

## Dr. Laurie S. Starkey, Organic Chemistry II CHM 3150, Cal Poly Pomona

### Preparing for the Final Exam

The American Chemical Society (ACS) standardized Organic Chemistry exam will be used for our final exam in CHM 3130. This exam covers the entire year of Organic Chemistry, and our results will be submitted to the ACS to add to their database. The 110-minute exam consists of 70 multiple-choice problems, and there is no penalty for wrong answers (i.e., guessing is better than leaving a problem blank). The ACS has prepared "Organic Chemistry – ACS Official Study Guide," which is available from me (I will place a bulk order) or you can purchase directly. A copy of the Study Guide is also on Reserve in the library. I have two main goals for using the standardized exam:

- 1) It serves as an assessment tool and gives us data about how Cal Poly Pomona students compare to the national averages.
- 2) It serves as a capstone experience that helps students to see the year of Organic Chemistry as a whole. This review should be useful as you move on to Biochemistry (or if you need to take any professional exam in the future which includes o-chem!).

Below, I've provided a list of general topics. As you review the material (by using your text and/or the Study Guide), try to focus your time on areas in which you need significant refreshing and briefly review topics you know well. Do not try to learn new material. Instead, work on topics that we have studied and, therefore, you should already be familiar with. It is possible that you will come across a problem on the exam that you have never seen. Try to do your best in that case; you will not be instructed to skip or ignore any problem. Please note that simple interpretation of IR and NMR spectra are included on the standardized exam.

### Final Exam Topics (CHM 3140, 3150)

Nomenclature (Ch 1–22!)	Predict the product (Ch 1–22!)
Acidity & Basicity	Synthesis and Retrosynthesis
Nucleophiles & Electrophiles	POR Diagrams (T.S., $\Delta H$ , intermediates)
Leaving Groups	Stereochemistry
Elimination Reactions	Hybridization
Substitution Reactions	Functional Groups
Competing Rxns ( $S_N2$ vs. $E2$ )	Atomic & Molecular Orbitals
Physical Properties (bp, $H_2O$ solubility)	Conformations (chair/boat/eclipsed)
Alkene Additions (Markovnikov)	Oxidations (alkenes, alcohols, arenes)
Epoxide ring openings	Organometallic Reagents (Grignard, $RLi$ $R_2CuLi$ )
Free-Radical Halogenation	Hydride & Grignards
Carbonyl Additions ( $RMgX$ , LAH, Wittig)	Formation of Imines and Enamines
Formation/Hydrolysis of Acetals	Williamson Ether Synthesis
Alkynes as Nu:	Carb. Acid Derivs: prep, LG's, electrophilicity
Enols (acid-) and Enolates (base-cat. mech.)	Carbonyl Chemistry (aldol, Claisen)
Aromaticity & Conjugation	Diels-Alder reaction
MO Theory (Aromaticity, Pericyclic Rxns)	Kinetic vs. Thermodynamic control
Electrophilic Aromatic Substitution (EAS)	Diazonium Salts
EDG groups & EWG groups	Ar side chain rxns: oxidation, halogenation
Reactions of C.A. Derivatives	1,2 vs. 1,4- addition of Nu: to dienes
Conj. Addn. of Nu: to $\alpha,\beta$ -unsat'd (Michael)	Resonance (of course!)