

Review Topics for Exam 2

Chapter 18. Ethers & Epoxides

- Nomenclature (18.1)
- Structure & Properties (18.2)
- Ether synthesis (18.3 – 18.4, 18.7)
 - Williamson ether synthesis (mechanism & limitations)
 - Alkoxymercuration (mechanism & limitations)
 - MCPBA Epoxidation
 - Epoxidation through halohydrins
- Reactions of ethers & mechanisms (18.5, 18.8)
 - Acidic cleavage
 - Ring opening of epoxides (acidic & basic)

➤ Spectroscopy (18.10)

- Synthesis of organic compounds containing ether groups

Chapter 19. Aldehydes & Ketones

- Nomenclature (19.1)
- Preparation of carbonyl compounds (19.2)
 - Aldehydes (New reagent = DIBALH)
 - Ketones (New reaction = cuprate + acid chloride)
- Oxidation of aldehydes and ketones (19.3)
 - PCC vs. CrO₃ – mechanisms
- Nucleophilic addition to aldehydes and ketones (19.4 – 19.12)
 - mechanisms
 - relative reactivities
 - Reversible processes: *hydration, cyanohydrin formation, acetal formation, imine formation, enamine formation*

- Grignard addition and hydride reduction
- Wolff-Kishner reaction (hydrazine/base)
- Wittig reaction (phosphorus ylide)

➤ Conjugate addition to α,β -unsaturated carbonyl compounds (19.14)

➤ Spectroscopy (19.16)

➤ Synthesis of organic compounds containing carbonyl groups

Chapter 20. Carboxylic Acids

➤ Nomenclature (20.1)

➤ Structure and Properties (20.2)

➤ Acid/base properties (20.3 – 20.5)

➤ Preparation of carboxylic acids (20.6)

- oxidation
- nitrile hydrolysis
- Grignard + CO₂

➤ Reactions of carboxylic acids (20.7 – 20.8)

- LiAlH₄ reduction
- BH₃ reduction

➤ Spectroscopy (20.9)

➤ Synthesis of organic compounds containing carboxylic acid groups