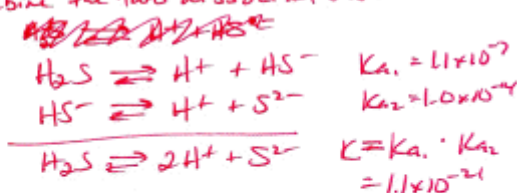


13. What is the S^{2-} concentration in a saturated solution (0.10 M) of H_2S , in which the pH has been adjusted to 6.00 by the addition of HCl?
 For H_2S , $K_{a1} = 1.1 \times 10^{-7}$ and $K_{a2} = 1.0 \times 10^{-14}$.
- a) $1.1 \times 10^{-16} M$ d) $3.2 \times 10^{-8} M$
 b) $1.1 \times 10^{-10} M$ e) $3.2 \times 10^{-6} M$
 c) $1.0 \times 10^{-2} M$

Combine the two dissociations:



$$\begin{aligned}
 K &= \frac{[H^+]^2[S^{2-}]}{[H_2S]} \\
 [S^{2-}] &= K \frac{[H_2S]}{[H^+]^2} \\
 &= \frac{(1.1 \times 10^{-21})(.10)}{(1 \times 10^{-6})^2} \\
 &= \boxed{1.1 \times 10^{-10} M}
 \end{aligned}$$

14. Which of the following salts will result in a basic solution when it is dissolved in water?
- a) KCl *pH 7* d) $MgBr_2$ *neutral*
 b) NH_4I *acidic* e) none of these
 c) $NaCN$ *basic*

15. What is the pH of a 0.50 M solution of $NaNO_2$?
 For HNO_2 , $K_a = 4.5 \times 10^{-4}$.
- a) 12.18 d) 8.52
 b) 5.48 e) 7.00
 c) 1.82

NO_2^-
 hydrolysis
 conjugate base of HNO_2

16. What is the pH of a 1.0 M solution of $NaOCl$?
 For $HOCl$, $K_a = 3.1 \times 10^{-8}$.
- a) 10.75 d) 10.25
 b) 3.25 e) 7.00
 c) 3.75

$$K_b = \frac{K_w}{K_a} = 3.23 \times 10^{-7}$$

Shortcut:
 $x^2 = (1.0)(3.23 \times 10^{-7})$

$[OH^-] = x = 5.677 \times 10^{-4}$ $pOH = 3.2436$
 $pH = 14 - pOH = 10.75$



.50M		0	0
-x		+x	+x
.50-x		x	x

$$K_b = \frac{K_w}{K_a} = \frac{[HNO_2][OH^-]}{[NO_2^-]} = 2.22 \times 10^{-11}$$

assume....

$$\frac{x^2}{.50} = 2.22 \times 10^{-11}$$

$$x^2 = 1.11 \times 10^{-11}$$

$$x = [OH^-] = 3.33 \times 10^{-6}$$

$$pOH = -\log [OH^-] = 5.477$$

$$pH = 14 - pOH = \boxed{8.52}$$