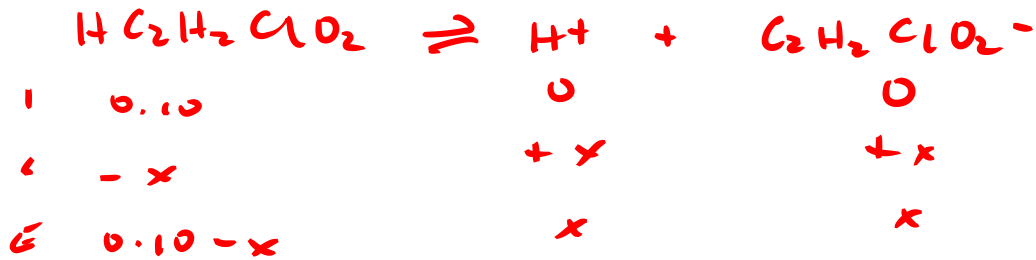


$K_a = 1.35 \times 10^{-3}$   
 $K_w = 1.0 \times 10^{-14}$



$$K_a = \frac{[\text{H}^+][\text{C}_2\text{H}_2\text{ClO}_2^-]}{[\text{HC}_2\text{H}_2\text{ClO}_2]} = 1.35 \times 10^{-3} = \frac{x^2}{0.10 - x}$$

$$x = 1.16 \times 10^{-2}$$

$$\text{So, } \frac{1.16 \times 10^{-2}}{0.10} \times 100 = 11.6\% \quad \therefore$$

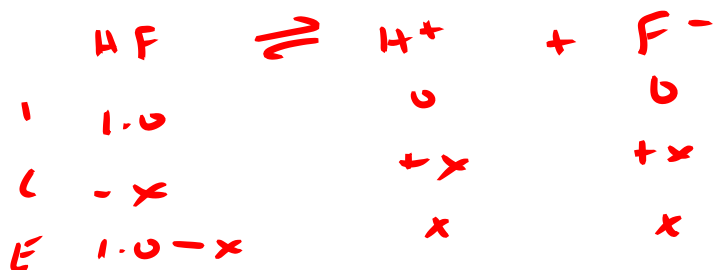
$$1.35 \times 10^{-3} = \frac{x^2}{0.10 - x}$$

$$1.35 \times 10^{-4} - 1.35 \times 10^{-3} x = x^2$$

$$x^2 + 1.35 \times 10^{-3} x - 1.35 \times 10^{-4} = 0$$

$$x = 1.1 \times 10^{-2} \text{ M}$$

$$\text{pH} = -\log(1.1 \times 10^{-2}) = 1.96$$

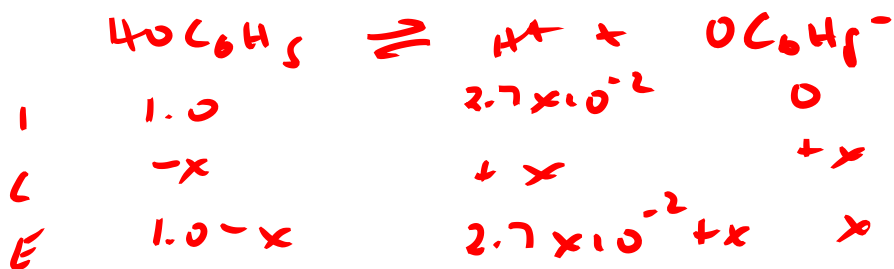


$$K_c = \frac{[H^+][F^-]}{[HF]} = 7.2 \times 10^{-4} = \frac{x^2}{1.0-x}$$

$$x = [H^+] = 2.7 \times 10^{-2} \text{ M}$$

$$\text{pH} = -\log(2.7 \times 10^{-2}) = 1.57$$

$$\% \alpha = \frac{2.7 \times 10^{-2}}{1.0} \times 100 = 2.7\%$$

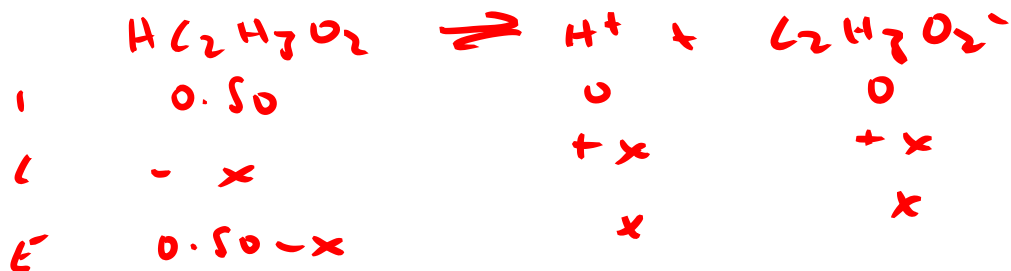


$$K_a = \frac{[H^+][OC_6H_5^-]}{[HOC_6H_5]} = 1.6 \times 10^{-10} = \frac{(2.7 \times 10^{-2})(x)}{1.0}$$

$$x = [OC_6H_5^-] = 5.9 \times 10^{-9} \text{ M}$$



$K_a = 1.8 \times 10^{-5}$   
 $K_w = 1.0 \times 10^{-14}$



$$K_a = \frac{[\text{H}^+][\text{C}_2\text{H}_3\text{O}_2^-]}{[\text{HC}_2\text{H}_3\text{O}_2]} = 1.8 \times 10^{-5} = \frac{x^2}{0.50-x}$$

$$x = [\text{H}^+] = [\text{C}_2\text{H}_3\text{O}_2^-] = 3.0 \times 10^{-3} \text{ M}$$

$$\% \text{ } \frac{3.0 \times 10^{-3}}{0.50} \times 100 = 0.60\%$$

b)  $K_a = 1.8 \times 10^{-5} = \frac{x^2}{0.050-x}$

$$x = [\text{H}^+] = [\text{C}_2\text{H}_3\text{O}_2^-] = 9.5 \times 10^{-4} \text{ M}$$

$$\% \text{ } \frac{9.5 \times 10^{-4}}{0.050} \times 100 = 1.9\% \checkmark$$

c)  $K_a = 1.8 \times 10^{-5} = \frac{x^2}{0.0050-x}$

$$x = [\text{H}^+] = [\text{C}_2\text{H}_3\text{O}_2^-] = 3.0 \times 10^{-4} \text{ M}$$

$$\% \text{ } \frac{3.0 \times 10^{-4}}{0.0050} \times 100 = 6.0\% \checkmark$$

Quadratic  $x = [\text{H}^+] = [\text{C}_2\text{H}_3\text{O}_2^-] = 2.5 \times 10^{-4} \text{ M}$

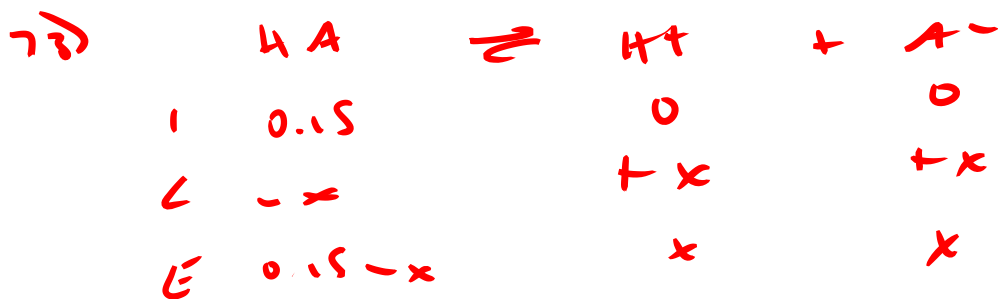
$$\% \text{ } \frac{2.5 \times 10^{-4}}{0.0050} \times 100 = 5\% \checkmark$$

d) - as you dilute a solution, all  
[ ] decrease

- dilution will shift the equilibrium  
to the side with greater number  
of particles

$Q > K$  shift to right  $\uparrow$  % dissociation

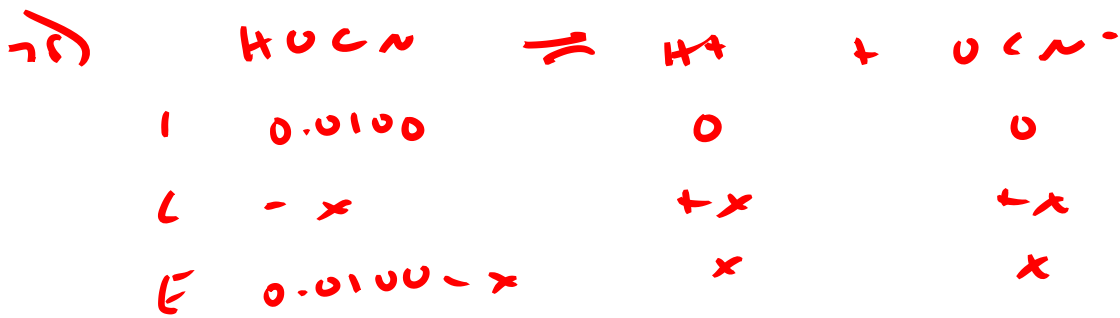
e) [ ]  $\downarrow$  more rapidly % dissociation  
so [H<sup>+</sup>] decreases



39% dissociation

$$x = [H^+] = 3.070 \text{ of } 0.15 = 4.5 \times 10^{-3} M$$

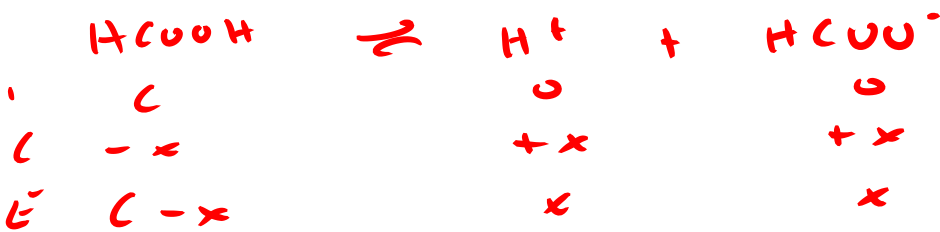
$$K_a = \frac{[H^+][A^-]}{[HA]} = \frac{(4.5 \times 10^{-3})^2}{(0.15 - 4.5 \times 10^{-3})} = 1.4 \times 10^{-4}$$



$$K_a = \frac{[\text{H}^+][\text{OCN}^-]}{[\text{HOCN}]} = \frac{x^2}{(0.0100 - x)}$$

$\text{pH} = 2.77 \quad x = [\text{H}^+] = 10^{-2.77} = 1.7 \times 10^{-3} \text{ M}$

$$K_a = \frac{(1.7 \times 10^{-3})^2}{(0.0100 - 1.7 \times 10^{-3})} = 3.5 \times 10^{-4}$$



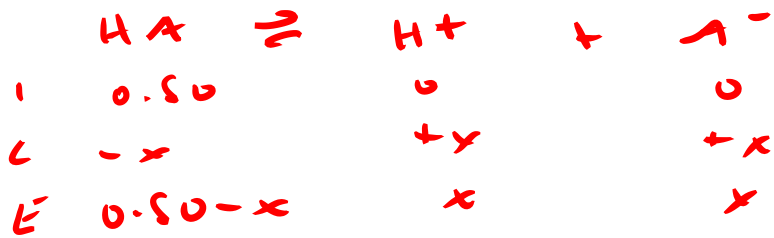
$$K_a = 1.8 \times 10^{-4} = \frac{[\text{H}^+][\text{HCOO}^-]}{[\text{HCOOH}]} = \frac{x^2}{C - x}$$

$\text{pH} = 2.70 \quad [\text{H}^+] = 10^{-2.70} = 2.0 \times 10^{-3} \text{ M}$

$$1.8 \times 10^{-4} = \frac{(2.0 \times 10^{-3})^2}{C - 2.0 \times 10^{-3}}$$

$$C = 2.4 \times 10^{-2} \text{ M}$$

$$\rightarrow a) [HA]_0 = \frac{1.0 \text{ mol}}{2.0 \text{ L}} = 0.50 \text{ M}$$



$$K_a = \frac{[H^+][A^-]}{[HA]} = \frac{x^2}{0.50 - x}$$

$$[HA] = 0.45 = 0.50 \text{ M} - x$$

$$x = 0.05 \text{ M}$$

$$K_a = \frac{(0.05)^2}{0.45} = 6 \times 10^{-3}$$