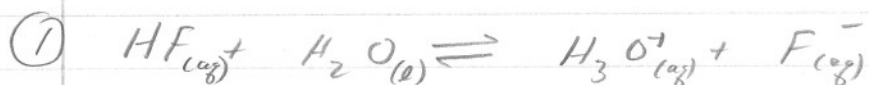


Acids + Bases - Acid Equilibrium Constant, K_a

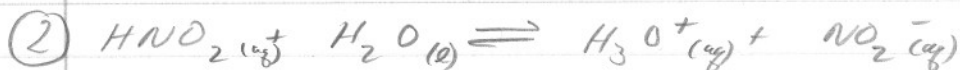


$$K_a = \frac{[\text{H}_3\text{O}^+][\text{F}^-]}{[\text{HF}]}$$

$$7.1 \times 10^{-4} = \frac{x^2}{0.2}$$

$$x = 0.012$$

$$\underline{[\text{H}_3\text{O}^+] = [\text{F}^-] = 0.012 \text{ mol/L}}$$



$$K_a = \frac{[\text{H}_3\text{O}^+][\text{NO}_2^-]}{[\text{HNO}_2]}$$

$$4.5 \times 10^{-4} = \frac{x^2}{2}$$

$$x = 0.03$$

$$\underline{[\text{H}_3\text{O}^+] = 0.03 \text{ mol/L}}$$

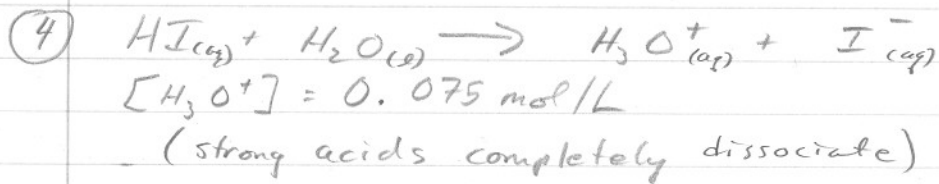


$$K_a = \frac{[\text{H}_3\text{O}^+][\text{F}^-]}{[\text{HF}]}$$

$$6.8 \times 10^{-4} = \frac{x^2}{0.62}$$

$$x = 0.021$$

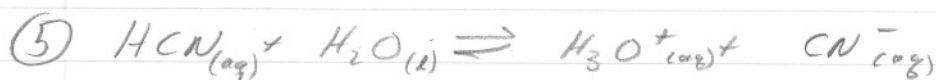
$$\underline{[\text{F}^-] = 0.021 \text{ mol/L}}$$



$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$= -\log(0.075)$$

$$\text{pH} = 1.12$$



$$K_a = \frac{[\text{H}_3\text{O}^+][\text{CN}^-]}{[\text{HCN}]}$$

$$4.9 \times 10^{-10} = \frac{x^2}{0.02}$$

$$x = 3.13 \times 10^{-6}$$

$$[\text{H}_3\text{O}^+] = 3.13 \times 10^{-6} \text{ mol/L}$$

$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$= -\log(3.13 \times 10^{-6})$$

$$\text{pH} = 5.5$$



$$K_a = \frac{[\text{H}_3\text{O}^+][\text{HCO}_3^-]}{[\text{H}_2\text{CO}_3]}$$

$$4.3 \times 10^{-7} = \frac{x^2}{0.25}$$

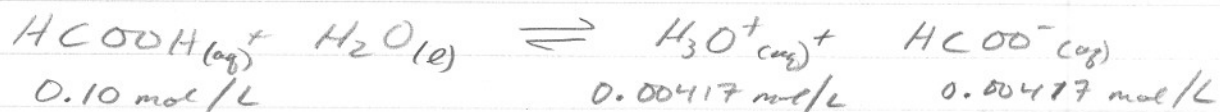
$$x = 3.28 \times 10^{-4}$$

$$[\text{H}_3\text{O}^+] = 3.28 \times 10^{-4} \text{ mol/L}$$

$$\text{pH} = -\log[\text{H}_3\text{O}^+] = -\log(3.28 \times 10^{-4})$$

$$\text{pH} = 3.5$$

$$\begin{aligned} \textcircled{7} \quad \text{pH} &= -\log [\text{H}_3\text{O}^+] \\ -2.38 &= +\log [\text{H}_3\text{O}^+] \\ [\text{H}_3\text{O}^+] &= 0.00417 \text{ mol/L} \end{aligned}$$



$$\begin{aligned} K_a &= \frac{[\text{H}_3\text{O}^+][\text{HCOO}^-]}{[\text{HCOOH}]} \\ &= \frac{(0.00417)(0.00417)}{(0.10)} \end{aligned}$$

$$K_a = 1.74 \times 10^{-4}$$

- $\textcircled{8}$ (a) HBr (b) HCl (c) H₂SO₄
 (d) H₂O (e) H₃PO₄