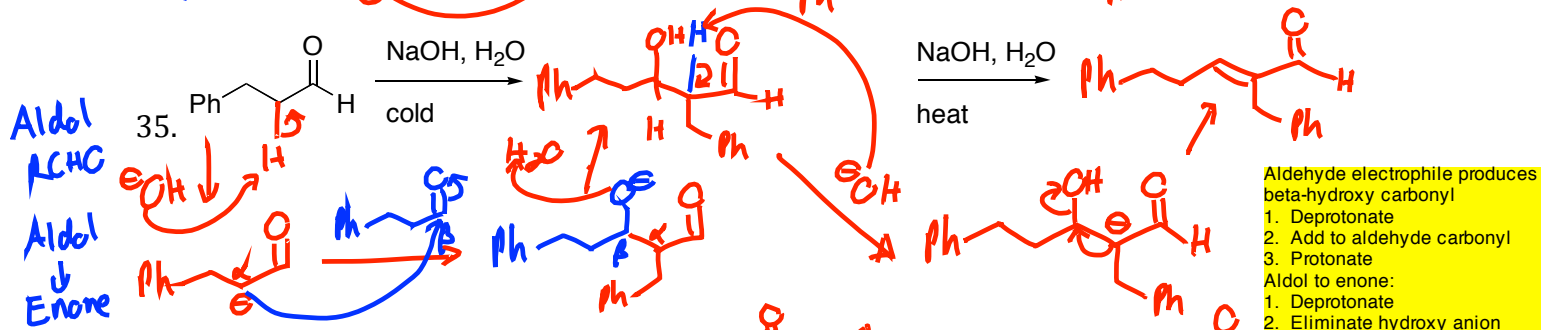
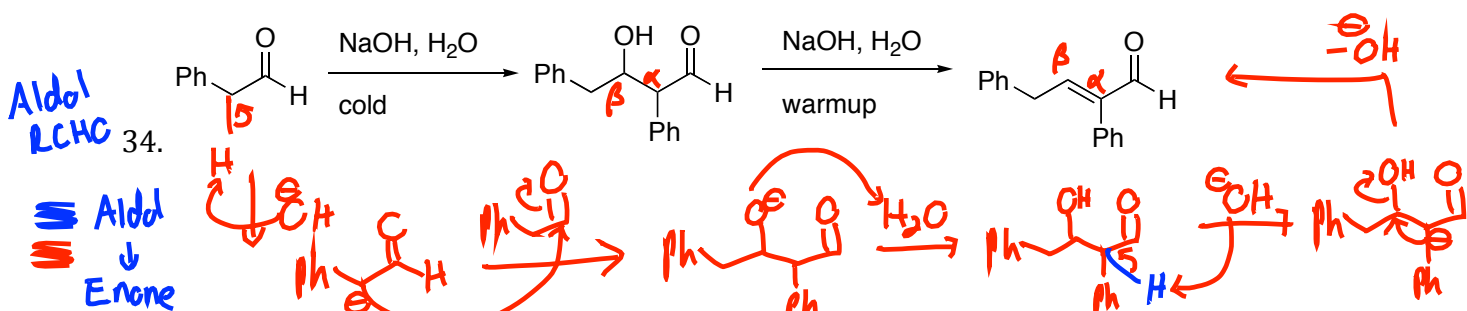
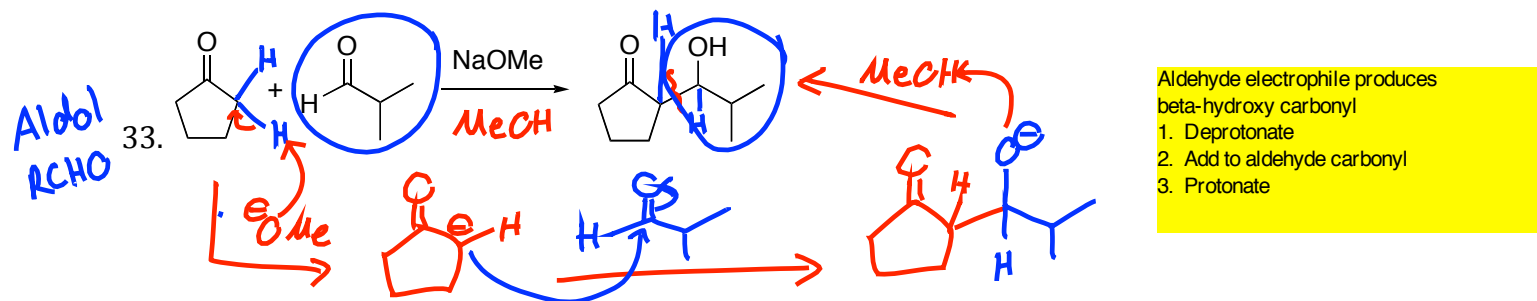
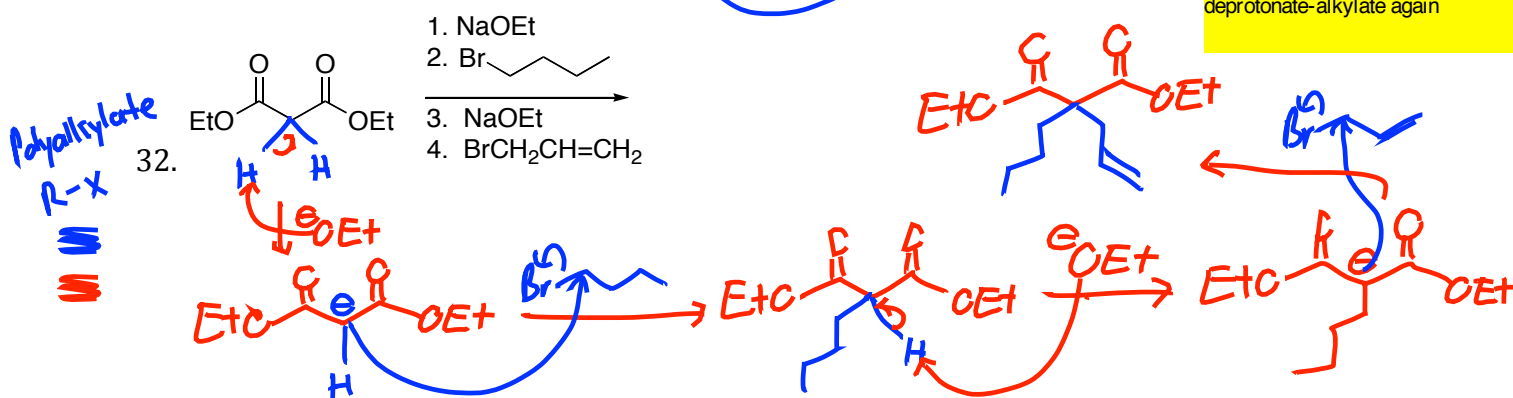
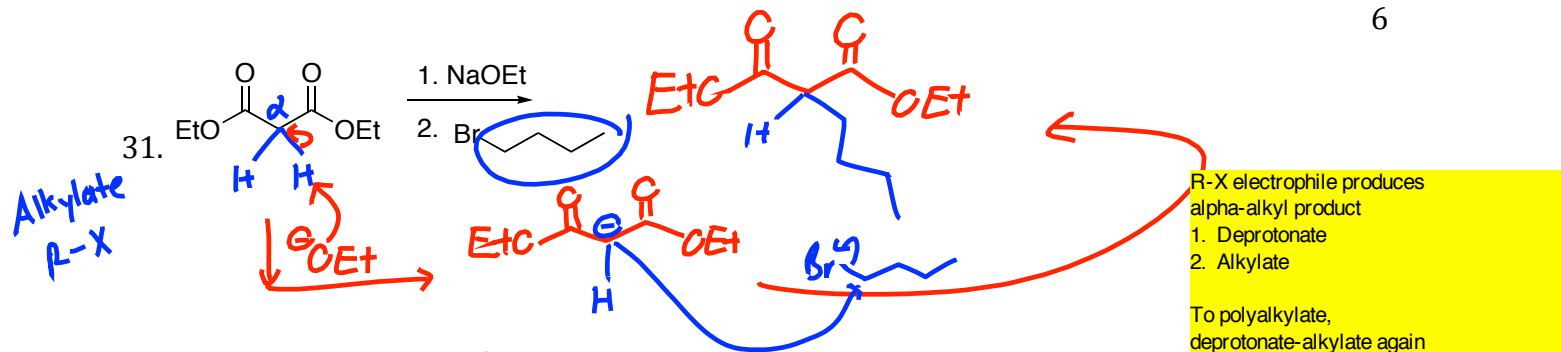


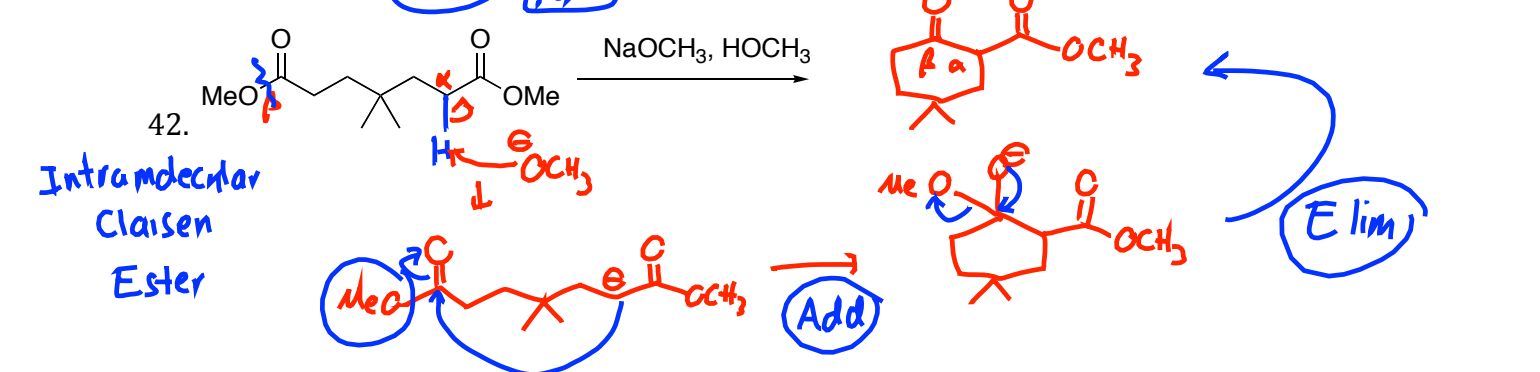
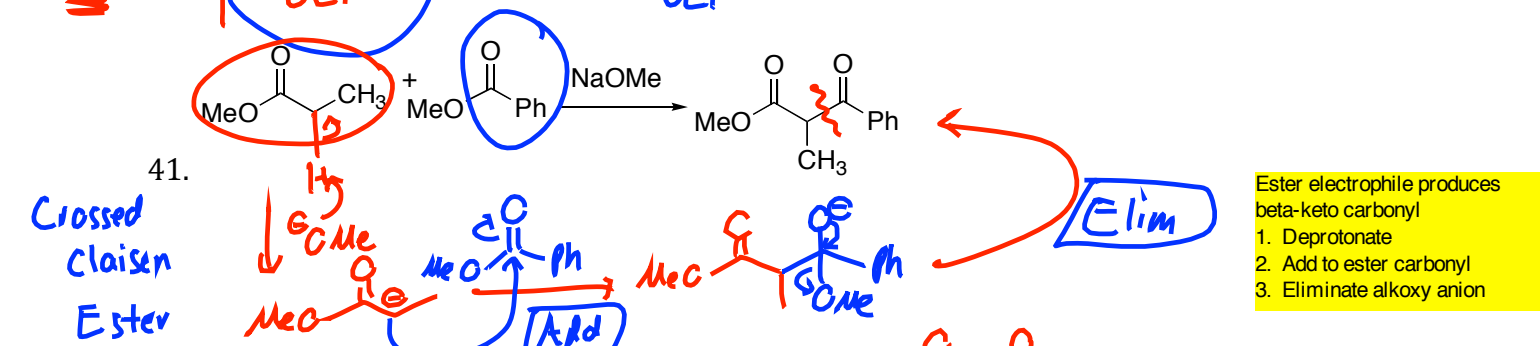
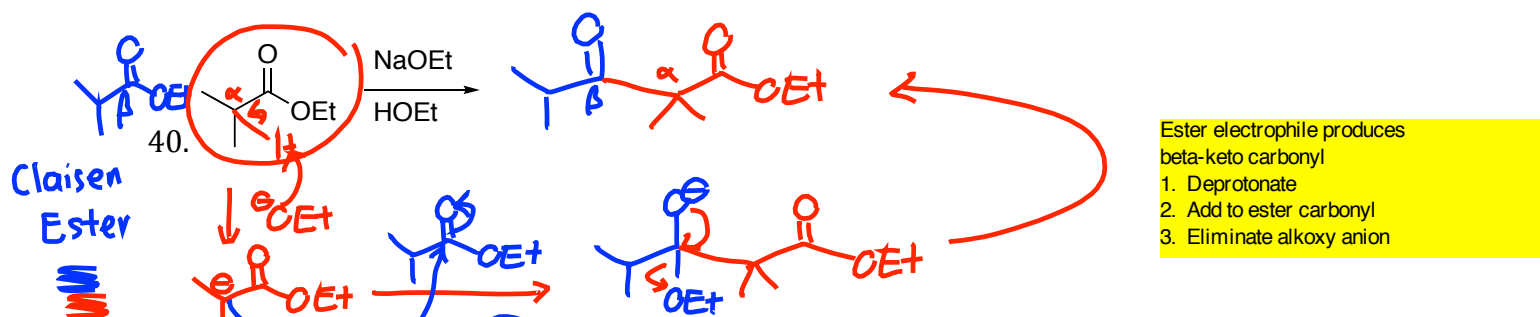
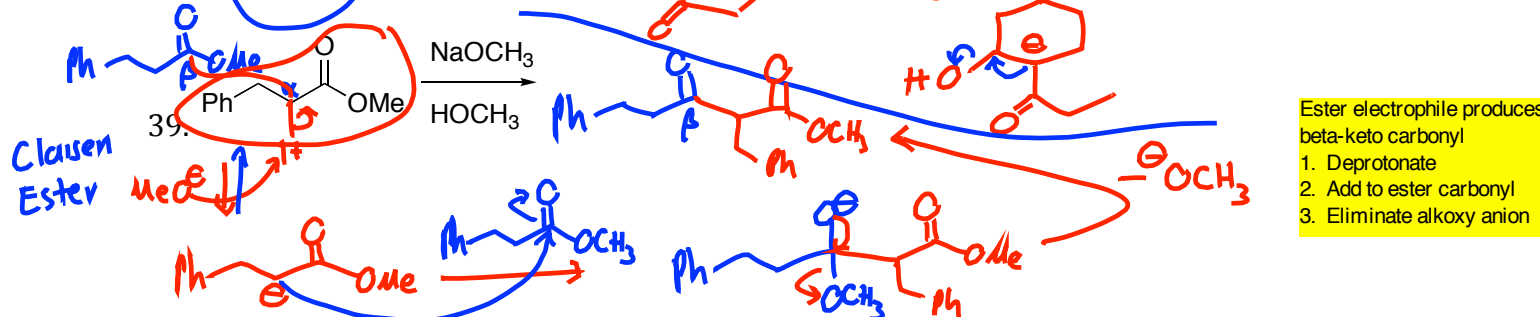
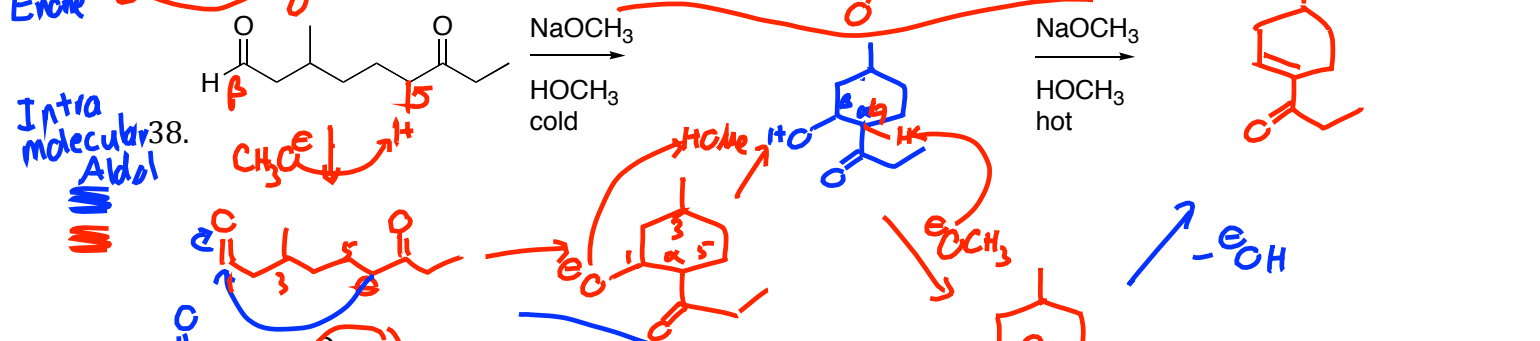
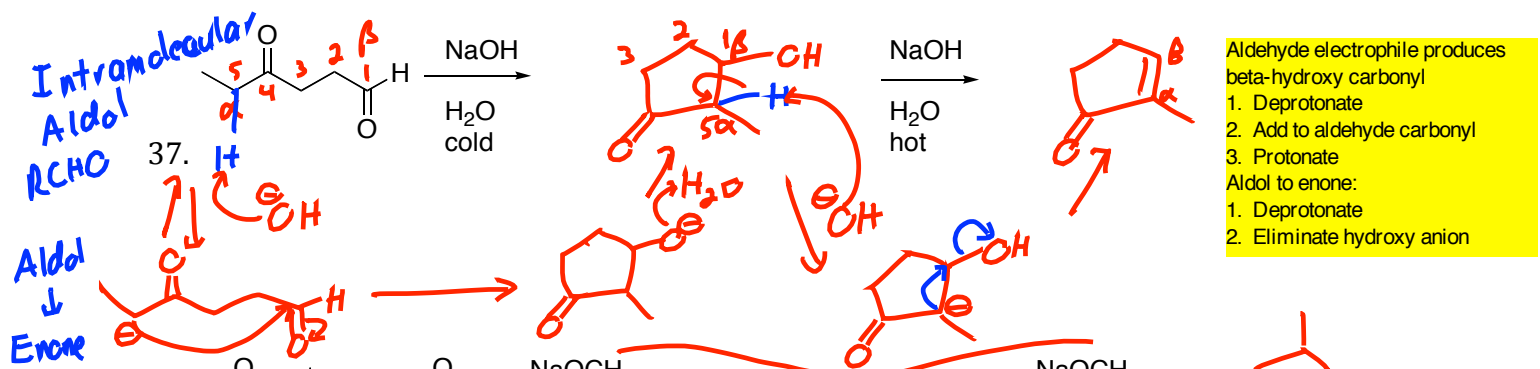
Aminol to Imine, last stage in imine formation
1. Protonate
2. Lose water
3. Deprotonate

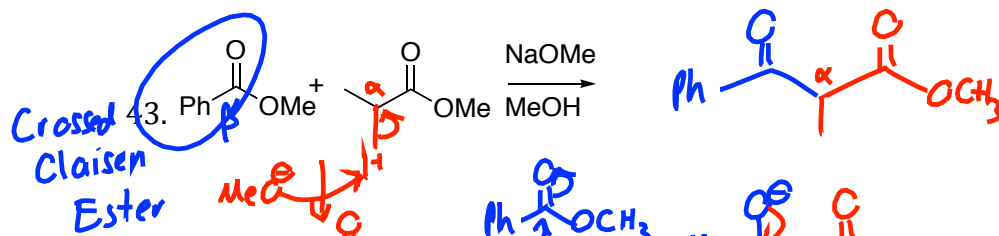


Imine to carbonyl, imine hydrolysis
Imine to aminol: 1. Protonate 2. Add water 3. Deprotonate
Aminol to carbonyl: 1. Protonate 2. Eliminate nitrogen 3. Deprotonate



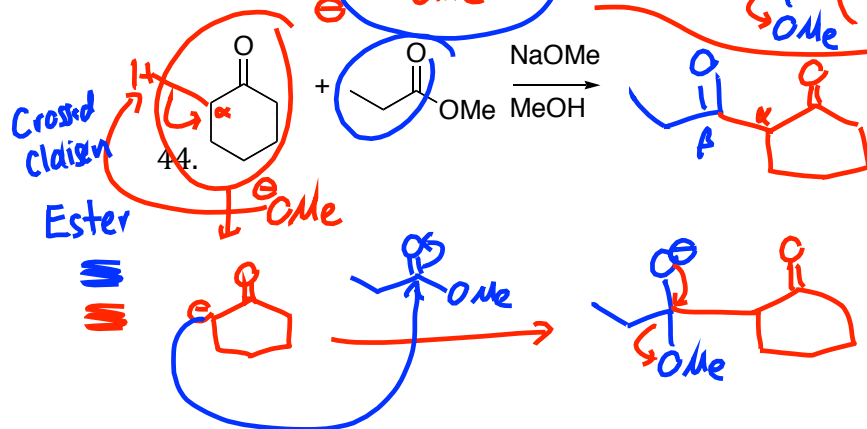






Ester electrophile produces beta-keto carbonyl

1. Deprotonate
2. Add to ester carbonyl
3. Eliminate alkoxy anion



Ester electrophile produces beta-keto carbonyl

1. Deprotonate
2. Add to ester carbonyl
3. Eliminate alkoxy anion

