REVIEW QUESTIONS
Chapter 15

1. For each reaction below, identify the Brønsted-Lowry acid and base and their conjugates:

A) $NH_4^+ (aq) + CN^- (aq) \rightleftharpoons HCN (aq) + NH_3 (aq)$

_____ _____ _____ _____

B) $(CH_3)_3N (aq) + H_2O (l) \rightleftharpoons (CH_3)_3NH^+ (aq) + OH^- (aq)$

_____ _____ _____ _____

C) $HCHO_2 (aq) + PO_4^{3-} (aq) \rightleftharpoons CH_2O^- (aq) + HPO_4^{2-} (aq)$

_____ _____ _____ _____

2. Predict the products of the following acid-base reactions, and use Table 16.2 in your text to determine whether the equilibrium lies to the right or left of the equation:

A) $NH_2^- (aq) + H_2O (l) \rightleftharpoons$

B) $HSO_4^- (aq) + HS^- (aq) \rightleftharpoons$

C) $HCO_3^- (aq) + F^- (aq) \rightleftharpoons$

3. Calculate the $[OH^-]$ for each solution below, and indicate whether each solution is acidic, basic or neutral:

   A) $[H^+] = 6.0 \times 10^{-6}$ M

   B) $[H^+] = 2.5 \times 10^{-8}$ M

4. Calculate the $[H^+]$ and $[OH^-]$ for each of the following strong acids and bases:

   A) 1.8×10^{-4} M HBr

   B) 0.025 M H_2SO_4

   C) 3.2×10^{-3} M KOH

   D) 0.0075 M $Ca(OH)_2$

5. Identify the Lewis acid and base in each of the following reactions:

A) $Fe(ClO_4)_3\ (s) + 6\ H_2O\ (l) \rightleftharpoons Fe(H_2O)_6^{3+}\ (aq) + 3\ ClO_4^-\ (aq)$

B) $(CH_3)_3N\ (g) + BF_3\ (g) \rightleftharpoons (CH_3)_3NBF_3\ (s)$

C) $HIO\ (lq) + NH_2^-\ (lq) \rightleftharpoons NH_3\ (l) + IO^-\ (lq)$

(lq denotes liquid ammonia as solvent)

6. For each pair, determine which is the stronger acid, and give a brief explanation:

A) H_2SO_4 and H_2SeO_4

B) CH_3CO_2H and CCl_3CO_2H

C) HPO_4^{2-} and $H_2PO_4^-$