

Honors Chemistry ACID and BASE TEST

Matching

Match each item with the correct statement below.

- | | |
|-------------------------------|---------------|
| a. acid dissociation constant | d. Lewis acid |
| b. diprotic acid | e. pH |
| c. hydrogen-ion donor | |

- _____ 1. can accept an electron pair
- _____ 2. acid with two ionizable protons
- _____ 3. Brønsted-Lowry acid
- _____ 4. negative logarithm of the hydrogen ion concentration
- _____ 5. ratio of the concentration of the dissociated to the undissociated form

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 6. When an acid reacts with a base, what compounds are formed?

a. a salt only	c. metal oxides only
b. water only	d. a salt and water
- _____ 7. Which of the following is a property of an acid?

a. sour taste	c. strong color
b. nonelectrolyte	d. unreactive
- _____ 8. What is a property of a base?

a. bitter taste	c. strong color
b. watery feel	d. unreactive
- _____ 9. The formula of the hydrogen ion is often written as _____.

a. H_2O^+	c. H^+
b. OH^+	d. H_4N^+
- _____ 10. What is an acid according to Arrhenius?

a. a substance that ionizes to yield protons in aqueous solution
b. a substance that is a hydrogen ion donor
c. a substance that accepts an electron pair
d. a substance that is a hydrogen ion acceptor
- _____ 11. Which of these is an Arrhenius base?

a. LiOH	c. H_2PO_4^-
b. NH_3	d. CH_3COOH
- _____ 12. What is transferred between a conjugate acid-base pair?

a. an electron	c. a hydroxide ion
b. a proton	d. a hydronium ion

- ____ 13. A Lewis acid is a substance that can ____.
- donate a pair of electrons
 - accept a pair of electrons
 - donate a hydrogen ion
 - accept a hydrogen ion
- ____ 14. What type of acid is sulfuric acid?
- monoprotic
 - diprotic
 - triprotic
 - none of the above
- ____ 15. Which compound can act as both a Brønsted-Lowry acid and a Brønsted-Lowry base?
- water
 - ammonia
 - sodium hydroxide
 - hydrochloric acid
- ____ 16. What are the acids in the following equilibrium reaction?
- $$\text{CN}^- + \text{H}_2\text{O} \rightleftharpoons \text{HCN} + \text{OH}^-$$
- CN^- , H_2O
 - H_2O , HCN
 - CN^- , OH^-
 - H_2O , OH^-
- ____ 17. What is the charge on the hydronium ion?
- 2-
 - 2+
 - 0
 - 1+
- ____ 18. If the hydrogen ion concentration of a solution is $10^{-10} M$, is the solution acidic, alkaline, or neutral?
- acidic
 - alkaline
 - neutral
 - The answer cannot be determined.
- ____ 19. The products of self-ionization of water are ____.
- H_3O^+ and H_2O
 - OH^- and OH^+
 - OH^+ and H^-
 - OH^- and H^+
- ____ 20. In a neutral solution, the $[\text{H}^+]$ is ____.
- $10^{-14} M$
 - zero
 - $1 \times 10^7 M$
 - equal to $[\text{OH}^-]$
- ____ 21. What is pH?
- the negative logarithm of the hydrogen ion concentration
 - the positive logarithm of the hydrogen ion concentration
 - the negative logarithm of the hydroxide ion concentration
 - the positive logarithm of the hydroxide ion concentration
- ____ 22. Which type of solution is one with a pH of 8?
- acidic
 - basic
 - neutral
 - The type varies, depending on the solution.
- ____ 23. Which of these solutions is the most basic?
- $[\text{H}^+] = 1 \times 10^{-2} M$
 - $[\text{OH}^-] = 1 \times 10^{-4} M$
 - $[\text{H}^+] = 1 \times 10^{-11} M$
 - $[\text{OH}^-] = 1 \times 10^{-13} M$

- ____ 24. What characterizes a strong acid or base?
- polar covalent bonding
 - complete ionization in water
 - ionic bonding
 - presence of a hydroxide or hydrogen ion
- ____ 25. With solutions of strong acids and strong bases, the word *strong* refers to ____.
- normality
 - molarity
 - solubility
 - degree of ionization
- ____ 26. The process of adding a known amount of solution of known concentration to determine the concentration of another solution is called ____.
- neutralization
 - hydrolysis
 - titration
 - buffer capacity

Short Answer

27. If the pH is 9, what is the concentration of hydroxide ion?
28. If the hydroxide-ion concentration is $1 \times 10^{-12} M$, what is the pH of the solution?
29. If the hydrogen-ion concentration is $1 \times 10^{-13} M$, what is the pOH of the solution?
30. What is the hydrogen-ion concentration if the pH is 3.7?
31. What is the pH if the hydrogen-ion concentration is $6.8 \times 10^{-7} M$?

Numeric Response

32. If the hydrogen ion concentration is $10^{-7} M$, what is the pH of the solution?
33. If the hydroxide ion concentration is $10^{-10} M$, what is the pH of the solution?
34. If $[OH^-] = 1 \times 10^{-4} M$, what is the pH of the solution?
35. What is the pH of a solution with a concentration of $0.01 M$ hydrochloric acid?

