Name

pH of Acids/bases

Ka Table

HF = 6.6E-4; $HClO_2$ = 1.1E-2; HCN = 6.2E-10; $HC_2H_3O_2$ = 9.1E-5; HNO_2 = 7.2E-5

Strong Acids

1. Determine the pH of the following strong acids
   a. .5M HBr. → 0.3 $-\log(.5)$
   b. .01M HCl → 2 $+\log(.01)$
   c. .005M HI → $-\log(.005)$ = 2.3
2. In the previous question the actual type of acid was not needed to calculate the pH of the acid. Why? they are strong. 100% → Product

3. For a weak acid two factors affect the number of hydronium ions that get produced. What are they?
   a. K (strength)
   b. Concentration

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

5. Write the hydrolysis reaction for the following weak acids and bases.
   a. HF $HF + H_2O \rightarrow H_3O^+ + F^-$
   b. HCN $HCN + H_3O^+ \rightarrow CN^- + H_3O^+$
   c. $HClO_2$
   d. HNO_2
   e. $HC_2H_3O_2$

6. Write the Equilibrium expression for each of the previous reactions.
   a. $K_a = \frac{[H^+][F^-]}{[HF]}$
   b. $K_a = \frac{[CN^-][H_3O^+]}{[HCN]}$
   c.
   d.
   e.

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

7. Determine the pH of a .1M solutions of $HC_2H_3O_2$.

From table on Front → $1.8E-5 = \frac{x^2}{.1}$ | $K_a = \frac{x \cdot x}{0.1-x}$ | $x = 0.003$ | $-\log(\ )$ | 2.52

$HC_2H_3O_2 + H_2O \rightarrow C_2H_3O_2^- + H_3O^+$

	$HC_2H_3O_2$		$C_2H_3O_2^-$	H_3O^+
I	0.1	−	0	0
S	−x	−	+x	+y
E	0.1−x	−	x	y

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

$6.6E-4 = \frac{x \cdot x}{0.1}$ $x = 0.00814$ $-\log(\ ) = 2.08$

$HF + H_2O \rightleftharpoons H_3O^+ + F^-$

	HF		H_3O^+	F^-
I	.1	−	0	0
S	−x	−	+x	+x
E	.1−x	−	x	x

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 HNO_2 solution:

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

13. Determine the pH of a 3M $HClO_2$ solution:

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