

TEST THREE SKILLS/OBJECTIVES / OUTCOMES / COMPETENCIES

		TEST THREE	Self-Assessment (Some but not all Graded)	Graded Assessment
7	Alkenes: Structure and Preparation: Elimination Reactions	<ol style="list-style-type: none"> 1. Calculate “elements of unsaturation” (“EU”) for any formula. 2. Determine the number of alkenes and rings present in any formula, given its chemical formula and hydrogenation information. 3. Draw possible structural isomers for a chemical, given formula and hydrogenation information. (“Detective” problems.) 4. Draw and name all alkenes with a given molecular formula 5. Use the E-Z and cis-trans systems to name stereoisomers 6. Use heats of hydrogenation to compare stabilities of alkenes, or use stability patterns for alkenes to predict heats of hydrogenation or heats of combustion 7. Predict relative stabilities of alkenes and cycloalkenes, based on structure and stereochemistry 8. Predict the products of E2-elimination for haloalkanes, reactions (Zaytsev versus Hofmann elimination), depending on whether the base used is bulky or normal. 9. Predict the distribution between E2-elimination and S_N2 substitution for reactions of haloalkanes 10. Predict the major alkene products (Zaytsev elimination) when alcohols undergo acid-catalyzed dehydration. 11. Propose and draw detailed mechanisms for E2-elimination reactions of alkyl halides, and for acid-catalyzed E1 elimination of alcohols. 12. Propose and design effective single-step and multistep syntheses of alkenes. (Synthesis design problems.) 	<ol style="list-style-type: none"> 1. In-lecture problems 2. Practice sets online 3. Practice Tests 4. Sapling homework problems 5. Book practice problems 	Sapling homework Test 3 Final Exam
8	Alkenes: Addition Reactions and Other Alkene Reactions	<ol style="list-style-type: none"> 13. Predict the product when an alkene react with a hydrogen halides 14. Predict the products when alkenes react with HBr/peroxides 15. Predict the product when an alkene react with H₂O/H⁺ 16. Predict the product when an alkene undergoes hydroboration/oxidation 17. Predict the products when alkenes undergoes oxymercuration/demercuration 18. Predict the product when an alkene undergoes hydrogenation 19. Predict the product when an alkene reacts with Cl₂ or Br₂ 20. Predict the product when an alkene reacts with Cl₂ or Br₂ in the present of water 21. Predict the product when an alkene undergoes expodiation, with or without water present 22. Predict the product when an alkene undergoes ozonolysis 23. In all of the above reactions, include effective consideration of reaction orientation (Markovnikov versus anti-Markovnikov orientation), and stereochemistry 24. Predict when a reaction will produce achiral versus chiral products 25. Predict the correct stereoisomers for stereospecific reactions. 26. <u>Draw detailed logical mechanisms</u> for alkene reactions with HBr, H₂O/H⁺, Br₂, or Br₂/H₂O. 27. <u>Use retrosynthetic analysis to solve multi-step synthesis design problems involving alkenes as intermediates or final products</u> 28. Use clues provided by products of reactions such as ozonolysis to determine the structure of an unknown alkene 29. Determine the stereochemistry of a starting alkene, given reactants and the product stereochemistry. 	<ol style="list-style-type: none"> 1. In-lecture problems 2. Practice sets online 3. Practice Tests 4. Sapling homework problems 5. Book practice problems 	Sapling homework Test 3 Final Exam