

Name
pH of Acids/bases
Ka Table

HF = 6.6E-4; HClO₂ = 1.1E-2; HCN = 6.2E-10; HC₂H₃O₂ = 9.1E-5; HNO₂ = 7.2E-5

Strong Acids

- Determine the pH of the following strong acids
 - .5M HBr. $\rightarrow 0.3$ $-\log(.5)$
 - .01M HCl $\rightarrow 2$ $-\log(.01)$
 - .005M HI $\rightarrow -\log(.005) = 2.3$
- In the previous question the actual type of acid was not needed to calculate the pH of the acid.

Why? they are strong, 100% \rightarrow Product

- For a weak acid two factors affect the number of hydronium ions that get produced. What are they?

- K (strength)
- Concentration

- Weak acids and bases undergo Hydrolysis in order to produce hydronium and hydroxide ions.

- Write the hydrolysis reaction for the following weak acids and bases.

- HF $\text{HF} + \text{H}_2\text{O} \rightarrow \text{H}_3\text{O}^+ + \text{F}^-$
- HCN $\text{HCN} + \text{H}_3\text{O}^+ \rightarrow \text{CN}^- + \text{H}_3\text{O}^+$
- HClO₂
- HNO₂
- HC₂H₃O₂

- Write the Equilibrium expression for each of the previous reactions.

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

b.

c.

d.

e.

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

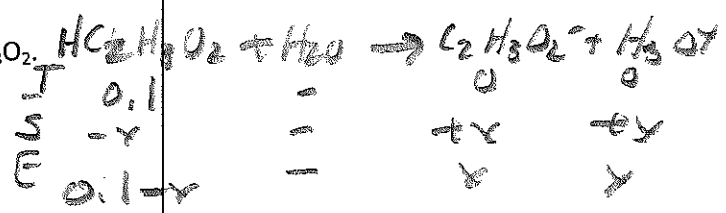
$$K_a = \frac{[X^-][H^+]}{[HX]}$$

From table on front

7. Determine the pH of a .1M solutions of HC₂H₃O₂.

$$K_a = \frac{x \cdot x}{0.1 - x} \quad x = 0.003$$

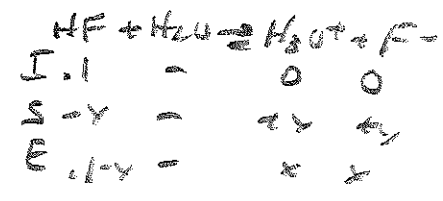
$$9.165 = \frac{x^2}{0.1 - x} \quad -\log(x) = 2.52$$



8. Determine the pH of a .1M solution of HF

$$6.6E-4 = \frac{x \cdot x}{0.1} \quad x = 0.00814$$

$$-\log(x) = 2.08$$



9. Why don't the substances have the same pH?

HF is stronger
- larger K value

10. Which substance would be considered the strongest acid?

HF ↑

11. Determine the pH of a 3M HNO₂ solution:

12. Determine the pH of a 3M HCN solution:

13. Determine the pH of a 3M HClO₂ solution:

14. Give an scenario where a weaker acid could produce a pH that is lower (more acidic)