Chapter 6 Lecture Outline **Stereochemistry**

assigned problems: **ch 6** 2-5, 8-9, 13, 15-17, 19-20, 22-23, 28, 32, 34

Key Concepts and Learning Goals

- know the definitions of all types of isomers and be able to identify the isomeric relationship of structures accordingly
- be able to identify stereocenters in molecules and
- be able to name/label stereoisomers as Z,E; R,S; P,M
- be able to calculate the enantiomeric excess of a mixture or the enantiomeric composition of a mixture for a given ee
- be able to write and manipulate stereochemical structures as Fisher projections
- be able to define and evaluate homochiral and heterochiral assemblies and prochirality in molecules
- be able to define and evaluate the topochemical relationships of groups in molecules as heterotopic, homotopic, enantiotopic, and diastereotopic and understand the chemical and physical consequences of these relations
- know the meaning and application of the terms stereospecific and stereoselective as applied to chemical reactions
- know the mechanism of the dienone-phenol rearrangement and the Woodward-Dewar debate about it
- know some of the leading theories on the origin of chirality in nature (L-amino acids, D-sugars)

I. Stereochemistry (ch 6.1-6.1.2 p 297-306)

A. basic definitions

1. isomers - constitutional isomers and stereoisomers
2. stereoisomers - enantiomers and diastereomers
3. configurational isomers, conformational isomers, and atropisomers
4. chirality and optical activity
5. mixtures of enantiomers

B. structure basis of stereoisomerism: stereocenters and stereogenic units

C. labeling stereoisomers: R,S and Z,E and P,M

D. homochiral and heterochiral ensembles and prochirality

II. Topicity (ch 6.3 p 315-317)

III. Reaction Stereochemistry (ch 6.4 p 317-322)

V. Origin of Chirality in Nature (ch 6.8.3 p 339-340)

VI. Terminology (ch 6.9 p 340-344)