1. At approximately what pH will 1% of a compound with pKₐ of 9 be in its acidic form? (Simply use the Henderson-Hasselbalch equation and solve for pH).

2. You'll learn in Chapter 9 that a synthetic method for preparing an ether involves reaction of an alkoxide ion, RO⁻ (the conjugate base on an alcohol), with a 1° alkyl halide, RCH₂X. A specific example is shown below:

\[
\text{CH}_3\text{CH}_2\text{O}^- + \text{CH}_3\text{CH}_2\text{CH}_2\text{Cl} \rightarrow \text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_2\text{CH}_3 + \text{Cl}^-
\]

This can be considered an acid-base reaction in the Lewis sense. Of the starting materials, which species is the Lewis acid and which is the Lewis base?

3. Draw the structure for each of the following compounds:

- sec-butyl alcohol
- diisopropyl ether
- \textit{n}-pentyl chloride
4. Draw and give an IUPAC (i.e. systematic) name for each of the following classes of compounds:

any 1° alkyl bromide

any 2° alcohol

any 3° alcohol

5. For propane:

(a) Draw a Newman projection looking down the C1–C2 bond of propane in a staggered conformation (all staggered conformations here happen to be of the same energy).

(b) Draw a Newman projection looking down the C2–C3 bond of propane in an eclipsed conformation (all eclipsed conformations here happen to be of the same energy).
6. (a) Draw 1,2,3,4,5,6-hexafluorocyclohexane in a chair conformation with all the halogen substituents in equatorial positions.

(b) Take the structure you have in part (a) and do a "chair-chair interconversion". Draw the resulting structure. How is the positions of the halogens compared to the structure you drew in part (a)?