Problem of the Day 27 CHEM 1252

Suggested Book Problems for Chapter 16: 15, 17, 19, 25, 29, 37, 43, 51, 57, 75, 81, 85, 89, 107

Exclude Section 16.10

1. In each case, identify the conjugate acid/base pairs and then predict if K_c for the reaction is greater than or less than 1.

(a) $F^- + HCN \rightleftharpoons HF + {}^-CN$ — 2

K_c — 4

(b) $HCO_2H + OH^- \rightleftharpoons HCO_2^- + H_2O$ — 2

K_c — 4

(c) $H_3O^+ + NH_3 \rightleftharpoons H_2O + NH_4^+$ — 2

K_c — 4

(d) $ClO_4^- + HNO_2 \rightleftharpoons HClO_4 + NO_2^-$ — 2

K_c — 4

(e) $HF + CH_3CO_2^- \rightleftharpoons F^- + CH_3CO_2H$ — 2

K_c — 4

(f) $Cl^- + HCN \rightleftharpoons HCl + {}^-CN$ — 4

K_c — 2

2. The equilibrium constant for the $HClO_2(aq) \rightleftharpoons H^+(aq) + ClO_2^-(aq)$ is K = 0.011. Calculate the equilibrium constant for $2\ H^+(aq) + ClO_2^-(aq) \rightleftharpoons 2\ HClO_2(aq)$.

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3.What is the pH and $[OH^-]$ of a 0.055 M HCl solution?

Calculation of pH	*Calculation of $[OH^-]$*
pH =	$[OH^-]$ = 5

4. Answer the following questions.

If $[H^+] = 2.4 \times 10^{-4}$, what is the pOH of the solution? 4	What is the pH of a solution formed by diluting 2.50 mL of 1.00 M HCl to 0.400 L? 4
If $[OH^-] = 5.9 \times 10^{-6}$, what is $[H^+]$? 4	If pOH = 12.14, is the solution acidic, basic, or neutral. You must justify your answer. 4