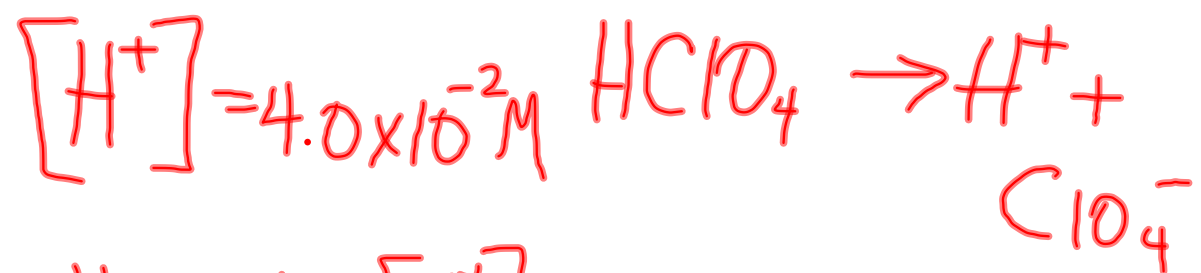


pH problems:

1. A solution formed by dissolving an antacid tablet has a pH of 9.18. Calculate  $[H^+]$ .

2. What is the pH of a 0.040 M solution of HClO<sub>4</sub>?



$$\begin{aligned} \text{pH} &= -\log[H^+] \\ &= -\log(4.0 \times 10^{-2}) \\ &= 1.40 \end{aligned}$$

3. An aqueous solution of  $\text{HNO}_3$  has a pH of 2.34. What is the concentration of the acid?

$$\text{pH} = 2.34$$

$$\begin{aligned} [\text{H}^+] &= 10^{-2.34} \\ &= 4.57 \times 10^{-3} \text{ M} \end{aligned}$$

4. What is the pH of (a) 0.028 M NaOH; (b) a 0.0011 M solution of  $\text{Ca}(\text{OH})_2$ .



$$[\text{OH}^-] = 0.028 \text{ M}$$

$$\begin{aligned} \text{pOH} &= -\log(\text{OH}^-) \\ &= -\log(0.028) \\ &= 1.55 \end{aligned}$$

$$\text{pOH} + \text{pH} = 14$$

$$14 - 1.55 = 12.45$$

B) 0.0011 M  $\text{Ca}(\text{OH})_2$



$$0.0011 \text{ M} \times 2 = [\text{OH}^-]$$

$$0.0022 \text{ M} [\text{OH}^-]$$

$$\text{pOH} = 2.66$$

$$\text{pH} + \text{pOH} = 14$$

$$14 - 2.66 = 11.34$$

5. What is the concentration of a solution of (a) KOH for which the pH is 11.89; (b)  $\text{Ca}(\text{OH})_2$  for which the pH is 11.68?

$$\text{A) } \text{pH} = 11.89$$

$$\text{pOH} + \text{pH} = 14$$

$$14 - 11.89$$

$$\text{pOH} = 2.11$$

$$[\text{OH}^-] = 10^{-2.11}$$

$$= 7.76 \times 10^{-3} \text{ M}$$

$$\text{B) } \text{pH} = 11.68$$

$$\text{pOH} = 14 - 11.68$$

$$= 2.32$$

$$[\text{OH}^-] = 10^{-2.32}$$

$$= 4.79 \times 10^{-3} \text{ M}$$

$$\underline{\quad}$$
$$2$$

$$= 2.39 \times 10^{-3} \text{ M}$$