

1. (8 pts.) Which of the following alkenes is the more stable alkene? Explain your choice.

1. _____



2. _____

3. _____

2. (8 pts. each) Predict the products of the following reactions and, where appropriate, identify the major and minor products (ignore stereochemistry). Ignore products that result from consecutive reactions.

4. _____

5. _____

6. _____

7. _____

8. _____

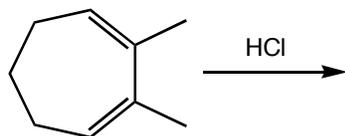
9. _____

10. _____

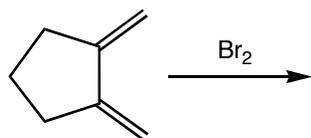
11. _____

3. (8 pts. each) Predict the products of the following reactions. Where appropriate, identify the kinetic and thermodynamic products (ignore stereochemistry).

a.



b.



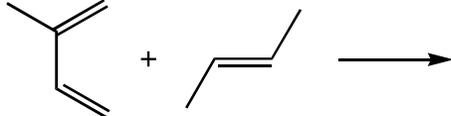
4. (8 pts.) Identify which products in question 3 result from 1,2- and 1,4-additions.

5. (8 pts. each) Predict the products of the following Diels-Alder reactions. Where appropriate, indicate the stereochemistry of the products.

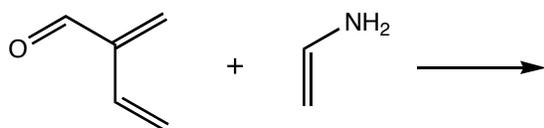
a.



b.

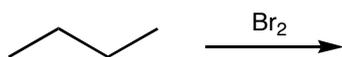


6. (8 pts.) Determine the products of the following Diels-Alder reaction, indicate which product is the major product.



7. a. (4 pts.) Determine the stereochemistry (draw wedge and dash structures) of the product(s) for the following radical substitution. Only consider products that form from the substitution of a secondary hydrogen.

b. (4 pts.) Is there any control of the stereochemistry in this reaction? Explain.

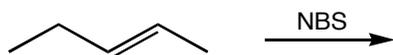


8. (8 pts.) Fluorine is so reactive that radical substitutions are normally not attempted with fluorine. If you survived the reaction of fluorine with propane, would you expect to isolate more 1- or 2-fluoropropane from the reaction?

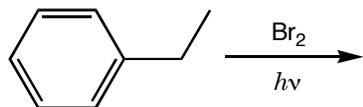
9. (8 pts.) If you wanted to make a primary alkyl halide from propane, would it be better to use Br_2 , NBS, or Cl_2 ? Explain.

10. (8 pts. each) Determine the major products of the following reactions (ignore stereochemistry).

a.

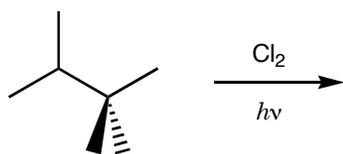


b.



11. (8 pts each) Determine the relative yields for all of the products in the following reactions (ignore stereochemistry). The following numbers might be helpful: 1600:82:1 and 5:3.8:1.

a.



b.

