Chapter 15 Organic Chemistry
Homework Questions and Problems

1. Draw the five structural isomers with formula \( \text{C}_6\text{H}_{14} \) and utilize the IUPAC nomenclature system to provide the correct name for each isomer.

2. Provide the IUPAC name for the following structural and/or geometric isomers with the formula \( \text{C}_6\text{H}_{12} \).

3. Provide the IUPAC name for the following structural and/or geometric isomers with the formula \( \text{C}_6\text{H}_{10} \).
4. Provide the IUPAC name for the following structural and/or geometric isomers with the formula (C₆H₁₃OH).

5. Provide the IUPAC name for the following structural and/or geometric isomers with the formula (C₆H₁₂O).

6. Provide the IUPAC name for the following structural and/or geometric isomers with the formula (C₆H₁₂O₂).
7. Provide the IUPAC name for the following structural and/or geometric isomers that contain at least one nitrogen atom.

8. Determine the product(s) for each of the following reactions. Write the name of the organic reactant product under each.

   a. Substitution reaction

   \[
   \begin{array}{c}
   \text{CH}_3 \\
   \text{CH}_3 - C - \text{OH} + \text{HCl} \rightarrow \\
   \text{CH}_3
   \end{array}
   \]

   b. Elimination reaction

   \[
   \begin{array}{c}
   \text{CH}_3 \\
   \text{CH}_3 - C - \text{Cl} + \text{KOH} \rightarrow \\
   \text{CH}_3
   \end{array}
   \]

   c. Addition reaction

   \[
   \begin{array}{c}
   \text{CH}_3 \\
   \text{CH}_3 - C = \text{CH} - \text{CH}_3 + \text{HBr} \rightarrow \\
   \text{CH}_3
   \end{array}
   \]
9. Draw at least five molecular structures of α-amino acids and show a one way that they could be combined in proteins utilizing peptide linkages.

10. Draw the molecular structure of two monosaccharides and show how a condensation reaction yields a disaccharide.

11. Draw the molecular structure of a triglyceride and show by the esterification reaction (base hydrolysis reaction) how soap could be formed. Discuss how soap functions to remove oil from cloth.