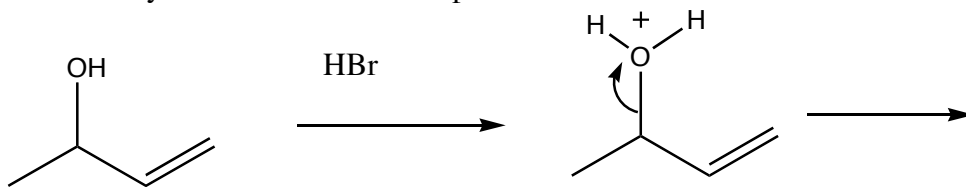
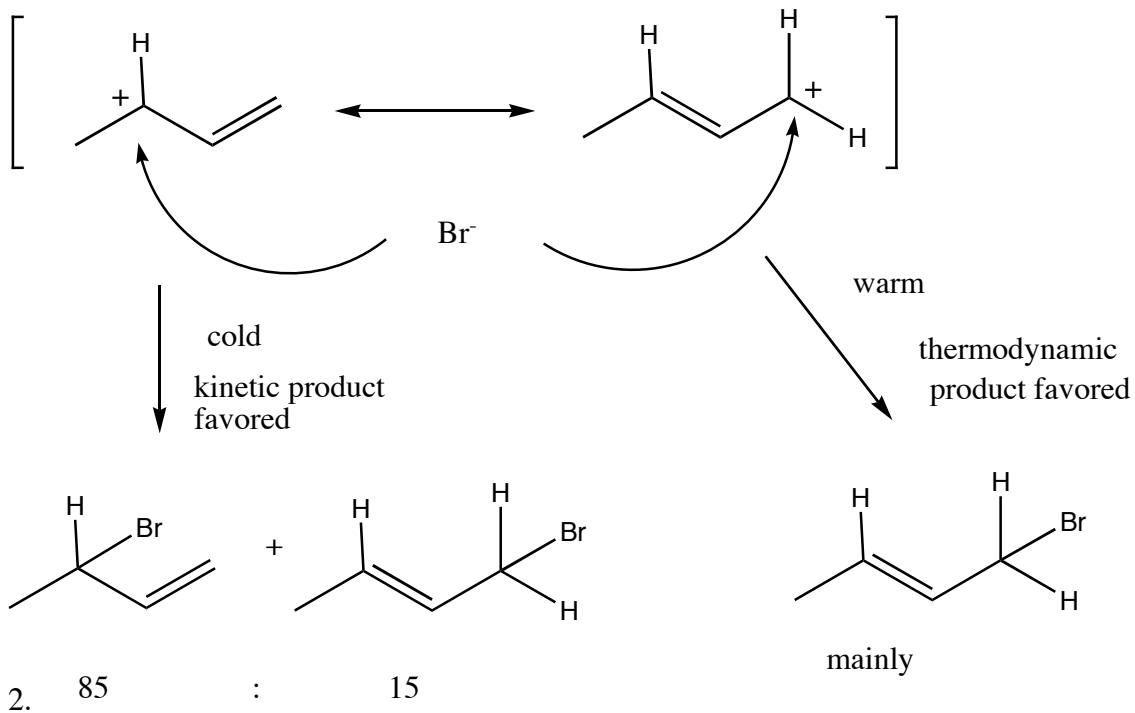


Additional Problems for practice:

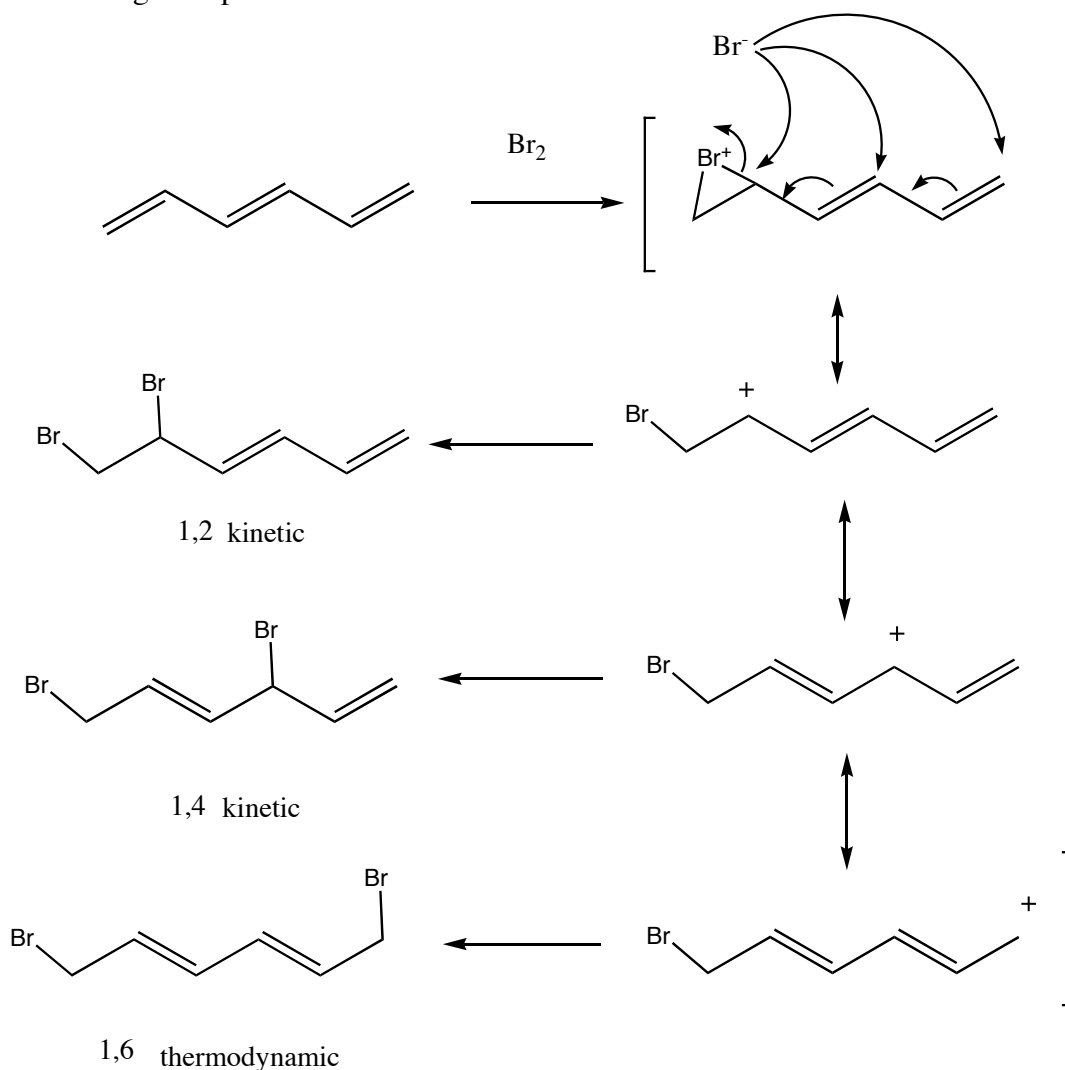
1. Treatment of 3-buten-2-ol with cold hydrogen bromide gives 1-bromo-2-butene and 3-bromo-1-butene in a 15:85 ratio. On heating, this ratio changes to give mainly 1-bromo-2-butene. Explain.



3-buten-2-ol

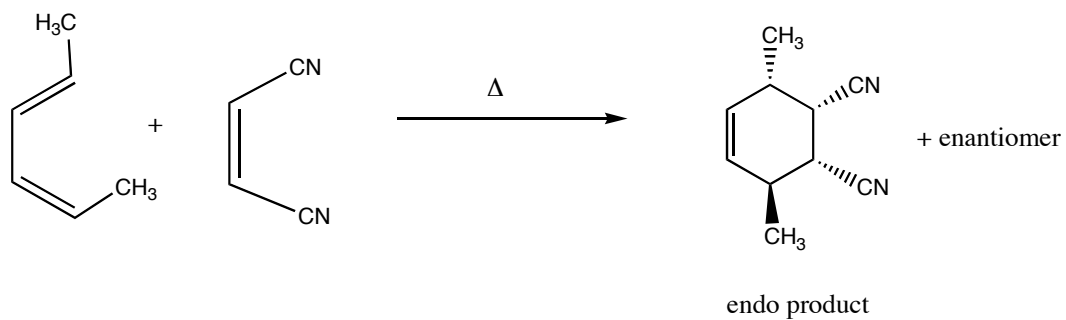
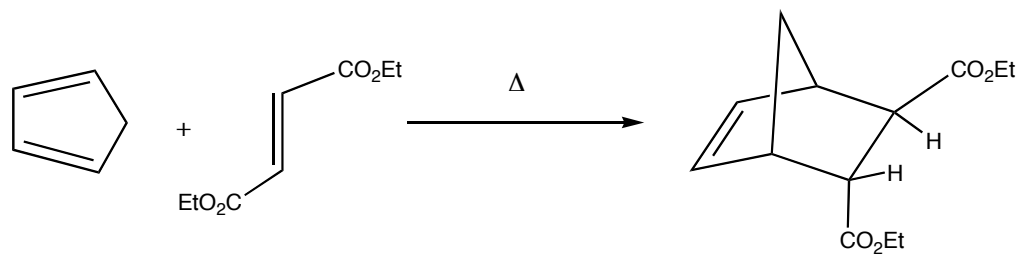
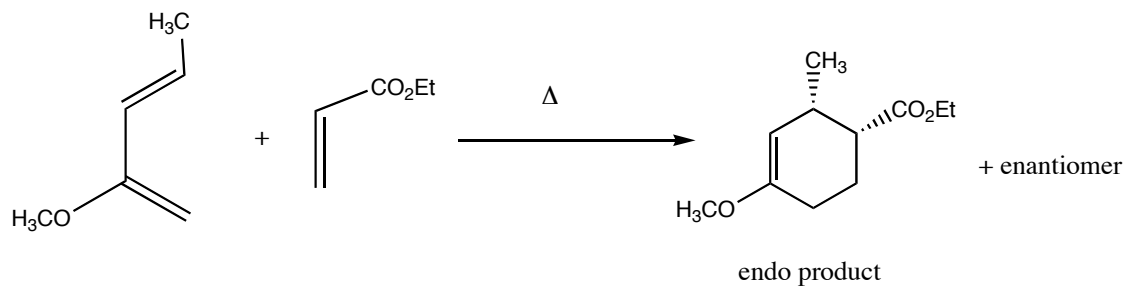


2. Addition of 1 equivalent of bromine to 1,3,5-hexatriene gives 3 dibromide products. Draw the structure of the products and indicate which product(s) are formed in excess at low temperatures and which product(s) are formed in excess at high temperatures.

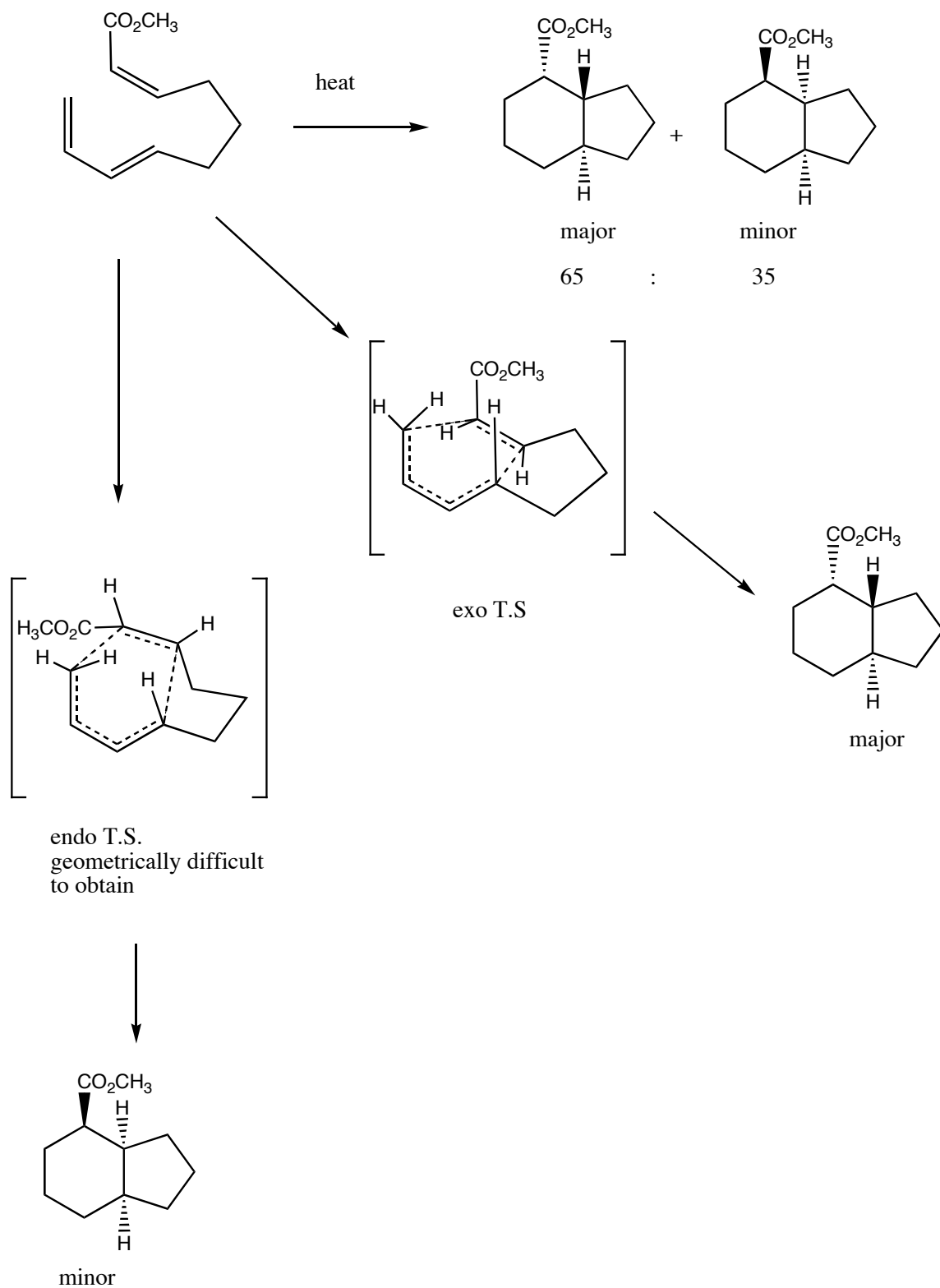


At low temperatures, 1,2 and 1,4 addition products are formed in excess. At high temperatures, 1,6 addition product is formed in excess. Because of the stability of the disubstituted double bond, it is unlikely that the initial bromonium ion formation will take place on the internal double bond.

3. Predict the product(s) of the following reactions. Be sure to indicate stereochemistry:



4. Explain why the major product of the Diels-Alder reaction shown below is formed in excess:.



5. Show how you could prepare the following compounds using a Diels-Alder reaction:

