

CHEM 160 WORKSHEET FOR CHAPTER 14

In the following equation, label each substance as an acid, base, conj. acid or conj. base.



Label each of these as a acid / conjugate base or base/conj. acid or neither.

- A) HCN / CN<sup>-</sup>      B) OH<sup>-</sup> / H<sub>2</sub>O      C) H<sup>+</sup> / HCl      D) OH<sup>-</sup> / HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>

Which of the following acids is considered a strong acid?

- A) HF      B) HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub>      C) NaOH      D) HNO<sub>3</sub>

Which of the following reactions is a neutralization reaction?

- A)  $2\text{HCl} + \text{Zn} \longrightarrow \text{H}_2 + \text{ZnCl}_2$   
 B)  $\text{HNO}_3 + \text{NaOH} \longrightarrow \text{H}_2\text{O} + \text{NaNO}_3$   
 C)  $\text{NaCl} + \text{AgNO}_3 \longrightarrow \text{AgCl} + \text{NaNO}_3$   
 D)  $2\text{H}_2\text{O} \longrightarrow 2\text{H}_2 + \text{O}_2$

What is the molar concentration of hydroxide ion if the concentration of hydronium ion is  $2.0 \times 10^{-4} \text{ M}$ ?

- A)  $2.0 \times 10^{-4} \text{ M}$       B)  $2.0 \times 10^{-18} \text{ M}$       C)  $5.0 \times 10^{-11} \text{ M}$       D)  $2.0 \times 10^{10} \text{ M}$

Which of the following solutions is more acidic?

- A)  $[\text{H}^+] = 1 \times 10^{-7}$       B)  $[\text{H}^+] = 1 \times 10^{-5}$       C)  $[\text{OH}^-] = 1 \times 10^{-7}$       D)  $[\text{OH}^-] = 1 \times 10^{-14}$

Which solution is considered neutral? A) pH = 3      B) pH = 5      C) pH = 7      D) pH = 9

What is the pH of a solution that has  $[\text{H}^+] = 1 \times 10^{-4}$  and  $[\text{OH}^-] = 1 \times 10^{-10}$  ?

- A) pH = 4      B) pH = -4      C) pH = 10      D) pH = -10

Which of the following is NOT a property of bases?

- A) Bases have a slippery feel.  
 B) Bases have a bitter taste.  
 C) Bases turn litmus paper blue.  
 D) Bases dissolve many metals.  
 E) All of the above are properties of bases.

In the following reaction:  $\text{HCO}_3^- (aq) + \text{H}_2\text{O} (aq) \rightarrow \text{H}_2\text{CO}_3 (aq) + \text{OH}^- (aq)$

- A) HCO<sub>3</sub><sup>-</sup> is an acid and H<sub>2</sub>CO<sub>3</sub> is its conjugate base.  
 B) H<sub>2</sub>O is an acid and OH<sup>-</sup> is its conjugate base.  
 C) HCO<sub>3</sub><sup>-</sup> is an acid and OH<sup>-</sup> is its conjugate base.  
 D) H<sub>2</sub>O is an acid and H<sub>2</sub>CO<sub>3</sub> is its conjugate base.  
 E) H<sub>2</sub>O is an acid and HCO<sub>3</sub><sup>-</sup> is its conjugate base.

What is the conjugate base of HO<sup>-</sup>?

- A) O<sup>2-</sup>      B) H<sub>2</sub>O      C) NaOH      D) OH<sup>-</sup>      E) H<sub>3</sub>O<sup>+</sup>

Which of the following pairs is *incorrectly* matched?

	<u>Compound</u>	<u>Classification</u>
A)	HI	strong acid
B)	Ca(OH) <sub>2</sub>	weak base
C)	HNO <sub>2</sub>	weak acid
D)	NH <sub>3</sub>	weak base

Which of the following correctly describes an acidic solution

- A. pOH = 4    B. pH = 9    C.  $H^+ = 1 \times 10^{-5} M$     D.  $OH^- = 1 \times 10^{-5} M$     E. All describe an acidic solution

If the pH of a solution is 12.5, then the pOH is

- A. 12.5    B. 2.5    C. 1.5    D. -1.5    E. -2.5

What is the pH of a solution where  $[H_3O^+] = 1 \times 10^{-3}$

- A. 0.001    B. 11    C. -3    D. 14    E. 3

A solution is considered neutral if

- A. pH = pOH    B.  $[H_3O^+] = [OH^-]$     C.  $OH^- = 1 \times 10^{-7} M$     D. pOH = 7    E. A, B, C, D are all correct

A solution where  $OH^- = 1 \times 10^{-4}$  has a  $H_3O^+$  of

- A.  $1 \times 10^{-4}$     B.  $1 \times 10^4$     C.  $1 \times 10^{14}$     D.  $1 \times 10^{-10}$     E. 10

A 1 M solution of HCl has a \_\_\_\_\_ concentration of  $H_3O^+$     A) 0 M    B) 0.5 M    C) 1 M    D) 2 M

A solution where  $OH^- = 1 \times 10^{-5}$  has a pH of

- A. -5    B. 5    C. 10    D. 9    E. -9

What is the concentration of the hydroxide ions in a neutral solution?

- A) 0.0 M    B)  $1.0 \times 10^{-7} M$     C)  $1.0 \times 10^{-1} M$     D)  $> 1.0 \times 10^{-7} M$     E)  $< 1.0 \times 10^{-7} M$

Which solution below is the most acidic?

- A) pH = 3.21    B) pH = 12.49    C) pH = 7.00    D) pH = 10.12    E) pH = 7.93