

AP Unit 7 Day 3: Review Kahoot

#2.) $\text{pH} = 3 \Rightarrow [\text{H}_3\text{O}^+] = x = 1 \times 10^{-3} \text{ M}$

$$K_a = \frac{x^2}{[\text{HA}]_i} = \frac{(1 \times 10^{-3})^2}{0.1} = \frac{1 \times 10^{-6}}{1 \times 10^{-1}} = 1 \times 10^{-5} \Rightarrow \boxed{\text{HN}_3} (1.9 \times 10^{-5})$$

from RICE table

#4.) $\text{pH} = \underline{6.23}$

$[\text{H}^+] = 8.5 \times 10^{-4} \approx 10 \times 10^{-4} = 1 \times 10^{-3} \text{ M} \Rightarrow \boxed{\text{pH} \approx 3} \downarrow \text{pH} = \text{most acidic}$

$\text{pOH} = 2.91 \Rightarrow \text{pH} = 14 - 2.91 = \underline{11.09}$

$[\text{OH}^-] = 1.7 \times 10^{-9} \text{ M} \approx 1 \times 10^{-9} \Rightarrow \text{pOH} = 9 \Rightarrow \text{pH} = 14 - 9 = \underline{5}$

#6.) $K_a = \frac{x^2}{[\text{HA}]_i} \Rightarrow [\text{H}^+] = x = \sqrt{K_a \cdot [\text{HA}]_i} = \sqrt{(2.2 \times 10^{-8})(0.01)}$

$$\approx \sqrt{(1 \times 10^{-8})(1 \times 10^{-2})} = \sqrt{1 \times 10^{-10}} = 1 \times 10^{-5}$$

$\Rightarrow \text{pH} = -\log(1 \times 10^{-5}) = \boxed{5} (4.83)$

#8.) $K_a = \frac{x^2}{[\text{HA}]_i} = \frac{x^2}{1.0} = 6.6 \times 10^{-5} \approx 10 \times 10^{-5} = 1 \times 10^{-4}$

$x = [\text{H}^+] = \sqrt{(1.0)(1 \times 10^{-4})} = 1 \times 10^{-2}$

$\% \text{ Ion} = \frac{[\text{H}^+]_{\text{eq}}}{[\text{HA}]_i} \times 100 = \frac{1 \times 10^{-2}}{1.0} \times 100 = \boxed{1\%}$

#12.) $K_b = \frac{x^2}{0.20} = 1.8 \times 10^{-5} \Rightarrow x = [\text{OH}^-] = \sqrt{(0.20)(1.8 \times 10^{-5})}$

$$\approx \sqrt{(2 \times 10^{-1})(1 \times 10^{-5})} = \sqrt{2 \times 10^{-6}} \approx 1 \times 10^{-3}$$

$\text{pOH} = -\log [\text{OH}^-] = -\log(1 \times 10^{-3}) = 3$

$\text{pH} = 14 - 3 = \boxed{11} (11.28)$