Chapter 8 Concepts
- Elimination reactions: E2 and E1
- Cis/Trans products
- Stereoisomers of alkenes
- Heats of hydrogenation
- Base strengths
- Zaitsev rule

1. Label each pair of alkenes as constitutional isomers, stereoisomers, or identical.

   a. [Diagram] and [Diagram]
   b. [Diagram] and [Diagram]
   c. [Diagram] and [Diagram]
   d. [Diagram] and [Diagram]

2. How does each of the following changes affect the rate of an E2 reaction?
   a. Tripling [RX]
   b. Halving [B:] 
   c. Changing solvent from CH₃OH to DMSO
   d. Changing the leaving group from I⁻ to Br⁻
   e. Changing the base from ʻOH to H₂O
   f. Changing the alkyl halide from CH₃CH₂Br to (CH₃)₂CHBr
Week 3 Worksheet

3. What alkenes are formed from each alkyl halide by an E2 reaction? Use the Zaitsev rule to predict the major product.

a. 
\[
\begin{array}{c}
\text{H}_3\text{C} - \text{C} - \text{CH}_3 \\
\text{H} & \text{C} & \text{Br} \\
\end{array}
\]

b. 
\[
\begin{array}{c}
\text{CH}_3 \\
\text{Br} \\
\text{C} \quad \text{C} \\
\text{CH}_3 \\
\text{Br} \\
\end{array}
\]

c. 
\[
\begin{array}{c}
\text{Cl} \\
\text{C} \\
\end{array}
\]

d. 
\[
\begin{array}{c}
\text{H}_3\text{C} \\
\text{C} \quad \text{Cl} \\
\text{H} \\
\text{C} \quad \text{Cl} \\
\text{CH}_3 \\
\end{array}
\]

4. Rank the alkenes in each group in order of increasing stability.

a. 
\[
\begin{array}{c}
\text{CH}_2=\text{CHCH}_2\text{CH}_2\text{CH}_3 \\
\text{C} \quad \text{C} \\
\text{C} \quad \text{C} \\
\end{array}
\]

b. 
\[
\begin{array}{c}
\text{CH}_2=\text{C(CH}_3\text{)_2CH}_3 \\
\text{CH}_2=\text{CHCH(CH}_3\text{)_2} \\
\text{(CH}_3\text{)_2C=CHCH}_3 \\
\end{array}
\]

5. Which elimination reaction in each pair is faster?

a. 
\[
\begin{array}{c}
\text{CH}_3 \quad \text{Cl} \\
\text{Cl} \quad \text{Cl} \\
\end{array}
\]

\[
\begin{array}{c}
\text{CH}_3 \quad \text{Cl} \\
\text{Cl} \quad \text{Cl} \\
\end{array}
\]

- OH

- OH
6. Draw all of the substitution and elimination products formed from the following alkyl halide with each reagent. Indicate the stereochemistry around the stereogenic centers present in the products, as well as the mechanism by which each product is formed.

b. 

\[
\begin{align*}
\text{Cl} & \quad \text{H}_2\text{O} \\
\text{Cl} & \quad \text{H}_2\text{O}
\end{align*}
\]

c. 

\[
\begin{align*}
\text{(CH}_3)_2\text{CCl} & \quad \text{H}_2\text{O} \\
\text{(CH}_3)_2\text{CCl} & \quad \text{DMSO}
\end{align*}
\]