Acid-Base 4 • Chem 220

1. Predict the products and $K$ for the following acid-base reactions:

$$\text{SO}_3^{2-} + \text{HClO} \rightleftharpoons \text{__________} + \text{__________} \quad K =$$

$$\text{NH}_4^+ + \text{HCO}_2^- \rightleftharpoons \text{__________} + \text{__________} \quad K =$$

2. Identify the following Lewis acid and base in the following reactions. Predict the formula of the products (if not given).

A) $\text{AlCl}_3 + \text{NH}_3 \rightleftharpoons$

B) $\text{SO}_2 + \text{H}_2\text{O} \rightleftharpoons$

C) $\text{CaO} + \text{H}_2\text{O} \rightleftharpoons$

3. A 50.0 mL sample of a 0.500 M NaOH is mixed with 125.0 mL of a 0.250 M solution of nitric acid. What will be the pH, $[\text{H}_3\text{O}^+]$, and $[\text{OH}^-]$ of the resulting solution?

4. A 25.0 mL sample of a 0.500 M KOH is mixed with 25.0 mL of a 0.200 M solution of sulfuric acid. What will be the pH, $[\text{H}_3\text{O}^+]$, and $[\text{OH}^-]$ of the resulting solution?

5. Selenite, $\text{SeO}_3^{2-}$, is a weak base anion. What is the pH and the concentration of all selenium-containing species for a 0.25 M solution of sodium selenite, $\text{Na}_2\text{SeO}_3$?

The $K_a$ values for the diprotic selenous acid, $\text{H}_2\text{SeO}_3$, are: $K_{a1} = 2.7 \times 10^{-3}$, $K_{a2} = 2.5 \times 10^{-7}$.