Equilibrium Practice 3: **Acids and Bases**

1. Describe the difference between a strong acid and a weak acid.

2. Which is a stronger acid, methanoic acid or ethanoic acid? Explain how you know.

3. Which is a stronger base, ammonia or hydrazine? Explain how you know.

4. For each acid-base reaction, identify the acid and it's conjugate base, and the base and it's conjugate acid.

   (a) $HNO_2(aq) + HCO_3^-(aq) \rightleftharpoons NO_2^-(aq) + H_2CO_3(aq)$

   (b) $NH_3(aq) + HF(aq) \rightleftharpoons NH_4^+(aq) + F^-(aq)$

5. Hydrogen carbonate (HCO_3^-) is amphiprotic. Explain what *amphiprotic* means and illustrate the concept using hydrogen carbonate.

6. Describe the components of a buffer solution. Give an example, and use Le Châtelier's principle to explain how the buffer solution resists changes in pH.

7. Do the following for each solution.
   i. Identify the substance as a strong acid, weak acid, strong base, or weak base.
   ii. Write a chemical equation representing what happens to the substance in solution.
   iii. Calculate the pH of the solution.

   (a) 0.050 mol/L hydrobromic acid solution

   (b) 0.050 mol/L aniline solution

   (c) 0.050 mol/L lithium hydroxide solution

   (d) 0.050 mol/L benzoic acid solution

   (e) 0.050 mol/L ammonia solution

   (f) 0.050 mol/L barium hydroxide solution

   (g) 0.050 mol/L hydrocyanic acid solution