# CHEM 36
# General Chemistry
# *Quiz #5*

March 8, 2002

**Name:** <u>**Answer Key**</u>

1. The pH of a solution is 5.00 -- calculate the concentration (in mol/L) of $H^+$ in the solution.

   **pH = -log[$H^+$], so: [$H^+$] = $10^{-pH}$ = $10^{-5.00}$ =** <u>***$1.0 \times 10^{-5}$ M***</u>

2. The pOH of a solution is 5.00 -- calculate the concentration (in mol/L) of $H^+$ in the solution.

   **pH = 14.00 – pOH = 14.00 – 5.00 = 9.00**

   **So: [$H^+$] = $10^{-pH}$ = $10^{-9.00}$ =** <u>***$1.0 \times 10^{-9}$ M***</u>

3. The conjugate acid of $NH_3$ is the ammonium ion ($NH_4^+$). If $K_b$ for ammonia is equal to $1.8 \times 10^{-5}$, is the ammonium ion a stronger or weaker acid than acetic acid ($K_a = 1.8 \times 10^{-5}$)? Explain.

   **What is $K_a$ for $NH_4^+$?**

   **For a conjugate acid/base pair: $K_aK_b = K_w$**
   **So: $K_a$ ($NH_4^+$) = $K_w/K_b$ = $1.0 \times 10^{-14}/1.8 \times 10^{-5}$ » $10^{-9}$**

   **Since: $K_a$ (Acetic Acid) > $K_a$ ($NH_4^+$),** <u>***Acetic Acid is the stronger acid***</u>