Chapter 8.1-8.4 – Alcohols

1. Nomenclature of Alcohols
2. Properties
   - Hydrogen Bonding: boiling point
3. Reactions of Alcohols
   - Conversion into alkyl halides (with HCl, HBr, SOCl₂)
   - Dehydration to form alkene (with H₂SO₄, concentrated, Δ)
   - Oxidation: Primary alcohol to aldehydes (with PCC)
     - Primary alcohol to carboxylic acids (with CrO₃ or K₂Cr₂O₇)
     - Secondary alcohol to ketones (with PCC or CrO₃ or K₂Cr₂O₇)
   - Tertiary alcohol: no reaction
   - Conversion into ethers, ROR (with Na metal, then RCl)

Chapter 9.1-9.4, 9.6-9.8 – Benzene and its Derivatives

1. Structure of the benzene ring
2. Electrophilic Aromatic Substitution: Benzene (nucleophile) + electrophile (E⁺)
   - Bromination (Br⁺): Br₂/FeBr₃
   - Chlorination (Cl⁺): Cl₂/FeCl₃
   - Nitration (NO₂⁺): HNO₃/H₂SO₄
   - Sulfonation (SO₃H): SO₃/ H₂SO₄
   - Alkylation (R⁺): RCl/AlCl₃
   - Acylation (RC⁻=O): RCOCl/AlCl₃
3. Substituent Effects (orientation effects for monosubstituted products)
   - Ortho/Para activating substituents: -NH₂, -OH, -OCH₃, -R
   - Ortho/Para deactivating substituents: -Cl, -Br
   - Meta deactivating substituents: -NO₂, -CN, -SO₃H, -COCH₃, -COOH, -CO₂CH₃,
     -CH=O (aldehyde)
4. Mechanisms of Electrophilic Aromatic Substitution

Chapter 13.1-13.8, 13.10-13.11 – Aldehydes and Ketones

1. Nomenclature
2. Reactions
   - Oxidation of aldehydes to carboxylic acids (with CrO₃ or K₂Cr₂O₇ or AgNO₃ in NH₄OH)
   - Reduction of aldehydes to primary alcohol (with NaBH₄)
   - Reduction of ketones to secondary alcohol (with NaBH₄)
   - Grignard reaction and mechanism: synthesis of alcohols (formation of new carbon-carbon bond)