Syllabus: Organic Chemistry I  Chem 243  FALL 2017

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Office Hours: by arrangement

Hard cover, Binder version or Electronic book)

Solomons Organic Chemistry, 13E
Molecular Model Kit 7E  9780471362715

The Study Guide for the textbook may be useful and is highly recommended.
An inexpensive set of molecular models is highly recommended and models can be used
during exams.
The powerpoint slides, old tests, and study materials will be posted on Moodle.
Material to be covered, learning outcomes and tentative exam dates:

**Chapter 1: Carbon Compounds and Chemical Bonds**
- Draw Lewis structures of molecules and ions
- Determine presence and location of formal charges
- Draw structures of resonance forms and approximate structure of resonance hybrids
- Use curved arrows to show relationship between resonance structures
- Identify hybridization states of atoms in given molecular structures
- Draw all isomers of a given formula

**Chapter 2: Representative Compounds, and Functional Groups, Intermolecular Forces and Infrared Spectroscopy**
- Identify existence of dipole moments in molecules
- Identify functional groups in molecules
- Use IR data to determine functional groups in molecules and deduce molecular structure given empirical formula
- Relate structural features to physical properties such as boiling point and solubility

**Chapter 3: Organic Reactions, Acids and Bases**
- Identify hemolytic and heterolytic bond breaking in given reactions
- Identify molecules as either acids or bases using the Lewis and Bronstead definitions
- Use curved arrows to show electron movement in reactions
- Determine relative acidity and basicity of a given set of molecules
- Describe structures of carbanions and carbocations
- Be able to interpret molecular structures given by condensed formulas, bond line formulas etc.
- Know the characteristics of sigma and pi bonds.
- Be able to identify reactions as one of the four fundamental types

**Exam 1: __________________ (25%) Chapters 1, 2, and 3**

**Chapter 4: Alkanes, Nomenclature, Conformational Analysis and Synthesis**
- Draw molecular structure from IUPAC or common name
- Give IUPAC or common name for given structure
- Draw Newman projection for a given conformation
- Draw cyclohexane ring structures with given substituents
- Show how cyclohexane “ring flip” changes conformation of substituents

**Chapter 5: Stereochemistry**
- Be able to identify chiral centers in a given structure
- Given Fisher projections be able to determine the stereochemical relationship between two structures
- Assign R and S configurations to chiral centers given Fisher projections
Chapter 6: Ionic Reactions
Identify species of a reaction as nucleophile, substrate or leaving group
Given reactants draw the structure of the major product of the reaction
Determine how a change in solvent affects the rate of a given reaction
Draw the mechanism for a given reaction
Know which mechanism will be favored by specific conditions
Identify relative stability of carbocations.

Exam 2: _________________ (20%) Chapters 4, 5, and 6

Chapter 7: Alkenes and Alkynes 1, Properties and Synthesis
Draw structures of reaction products for elimination reactions including stereochemical effects
Write mechanisms for elimination reactions
Give names for given structures and draw structures from names

Chapter 8: Alkenes and Alkynes 2, Addition Reactions
Draw structures of products of addition reactions to alkenes, including any stereochemical effects
Write mechanisms for addition reactions
Identify when rearrangements can occur and the products formed

Chapter 9: NMR Spectroscopy and Mass Spectrometry
Deduce structures of molecules given empirical formulas with NMR and IR data
Use Mass Spectroscopy to help identify structures
Recognize different magnetic environments in molecules
Interpret spin-spin coupling in spectra

Exam 3: _________________ (20%) Chapters 7, 8, and 9

Chapter 10: Radical Reactions (introduction)
Write the products of radical substitution reactions
Write the mechanism of radical substitutions

Chapter 11: Alcohols and Ethers
Write the products of the reactions of alcohols and ethers
Write the mechanisms of reactions

Chapter 12: Alcohols from Carbonyl Compounds
Know oxidation and reduction reagents and the products of their reactions
Write the products of the organometallic reactions covered

Final Exam (25%) Cumulative

All the power point presentations and sample tests will be uploaded on Moodle.
YOU MUST USE YOUR NJIT E-MAIL TO CONTACT ME. I WILL NOT REPLY TO A PERSONAL E-MAIL ADDRESS.

The NJIT Honor Code will be upheld, and any violations will not be tolerated and will be brought to the immediate attention of the Dean of Students.

GRADING POLICY

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No homework will be accepted after the due date. No exception.