1. Give the IUPAC name for the following.

   d) $\text{HCH}_2\text{CH}_2\text{CH}_3\text{Cl}$

2. Draw structural formulas for the following compounds. Give the molecular formula of each ($C_xH_y$...).

   a) 2-methyl-3-hexene

   c) most stable chair conformation of $\text{cis}$-$1,4$-dimethylcyclohexane

5. Explain why the following is an incorrect IUPAC name. Draw the structure and correct the name.

   c) 4-heptene

   d) 1-chloro-5-methylcyclohexene

6. Arrange the following groups in order of increasing priority. Explain your order.

   $-\text{CH}_2\text{CH}_3$  $-\text{CH}_2\text{NH}_2$  $-\text{CH}_2\text{Br}$  $-\text{CH}_2\text{OH}$  $-\text{CH}_2\text{CH(\text{CH}_3)}_2$
7. Consider the following acid-base reaction:

\[
\text{CH}_3\text{COH} + \text{NH}_3 \rightarrow \text{CH}_3\text{CO}^- + \text{NH}_4^+
\]

a) Complete the Lewis structure for each species (reactants and products).

b) Use curved arrows to indicate the flow of electron pairs.

c) Indicate the conjugate acid-base pairs.

2. Draw mirror images of the following molecules. Are the mirror images superimposable on the original?

a) \(H\) \(\text{Br}\) \(\text{Br}\) \(\text{CH}_3\)

b) \(H\) \(\text{H}\) \(\text{O}\) \(\text{H}\) \(\text{CH}_3\)

c) \(\text{H}_3\text{C}\) \(\text{OH}\) \(\text{H}\)

5. Determine the R,S configuration of the following molecules:

a) \(H\) \(\text{OH}\) \(\text{Br}\) \(\text{CH}_3\)

b) \(H_2\text{N}\) \(\text{CH}_2\text{COOH}\)

7. Clearly indicate the stereocenters in the following molecule:

\[
\text{H}_2\text{C}\rightarrow\text{COOH} \\
\text{H}\rightarrow\text{COOH} \\
\text{H}\rightarrow\text{COOH} \\
\text{H}\rightarrow\text{COOH} \\
\text{OH}
\]
8. Define the terms: stereoisomers, enantiomers and diastereomers. Use 2,3-dichloropentane to illustrate these terms.