Name ___________________

1. Name the following compounds:

2. Draw the following compounds:

3. mercapto-2,5-pentandiol

sec-butyl alcohol

3. Rank the following compounds in order of increasing acidity and justify your answer.

4. Rank the following compounds in order of increasing solubility in water and justify your answer.
5. Rank the following compounds in order of increasing \textit{boiling point} and justify your answer.

\begin{enumerate}
\item \text{OH}
\item \text{SH}
\item \text{Cl}
\end{enumerate}

6. Draw the resonance structures of the conjugate base of 4-chlorophenol. Would you expect 4-chlorophenol to be more or less acidic than 3-chlorophenol? Explain. Why is the positioning of the chloro group important (whether it is at position 2, 3, or 4)?

7. For the following acid-base reactions, predict the products. Label the acid (A), base (B), conjugate acid (CA), and conjugate base (CB). Using equilibrium constant data, indicate whether the reaction will proceed as written. (Which side of the reaction is favored?)

- phenol + ammonia
- ethyl sulfide + acetic acid

8. Predict the product(s) of the following reactions:

- sodium ethoxide + 1-iodohexane $\rightarrow$
- 2-hexene + H$_3$O$^+$ $\rightarrow$
ethanol + CH₃CH₂COOH →

2-methylcyclopentanol + H₂SO₄ →

9. For the following reduction reactions, predict the product(s), and classify the alcohols as primary, secondary or tertiary.

\[
\text{LAH} \\
\text{Raney Ni} \\
\text{NaBH₄}
\]

10. Describe a synthetic pathway for the following synthesis. (It is a multi-step problem.)

\[
\text{Br} \\
\text{Br}
\]