

### Practice 6-1

Name the following acids:



### Answer

$\text{H}_2\text{SO}_3$ <b>sulfurous acid</b>	$\text{HBr}$ <b>hydrobromic acid</b>
$\text{HClO}_4$ <b>perchloric acid</b>	$\text{H}_2\text{S}$ <b>hydrosulfuric acid</b>
$\text{HClO}$ <b>hypochlorous acid</b>	$\text{H}_2\text{SO}_4$ <b>sulfuric acid</b>

### Practice 6-2

Calculate the pH of each of the following solutions and classify the solution as acidic or basic:

Lemon juice:  $[\text{H}^+] = 1.1 \times 10^{-2} \text{ M}$

Urine:  $[\text{H}^+] = 1.2 \times 10^{-6} \text{ M}$

Antiseptic:  $[\text{H}^+] = 1.2 \times 10^{-10} \text{ M}$

Coffee:  $[\text{H}^+] = 7.9 \times 10^{-6} \text{ M}$

Soft drink:  $[\text{H}^+] = 2.5 \times 10^{-4} \text{ M}$

Blood:  $[\text{H}^+] = 3.9 \times 10^{-8} \text{ M}$

Beer:  $[\text{H}^+] = 5.0 \times 10^{-3} \text{ M}$

Detergent:  $[\text{H}^+] = 3.2 \times 10^{-11} \text{ M}$

### Answer

material	$[\text{H}^+]$	pH	acidic or basic?
lemon juice	$1.1 \times 10^{-2} \text{ M}$	<b>1.96</b>	<b>acidic</b>
soft drink	$2.5 \times 10^{-4} \text{ M}$	<b>3.60</b>	<b>acidic</b>
urine	$1.2 \times 10^{-6} \text{ M}$	<b>5.92</b>	<b>acidic</b>
blood	$3.9 \times 10^{-8} \text{ M}$	<b>7.41</b>	<b>basic</b>
antiseptic	$1.2 \times 10^{-10} \text{ M}$	<b>9.92</b>	<b>basic</b>
beer	$5.0 \times 10^{-3} \text{ M}$	<b>2.30</b>	<b>acidic</b>
coffee	$7.9 \times 10^{-6} \text{ M}$	<b>5.10</b>	<b>acidic</b>
detergent	$3.2 \times 10^{-11} \text{ M}$	<b>10.49</b>	<b>basic</b>



### Practice 6-5

For a  $7.4 \times 10^{-3}$  M HCl solution, determine the following:

- a)  $[H^+]$       b)  $[OH^-]$       c) The pH

**Answer**

- a) Because HCl is a strong acid, it completely dissociates:**



So the concentration of hydrogen ion of a  $7.4 \times 10^{-3}$  M HCl solution is  $7.4 \times 10^{-3}$  M.

$$[H^+] = 7.4 \times 10^{-3}$$

- b) Substituting the  $[H^+]$  value in  $K_w = [H^+] \times [OH^-] = 1.0 \times 10^{-14}$  yields:**

$$[OH^-] = \frac{1.0 \times 10^{-14}}{7.4 \times 10^{-3}} = 1.4 \times 10^{-12} \text{ M}$$

- c)  $pH = -\log [H^+]$        $pH = -\log(7.4 \times 10^{-3})$        $pH = 2.13$**

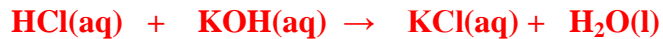
### Practice 6-6

Write molecular, ionic, and net ionic equation for the reaction of HCl and KOH.

Answer

**Molecular equation:**

We write each substance as if it were a molecular substance



**Ionic equation:**

The formula HCl(aq) actually means  $\text{H}^+(\text{aq})$  and  $\text{Cl}^-(\text{aq})$

The formula KOH(aq) actually means  $\text{K}^+(\text{aq})$  and  $\text{OH}^-(\text{aq})$

The formula KCl(aq) actually means  $\text{K}^+(\text{aq})$  and  $\text{Cl}^-(\text{aq})$

We can replace the molecular equation with the following ionic equation:



**Net ionic equation**

Removing spectator ions from the ionic equation gives the following



All strong acid/strong base neutralization reactions have the same net ionic equation.