TEST TWO OBJECTIVES / OUTCOMES / COMPETENCIES

Ch		**TEST TWO**	**Self-Assessment** (Some but not all Graded)	**Graded Assessment**
4	Alkyl Halides and An Overview of Chemical Reactions	1. Draw the mechanism and explain the energetics of the propagation steps in the free-radical halogenation of alkanes 2. Based on the selectivity of halogenation and the varying stabilities of 1º, 2º, 3º, and allylic radicals, predict the products of halogenation of hydrocarbons 3. Apply principles of bond strength to predict whether overall reactions or individual steps within a multi-step mechanism are exothermic or endothermic, are favorable or unfavorable, and use bond strengths to predict the energetics of reactions. 4. Given a rate law, predict how the rate would vary with changes in solute concentrations or solvent volume. 5. Use energy diagrams to discuss transition states, activation energies, intermediates, and the rate-determining step of a multistep reaction 6. Rank the stabilities of different radical, carbocations, or anions and describe or explain the structural features that stabilize them. 7. Use reactant and product stability-reactivity principles in conjunction with structural factors to compare the relative reactivities of different reactions 8. Predict and explain variations in bond strengths	1. In-lecture in-notes problems 2. Practice sets online 3. Practice Tests 4. Sapling homework problems 5. Book practice problems	Sapling homework Quiz 3 Test 2 Final Exam
5	Stereochemistry	9. Classify moleculas as chiral or achiral, and identify mirror planes of symmetry 10. Draw a mirror image for any molecule 11. Identify chiral carbons, and name them using the (R) and (S) convention 12. Identify relationships between pairs of molecules as enantiomers, diastereomers, or equivalent 13. Identify and identify meso compounds 14. Draw all stereoisomers for a given structure 15. Identify when a solution is racemic versus optically active 16. Identify when a chemical reaction will give a racemic versus optically active product Recognize and explain how various physical properties might vary or not vary for enantiomers, or for diastereomers.	1. In-lecture in-notes problems 2. Practice sets online 3. Practice Tests 4. Sapling homework problems 5. Book practice problems	Sapling homework Quiz 4 Test 2 Final Exam
6	Reactions of Alkyl Halides; Nucleophilic Substitutions and Eliminations	17. Correctly name alkyl halides, and identify halocarbons as 1º, 2º, 3º, allylic, vinyl, or aryl 18. Predict the products of S_N2 reactions, including stereochemistry. 19. Predict the products of S_N1 reactions, including stereochemistry. 20. Predict the products of E1 and E2 reactions, including stereochemistry. 21. Use Zaytsev's Rule to predict which structural isomer will predominate in E2 or E1 reactions. 22. When a halocarbon reacts, identify when S_N2 or E2 reactions occur, or when S_N1 or E1 reactions will occur, and predict the major products. 23. Draw mechanisms for any of S_N1, S_N2, E1, or E2 reaction 24. Rank the relative rates of substitutions or eliminations reactions, based on differences in substrate, base/nucleophile, leaving group, or solvent. 25. Predict whether a reaction will be first-order or second-order 26. When possible, predict predominance of substitution or elimination 27. Identify reactants that could product target chemical products 28. Design multi-reaction synthesis design sequences to convert hydrocarbons to more highly functional derivatives	1. In-lecture in-notes problems 2. Practice sets online 3. Practice Tests 4. Sapling homework problems 5. Book practice problems	Sapling homework Test 2 Final Exam