Week 4 Worksheet

1. Rank the following compound in order of increasing ability to hydrogen bond. (1 = highest ability to hydrogen bond, 3 = lowest). Would the trend for increasing boiling point be the same or different?

\[
\text{HOH} \quad \text{OH} \quad \text{OH}
\]

2. Now rank the following in order of increasing rate of dehydration (1 = highest, 3 = lowest)

\[
\text{HOH} \quad \text{OH} \quad \text{OH}
\]

3. How would the following molecules be rearranged, and what are they called? (Carbocation rearrangement is seen during dehydration.)

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

   b. 
   \[
   \begin{array}{c}
   \text{CH}_3 \text{H} \\
   \text{H}_3\text{C} - \text{C} - \text{C} - \text{H} \\
   \text{CH}_3 \\
   \end{array}
   \]
4. For the following reactants, draw a stepwise mechanism for all possible products. Determine which product is the major product.

1. \[
\text{Reactant} \xrightarrow{\text{TsoH}} \text{Product}
\]

2. \[
\text{Reactant} \xrightarrow{\text{H}_2\text{SO}_4} \text{Product}
\]

5. For the following reactants, draw a stepwise mechanism to find the product.

1. \[
\text{Reactant} \xrightarrow{\text{HI (2 Equiv)}} \text{Product}
\]

2. \[
\text{Reactant} \xrightarrow{\text{NaH}} \text{Product}
\]