

Key Thursday

- (2 points) An equal volume of 0.0010 M solution of C^- (conjugate base of HC) is mixed with the solution of the strong acid and the final pH is 7.0. What is the pH of a 0.002 M solution of HC at 25°C?

Based on the information we can conclude that C^- is a strong Base that reacts 100% that means it's conjugate acid so weak it is weaker than water hence it will not change pH of water.

pH=7 **2 points R or W**

- (2 points) At 25°C an aqueous solution of an acid HA has pH = 3. Circle all of the following that must be true.

The acid is a strong acid.

The acid is a weak acid.

The conjugate base is strong.

$$\underline{K_a > K_w}$$

$$K_a \approx K_w$$

$$K_a < K_w$$

$$\underline{[H_3O^+] > [OH^-]}$$

$$[H_3O^+] \approx [OH^-]$$

$$[H_3O^+] < [OH^-]$$

$$[HA] > [A^-]$$

$$[HA] \approx [A^-]$$

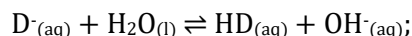
$$[HA] < [A^-]$$

$$[HA] > [H_3O^+]$$

$$[HA] \approx [H_3O^+]$$

$$[HA] < [H_3O^+]$$

- (4 points) The solution of 0.20M NaD has a pH of 10.3. What is the K for this equilibrium reaction?



$$pOH = 14 - pH = 3.7$$

$$[OH^-] = 10^{-pOH} = 10^{-3.7} = 1.99 \times 10^{-4}; \quad 2 \times 10^{-4}$$

$$K = \frac{[OH^-][HD]}{[D^-]} = \frac{1.995 \times 10^{-4} \times 1.995 \times 10^{-4}}{0.20} = 1.99 \times 10^{-7} = 2 \times 10^{-7}$$

- (2 points) Calculate the pH of a solution that is made by dissolving 0.8 moles of barium hydroxide in 400 mL of water at 25°C.

$$[Ba(OH)_2] = 0.8 \text{ mol} / 0.4 \text{ L} = 2 \text{ M}$$

$$[OH^-] = 4 \text{ M}$$

$$pOH = -0.6$$

$$pH = 14.6$$

Key Friday :

1. (2 points) An equal volume of 0.0020 M solution of A^- (conjugate base of HA) is mixed with the solution of the strong acid and the final pH is 7.0. What is the pH of a 0.002 M solution of HA at 25°C?

Based on the information we can conclude that C^- is a strong Base that reacts 100% that means it's conjugate acid so weak it is weaker than water hence it will not change pH of water.

$$pH=7$$

2. (2 points) At 25°C an aqueous solution of an acid HA has pH = 4. Circle all of the following that must be true.

The acid is a strong acid.

The acid is a weak acid.

The conjugate base is strong.

$$\underline{K_a > K_w}$$

$$K_a \approx K_w$$

$$K_a < K_w$$

$$\underline{[H_3O^+] > [OH^-]}$$

$$[H_3O^+] \approx [OH^-]$$

$$[H_3O^+] < [OH^-]$$

$$[HA] > [A^-]$$

$$[HA] \approx [A^-]$$

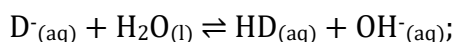
$$[HA] < [A^-]$$

$$[HA] > [H_3O^+]$$

$$[HA] \approx [H_3O^+]$$

$$[HA] < [H_3O^+]$$

3. (4 points) The solution of 0.20M NaD has a pH of 10.52. What is the K for this equilibrium reaction?



$$pOH = 14 - pH = 3.48$$

$$[OH^-] = 10^{-pOH} = 10^{-3.48} = 3.31 \times 10^{-4} \text{ or } 3.3 \times 10^{-4}$$

$$K = \frac{[OH^-][HD]}{[D^-]} = \frac{3.31 \times 10^{-4} \times 3.31 \times 10^{-4}}{0.20} = 5.48 \times 10^{-7} = 5.5 \times 10^{-7}$$

4. (2 points) Calculate the pH of a solution that is made by dissolving 0.4 moles of barium hydroxide in 500 mL of water at 25°C.

$$[Ba(OH)_2] = 0.4 \text{ mol} / 0.5 \text{ L} = 0.8 \text{ M}$$

$$[OH^-] = 1.6 \text{ M}$$

$$pOH = -0.2$$

$$pH = 14.2$$