



Name: _____

Period: _____

Assigned on Wednesday, March 18, 2026

11.1 Weak Acids and Weak Bases**Due Friday, March 20, 2026**

For all problems, assume 25°C unless otherwise noted.

1. Which of the following is NOT a conjugate acid-base pair?

- a)
- $(\text{CH}_3)_3\text{N}; (\text{CH}_3)_3\text{NH}^+$
- b)
- $\text{H}_2\text{SO}_4; \text{H}_2\text{SO}_3$
- c)
- $\text{HNO}_2; \text{NO}_2^-$
- d)
- $\text{NH}_4^+; \text{NH}_3$

2. Determine the pH of each of the following strong acid or strong base solutions.

- a) 0.015 M
- HNO_3
- b) 0.810 M
- KOH
- c) 2.50 M
- HCl

3. What is the pH of water at 40°C where $K_w = 2.916 \times 10^{-14}$? (remember: $K_w = [\text{H}^+][\text{OH}^-]$)4. What is the value of K_w at 10°C where the pH of water is 7.27?5. Which of the following acids would you expect to have the *highest* K_a value?

- a.
- HBrO
- b.
- HBrO_3
- c.
- HBrO_4
- d.
- HBrO_2

7. Write the equation for the following monoprotic acids or monoprotic bases in water and then calculate the $[\text{H}_3\text{O}^+]$ and percent ionization for each.

- a. 2.85 M
- $\text{HC}_2\text{H}_3\text{O}_2$
- (
- $K_a = 1.8 \times 10^{-5}$
-)

- b. 0.55 M
- HClO_2
- (
- $K_a = 1.2 \times 10^{-2}$
-)

- c. 3.60 M ammonia (
- NH_3
- , a monoprotic base) (
- $K_b = 1.8 \times 10^{-5}$
-)

8. What is the pH of a formic acid (HCHO_2) solution that has a concentration of 2.50 M? The K_a of formic acid is 1.77×10^{-4} .

Answers

1) B

2) a) 1.82 b) 13.908 c) -0.398

3) 6.7676

4) 2.9×10^{-15}

5) C

7) a) $\text{HC}_2\text{H}_3\text{O}_2 + \text{H}_2\text{O} \leftrightarrow \text{C}_2\text{H}_3\text{O}_2^- + \text{H}_3\text{O}^+$; $[\text{H}_3\text{O}^+] = 0.00716 \text{ M}$ and % ionization = 0.251%

b) $\text{HClO}_2 + \text{H}_2\text{O} \leftrightarrow \text{ClO}_2^- + \text{H}_3\text{O}^+$; $[\text{H}_3\text{O}^+] = 0.075 \text{ M}$ and % ionization = 14% (had to use quadratic equation!)

c) $\text{NH}_3 + \text{H}_2\text{O} \leftrightarrow \text{NH}_4^+ + \text{OH}^-$; $[\text{H}_3\text{O}^+] = 1.24 \times 10^{-12} \text{ M}$ and % ionization = 0.224%

8) 1.677