

Discussion Quiz #7 (10 minutes 10 points) key

Your Name: _____

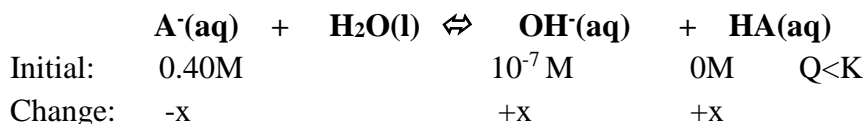
TF's name: _____

Discussion Day/Time: _____

1. (2 points) Calculate the pOH at room temperature of 0.15 M Mg(OH)₂ solution.

$$[\text{OH}^-] = 0.30\text{M} \quad \text{pOH} = 0.52$$

2. (2 points) Calculate the pH of 0.40M of a solution NaA. The acid HA has a K_a of 4.0 · 10⁻⁷.



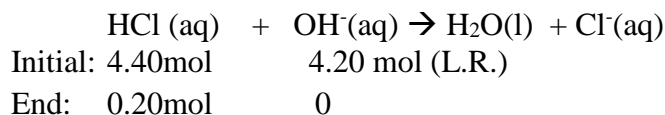
$$K_b = \frac{[\text{OH}^-] \cdot [\text{HA}]}{[\text{A}^-]} = \frac{x^2}{0.40} = 2.5 \cdot 10^{-8} ; \quad [\text{OH}^-] = 10^{-4} \text{ M}$$

$$\text{pOH} = 4 ;$$

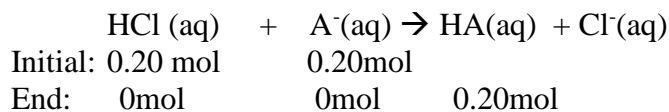
$$\text{pH} = 10$$

3. (6 points) One liter solution has 4.40 mol of HCl, 4.20 mol of NaOH and 0.20 mol of A⁻. What is the concentration of H₃O⁺ when the resulting solution reaches equilibrium? (K_a of HA is 5.0 × 10⁻⁵)

a. Limiting reagent (in mols)

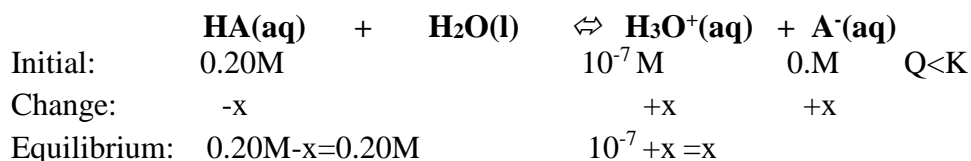


b. Limiting reagent (in mols)



$$[\text{HA}] = 0.2\text{M}$$

c. Equilibrium calculation (use concentrations)



$$K_a = \frac{[\text{H}_3\text{O}^+] \cdot [\text{A}^-]}{[\text{HA}]} = \frac{x^2}{0.2} = 5.0 \cdot 10^{-5}$$

$$[\text{H}_3\text{O}^+] = 3.2 \cdot 10^{-3} \text{ M}$$