CHE 232–002: Final Exam Study Guide

1. Radical Reactions
2. Electrophilic aromatic substitution reactions
   - ortho–, meta–, para directors
   - general reaction mechanism
   - Friedel–Crafts alkylation and acylation
3. Preparation of aldehydes, ketones, carboxylic acids, esters – from various types of starting materials.
4. Protection of aldehydes/ketones as acetals – use and mechanism.
5. Deprotection of acetals – use and mechanism
6. Nucleophilic additions to aldehydes and ketones; Imine, enamine, etc formation; mechanism.
8. Formation of enolates (under basic conditions) and enols (under acidic conditions).
9. Acid catalyzed halogenation of aldehydes and ketones– note the requirement for an alpha hydrogen.
10. Haloform reaction –use and mechanism.
11. Alkylation of enolates – malonic ester syntheses and acetoacetic ester synthesis.
12. Hydrolysis of esters under basic– and acidic conditions – mechanism.
13. Decarboxylation of diacids – conditions, and mechanism.
15. Michael Additions –types of nucleophiles and mechanism.
16. Acid chloride synthesis and reactivity
17. Ester synthesis and reactivity
18. Amide, nitrile and amine syntheses and reactivities.
19. Be prepared to apply your knowledge of these reactions in design of synthesis routes to target compounds.
20. Be prepared to apply your understanding of spectroscopic techniques

AS you will see, most of the reaction mechanisms are similar since they are predicated upon the properties of carbonyl compounds, enolates, enols, etc. Therefore, make it a point to understand structural and electronic properties of these types of species.