

Exercise walk-through

8.2

pH and pOH of Strong Acids and Bases

AP Chemistry

Strong acids and bases

A **strong acid** ionizes **completely**, so $[\text{H}^+]$ equals its concentration.

Two logarithms

$$\text{pH} = -\log[\text{H}^+], \text{pOH} = -\log[\text{OH}^-]$$

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

Worked example

0.010 M HCl:

$$[\text{H}^+] = 0.010 \Rightarrow \text{pH} = 2$$

$$\text{pOH} = 12, [\text{OH}^-] = 10^{-12}$$

Exercises 2.1·2.3

2.1 Find the pH of 0.001 M HCl.

[2]

2.2 Find the pOH of 0.010 M NaOH, then the pH.

[2]

2.3 Find $[\text{H}^+]$ for a solution of $\text{pH} = 4$.

[1]

Exercises 2.1·2.3

2.1 Find the pH of 0.001 M HCl.

[2]

2.1

- $\text{pH} = -\log(0.001) = 3$

2.2 Find the pOH of 0.010 M NaOH, then the pH.

[2]

2.2

- $\text{pOH} = -\log(0.010) = 2$; $\text{pH} = 14 - 2 = 12$

2.3 Find $[\text{H}^+]$ for a solution of $\text{pH} = 4$.

[1]

2.3

- $[\text{H}^+] = 10^{-4} = 1 \times 10^{-4} \text{ M}$

Exercise 3.1

3.1 At 25°C, $\text{pH} + \text{pOH} =$

[1]

☐

A 7

B 10

C 14

D 1

Exercise 3.1

3.1 At 25°C, $\text{pH} + \text{pOH} =$

[1]

☐

A 7

B 10

C 14

D 1

3.1 C

- 14

Exercise 3.2 (a)

3.2 A 0.0050 M solution of HNO_3 (a strong acid).

(a) State $[\text{H}^+]$.

[1]

Exercise 3.2 (a)

3.2 A 0.0050 M solution of HNO_3 (a strong acid).

(a) State $[\text{H}^+]$.

[1]

(a)

- $[\text{H}^+] = 0.0050 \text{ M}$

Exercise 3.2 (b)

3.2 A 0.0050 M solution of HNO_3 (a strong acid).

(b) Find the pH.

[2]

Exercise 3.2 (b)

3.2 A 0.0050 M solution of HNO_3 (a strong acid).

(b) Find the pH.

[2]

(b)

- $\text{pH} = -\log(0.0050) = 2.30$

Exercise 3.3 (a)

3.3 A 0.020 M solution of NaOH.

(a) Find the pOH.

[2]

Exercise 3.3 (a)

3.3 A 0.020 M solution of NaOH.

(a) Find the pOH.

[2]

(a)

- $\text{pOH} = -\log(0.020) = 1.70$

Exercise 3.3 (b)

3.3 A 0.020 M solution of NaOH.

(b) Find the pH.

[1]

Exercise 3.3 (b)

3.3 A 0.020 M solution of NaOH.

(b) Find the pH.

[1]

(b)

- $\text{pH} = 14 - 1.70 = 12.30$