Name:___________________________

1. Circle the hydrogens that are most easily removed in each molecule. (2 pts)

   a. \[
   \begin{array}{c}
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H} \\
   \text{H}
   \end{array}
   \]

   b. \[
   \text{H}_3C-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3
   \]

2. Fill in the appropriate number of hydrogens on each structure, and circle the ones that will be most easily removed (be removed first) upon combustion. Which alkane would be most likely to “preignite” or “autoignite” if used in an engine (circle the entire molecule)? (8 pts)

   a. \[
   \text{CH}_2 \text{CH}_2 \text{CH}_2 
   \]

   b. \[
   \text{CH}_3 
   \]

   c. \[
   \text{CH}_4
   \]

3. Draw the most likely products for each reaction. (15 pts)

   a. \[
   \begin{array}{c}
   \text{H}_3C \\
   \text{CH}-\text{CH}_3
   \end{array} + \text{Br--Br} \xrightarrow{\text{hv}} \text{H}_3C
   \]

   (monohalogenation product)

   b. \[
   \begin{array}{c}
   \text{C}_6\text{H}_{14}
   \end{array} + \text{H}_2 \xrightarrow{\text{Pd}}
   \]

   c. \[
   \begin{array}{c}
   \text{H}_3C \\
   \text{CH}_2
   \end{array} + \text{H}_2\text{O} \xrightarrow{}
   \]

   d. \[
   \begin{array}{c}
   \text{H}_2\text{C}==\text{CH}-\text{CH}_3
   \end{array} + \text{H}_2\text{O} \xrightarrow{}
   \]
4. What is the purpose of the Pd in reaction b? (2 pt)

5. What would happen if reaction were performed in the dark? (2 pts)

6. Fill in the reactant needed to perform the following reactions: (6 pts)
   - Oxidizing agent
   - Water
   - Hydrogen halide

   a. 
   
   b. 
   
   c. 

**Bonus:** (3 pts)
What do you think the product would be of hydrogenation of butyne?

\[ \ce{H3C=CH-CH3 + H2 ->} \]