Week 4 Worksheet

1) Identify the functional groups in the structures below:

\[
\text{HO} \quad \text{O} \quad \text{Cl}
\]

\[
\text{O} \quad \text{NH}_2
\]

\[
\text{OH} \quad \text{O} \quad \text{O} \quad \text{S}
\]

2) Identify the intramolecular forces present in each of these substances:

\[
\begin{align*}
\text{Cl} \\
\text{O} \\
\text{Cl} \\
\text{O} \\
\text{OH}
\end{align*}
\]

3) Rank the following molecules in order of increasing boiling point: __<__<__
   a) decane \([\text{CH}_3(\text{CH}_2)_8\text{CH}_3]\)
   b) dodecane \([\text{CH}_3(\text{CH}_2)_{10}\text{CH}_3]\)
   c) 2,2,5,5-tetramethylhexane \([(\text{CH}_3)_3\text{C}(\text{CH}_2)_2\text{C}(\text{CH}_3)_3]\)
4) Rank the following solutes in order of increasing solubility in water: 

\[ \text{a) sodium chloride} \quad \text{b) 1-propanol (CH}_3\text{CH}_2\text{CH}_2\text{OH)} \quad \text{c) ethyl methyl ether (CH}_3\text{CH}_2\text{OCH}_3) \]

5) Explain why ICl has a higher melting point (~27°C) than Br\textsubscript{2} (-7.2°C) even though they have the same number of electrons.

6. For the following reactions:
   i. Identify the Lewis acid and base.
   ii. Draw the arrow mechanism and products

   a.

   \[ \text{AlF}_3 + \text{NH}_3 \rightarrow \]

   b.

   \[ \text{Cyclohexyl}^+ \text{Br}^- + \text{H}_2 \rightarrow \]