Instructions: Read the directions to each type of question carefully.

1. Draw the conjugate acid of each of the following
   a. NH₃
   b. H₂O
   c. HO⁻ (hydroxide anion)

2. Briefly explain about acid rain

3. What is the relationship between pKₐ and dissociation constant? Write approximate pKₐ values for acetic acid, water, ammonium ion.

4. Which is stronger acid H₂O or H₂S and why?
5. Explain the difference in the pKₐ of the following compounds with a valid reason:

- pKₐ = 4.76
- pKₐ = 3.15
- pKₐ = 2.86
- pKₐ = 2.81
- pKₐ = 2.66
6. How will you separate a mixture of the following compounds? You can use any of the following reagents for separation. Water, ether, 1.0 M HCl, and 1.0 M NaOH. 
*Hint:* See problem 34, 35 page 46.

\[
\begin{align*}
\text{COOH} & \quad \text{pK}_a = 4.8 \\
\text{NH}_3\text{Cl}^- & \quad \text{pK}_a = 10.66
\end{align*}
\]