

Phillips, CHE 256, Organic Chemistry II Test 2 Review Sheet

I will be available Sunday afternoon from 3-6 p.m. for last minute questions; TEC 404; Call my office phone if the outer door to the building is locked (601)266-4083

General details

- Although this test will focus on the material from chapters 9, 13, 14, 15, elements from previous chapters will be included as fundamentals.
- 10 questions, mixture of multiple choice and short answer
- 4 questions directly from homework problems from chapters 13-15
- You will have one **bonus** question – a synthetic question
- 1 NMR question, where you are expected to take NMR information regarding proton (1) chemical shift; (2) multiplicity; (3) peak area and relate this information to discerning molecular structure
- You **will** be provided with the following resources: periodic table, pKa table, and 3 extra sheets of paper.
- You are allowed to bring models **preassembled** for the test. I suggest a few tetrahedral carbons and a butane molecule, with lots of extra atoms of various colors.

Specific details

- Chapter 13 conjugated unsaturated systems
 - We have introduced several new reactions which use familiar reagents but obtain different products because of the unique chemistry at allylic and benzylic positions. Be prepared to predict the products of these reactions.
 - Be able to discuss the stability of the allylic and benzylic position using relative bond dissociation energies (BDE).
 - Be able to draw resonance structures, and predict the thermodynamic stabilities of various radicals and carbocations. Review the factors which increase the stability of electron deficient centers, and know the rules of drawing good resonance structures and hybrids.
 - Be able to name alkenes and predict relative thermodynamic stabilities. Review the factors that increase or decrease the thermodynamic stability of alkenes and conjugated alkenes.
 - Kinetic versus thermodynamic control of addition reactions to conjugated dienes
 - Diels-alder reactions: be able to predict reactants, products, stereochemistry, and know the factors that increase the rate of reaction, i.e. what makes a good diene or dienophile ?
- Chapter 14 aromatic compounds
 - Be able to name simple benzene derivatives
 - Be able to predict whether various molecules or ions are aromatic, non-aromatic or anti-aromatic
- Chapter 15 reactions of aromatic compounds
 - Know the mechanism of electrophilic aromatic substitution reaction; remember the electrophile changes but the mechanism will be the same.
 - Know the reagents in Figure 15.1, be able to identify the electrophile, predict products, whether the substituent is an activating or deactivating group, and an ortho,para-directing or meta-directing
 - Be able to predict the products of multiple substitutions and determine the best order in which to add the reagents to get the products that you want
 - Know the limits of Friedel-Crafts alkylations and acylations
 - Know the reagents and products of the Clemmensen reduction
 - Know reagents and products of the free radical halogenation reaction in the benzylic position
 - Know the products of addition of $\text{KMnO}_4/\text{OH}^-$, heat, H_2O to an alkyl benzene