Key Thursday

1. (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 week it is weaker than water hence it will not change pH of water.

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

2. (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.
$K_a > K_w$	$K_a \approx K_w$	$K_a < K_w$
$[H_3O^+] > [OH^-]$	$[H_3O^+] \approx [OH^-]$	$[H_3O^+] < [OH^-]$
$[HA] > [A^-]$	$[HA] \approx [A^-]$	$[HA] < [A^-]$
$[HA] > [H_3O^+]$	$[HA] \approx [H_3O^+]$	$[HA] < [H_3O^+]$

3. (4 points) The solution of 0.20M NaD has a pH of 10.3. What is the K for this equilibrium reaction?

   $$D^-_{(aq)} + H_2O_{(l)} \rightleftharpoons HD_{(aq)} + OH^-_{(aq)};$$

   $pOH = 14 - pH = 3.7$
   $[OH^-] = 10^{-pOH} = 10^{-3.7} = 1.99 \times 10^{-4}$; 2×10^{-4}

   $$K = \frac{[OH^-][HD]}{[D^-]} = \frac{1.995\times10^{-4}\times1.995\times10^{-4}}{0.20} = 1.99 \times 10^{-7} = 2 \times 10^{-7}$$

4. (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.
   $[Ba(OH)_2] = 0.8 mol/0.4L = 2M$
   $[OH^-] = 4M$
   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 week 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.
$K_a > K_w$	$K_a \approx K_w$	$K_a < K_w$
$[H_3O^+] > [OH^-]$	$[H_3O^+] \approx [OH^-]$	$[H_3O^+] < [OH^-]$
$[HA] > [A^-]$	$[HA] \approx [A^-]$	$[HA] < [A^-]$
$[HA] > [H_3O^+]$	$[HA] \approx [H_3O^+]$	$[HA] < [H_3O^+]$

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

   $$D^-_{(aq)} + H_2O_{(l)} \rightleftharpoons HD_{(aq)} + OH^-_{(aq)};$$

   $pOH = 14 - pH = 3.48$

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

   $K = \frac{[OH^-][HD]}{[D^-]} = \frac{3.31\times10^{-4}\times3.31\times10^{-4}}{0.20} = 5.48 \times 10^{-7} = 5.5 \times 10^{-7}$

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.
   $[Ba(OH)_2] = 0.4mol/0.5L = 0.8M$
   $[OH^-] = 1.6M$
   pOH= -0.2
   pH=14.2