CHEM 1105 **PROBLEM SET 7**

1. Calculate the $[H^+]$ and pH of a 0.125 *M* solution of NaH_2PO_4. K_a for NaH_2PO_4 is 6.2×10^{-8}.

2. Calculate the $[H^+]$ and pH of a buffer solution which is 0.30 *M* in H_3PO_4 and 0.20 *M* in KH_2PO_4. K_b for $H_2PO_4^-$ is 1.3×10^{-12}.

3. Calculate the $[OH^-]$ and pH of a 0.222 *M* solution of the weak base methylamine, CH_3NH_2. K_b for $CH_3NH_2 = 5.0 \times 10^{-4}$.

4. For the equilibrium $OH^- + C_6H_5NH_3^+ \rightleftharpoons C_6H_5NH_2 + H_2O$, $K = 2.2 \times 10^9$. Calculate K_a for the acid $C_6H_5NH_3^+$.

5. A 0.050 *M* solution of an acid HA is 0.35% dissociated. Calculate

   (i) the pH of the solution, and

   (ii) K_a for HA.

6. Calculate the percent dissociation of a base, B ($pK_b = 5.4$), in a 0.10 *M* solution.

7. Calculate the pH of a solution containing 2.5 g of phenol, HOC_6H_5, and 3.5 g of $NaOC_6H_5$ in 500 mL of solution. K_a for phenol $= 1.6 \times 10^{-10}$.

8. Calculate the pH of a solution made by adding 75.0 g of CH_3COONa to 750 mL of 0.64 *M* CH_3COOH. K_a for CH_3COOH is 1.8×10^{-5}.

9. What mass of CH_3COONa must be added to 50.0 mL of 0.50 *M* CH_3COOH to make a solution of pH 6.0 ?

10. Calculate the pH after 17.2 mL of 0.155 *M* NaOH has been added to 25.0 mL of 0.200 *M* HF. K_a for HF $= 7.2 \times 10^{-4}$.