

TEST FOUR SKILLS/OBJECTIVES / OUTCOMES / COMPETENCIES

| | | <u>TEST FOUR</u> | <u>Self-Assessment</u> (Some but not all Graded) | <u>Graded Assessment</u> |
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| 15 | Conjugation in Alkadienes and Allylic Systems | <ol style="list-style-type: none"> 1. Recognize when conjugation applies, how it impacts chemical stability, and use it to predict and rank stabilities of various substances 2. For compounds containing nitrogen atoms, determine what the nitrogen atom hybridization and shape is; determine what the lone pair hybridization is; and predict whether the nitrogen basicity is normal or low 3. Predict and rank how various reactions and their reaction rates are impacted by conjugation/resonance, whether in a reactant or an intermediate or a product, for example in SN1 reactions, radical reactions or acid-base reactions 4. Predict the products of hydrogen halide additions to conjugated dienes. 5. Identify 1,2 vs 1,4 addition products in hydrogen halide additions to conjugated dienes 6. Identify thermodynamic versus kinetic products 7. Predict the products of allylic radical bromination reactions. 8. Draw mechanisms for addition reactions or SN1 reactions proceeding through allylic cations 9. Draw resonance structures for allylic cations, radicals, or anions 10. Predict the products of Diels-Alder reactions, including stereochemistry; and when the dienophile is disubstituted. 11. Identify reactants involved in Diels-Alder reactions, allylic bromination reactions, and hydrogen halide additions to conjugated dienes. | <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 | <p>Sapling homework</p> <p>Test 4</p> <p>Final Exam</p> |
| 16 | Arenes and Aromaticity | <ol style="list-style-type: none"> 12. Name aromatic molecules, and draw structures given names 13. Use the polygon rule to draw the energy diagram for a cyclize system of p orbitals, and fill in the electrons to show whether a given compound or ion is aromatic or anti-aromatic 14. Use Huckel's rule to identify whether a given structure is aromatic, anti-aromatic, or non-aromatic, including heterocycles and ions 15. Apply understanding of how aromaticity or anti-aromaticity in a reactant, intermediate, or product impacts reactivity and reaction rates, for example in SN1 reactions or acid-base reactions 16. For compounds containing nitrogen atoms, determine what the nitrogen atom hybridization and shape is; determine what the lone pair hybridization is; and predict whether the nitrogen basicity is normal or low | <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 | <p>Sapling homework</p> <p>Test 4</p> <p>Final Exam</p> |
| 17 | Reactions of Arenes: Electrophilic Aromatic Substitution | <ol style="list-style-type: none"> 17. Predict products for the common electrophilic aromatic substitutions: halogenation, nitration, sulfonation, alkylation, and acylation. 18. Predict the position of substitution involving rings that have more than one substituent. 19. Draw the mechanisms for the electrophilic aromatic substitution reactions. 20. Draw resonance structures for the cationic intermediates involved in electrophilic aromatic substitution reactions on substituted rings. 21. Identify and apply which substituents are electron donors and electron withdrawers; activators versus deactivators; and ortho/para directors versus meta directors for electrophilic aromatic substitution reactions. 22. Predict products and utilize in synthesis design problems the common aromatic support reactions: reduction of nitro groups to amino; reduction of acyl group to 1° alkyl; oxidation of alkyl groups to carboxyl; desulfonation; allylic bromination. 23. Retrosynthesis/Synthesis design: design syntheses towards specific aromatic targets with appropriate ortho, meta, or para substitution, by using appropriate reactants and appropriate reaction sequencing | <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 | <p>Sapling homework</p> <p>Test 4</p> <p>Final Exam</p> |