

Chapter 19 Study Guide: Acids, Bases & Titration – Answers

1. Differentiate between Arrhenius, Brønsted-Lowry & Lewis acids and bases.

	ACIDS	BASES
Arrhenius	Form hydronium ions (H_3O^+) in aqueous sol'n	Form hydroxide ions (OH^-) in aqueous sol'n
Brønsted-Lowry	Proton (H^+) donors	Proton (H^+) acceptors
Lewis	Electron pair acceptors	Electron pair donors

2. Label the acid (A), base (B), conjugate acid (CA) and conjugate base (CB) in each of the following reactions:



3. Write the names or formulas for the following acids and bases:

- a. H_2S – hydrosulfuric acid
 b. $\text{HC}_2\text{H}_3\text{O}_2$ – acetic acid
 c. NaOH – sodium hydroxide
 d. HNO_3 – nitric acid
 e. Nitrous acid – HNO_2
 f. Calcium hydroxide – $\text{Ca}(\text{OH})_2$
 g. hydrochloric acid – HCl

Use the following formulas for the remaining questions: (these will not be given to you on the test!)

$$K_w = [\text{H}_3\text{O}^+][\text{OH}^-] = 1.0 \times 10^{-14}$$

$$\text{pH} = -\log[\text{H}_3\text{O}^+]$$

$$\text{pOH} = -\log[\text{OH}^-]$$

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

$$M_A \cdot V_A \cdot n_A = M_B \cdot V_B \cdot n_B$$

4. What is the pH of
- 1.34×10^{-4}
- M solution of hydrochloric acid?

$$\text{pH} = -\log [1.34 \times 10^{-4}\text{M}] = 3.873$$

5. Determine the pH and pOH of a
- 1.85×10^{-6}
- M NaOH solution.

$$\text{pOH} = -\log [1.85 \times 10^{-6}\text{M}] = 5.733$$

$$\text{pH} = 14 - 5.73 = 8.267$$

6. What is the
- $[\text{OH}^-]$
- of an aqueous solution that has a pH of 5.0?

$$\text{pOH} = 9 \quad [\text{OH}^-] = 1 \times 10^{-9} \text{ M}$$

7. What is the pH and the pOH of a solution with a volume of 2000. mL containing 35 grams of NaOH? Is this solution acidic or basic?

$$\frac{35\text{gNaOH}}{2.000\text{L}} \times \frac{1\text{molNaOH}}{40.00\text{gNaOH}} = 0.44\text{M NaOH}$$

$$\text{pOH} = -\log[0.44\text{M}] = 0.36 \quad \text{pH} = 14 - 0.36 = 13.64 \quad \text{basic}$$

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Clemens Wendtner



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