



Chemistry

Name: _____

Section _____ ACIDS AND BASES WS Date: _____

Directions (1-13): For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Some questions may require the use of the 2011 Edition Reference Tables for Physical Setting/Chemistry.

- 1 According to Arrhenius theory, acids form which ion in water?
(1) acetate (3) chloride
 (2) hydrogen (4) sodium
- 2 As 1 g of sodium hydroxide dissolves in 100 g of water, the conductivity of the water
(1) decreases
 (2) increases
(3) remains the same
- 3 According to Arrhenius theory, citric acid in oranges and acetic acid in vinegar are classified as acids because their aqueous solutions contain
 (1) H^+ ions (3) OH^- ions
(2) H_2 atoms (4) OH^- atoms
- 4 Which of the following is an Arrhenius acid?
(1) C_2H_5OH (3) KH
 (2) CH_3COOH (4) KOH
- 5 1.0-molar solutions of which of the following would have the highest OH^- concentration?
(1) H_2SO_4 (3) KNO_3
(2) NH_4Cl (4) $NaOH$
- 6 If 1 mol of each of the following substances were dissolved in 1 L of water, which solution would have the highest H_3O^+ ion concentration?
 (1) CH_3COOH (3) KBr
(2) $NaCl$ (4) $Ba(OH)_2$
- 7 Which compound is an electrolyte?
(1) $C_6H_{12}O_6$ (3) C_2H_5OH
(2) $C_{12}H_{22}O_{11}$ (4) CH_3COOH
- 8 Which is the only negative ion present when an Arrhenius base is dissolved in water?
 (1) OH^- (3) H^-
(2) H_3O^- (4) O^{2-}
- 9 When substance X is dissolved in water, the only positive ions in the solution are hydrogen ions. Substance X could be
(1) $NaOH$ (3) H_2S
(2) NaH (4) NH_3
- 10 Which species is classified as an Arrhenius base?
(1) CH_3OH (3) PO_4^{3-}
 (2) $LiOH$ (4) CO_3^{2-}
- 11 A solution of a base differs from a solution of an acid in that the solution of base
(1) is able to conduct electricity
(2) is able to cause an indicator color change
(3) has a greater $[H_3O^+]$
 (4) has a greater $[OH^-]$
- 12 An HCl solution is a stronger acid than a solution of $HC_2H_3O_2$ of the same concentration because
 (1) it has more hydrogen ions in solution
(2) it has more hydroxide ions in solution
(3) it has fewer hydrogen ions in solution
(4) it has fewer positive ions in solution
- 13 When an Arrhenius acid is dissolved in water, it produces
 (1) H^+ as the only positive ions in solution
(2) NH_4^+ as the only positive ions in solution
(3) OH^- as the only negative ions in solution
(4) HCO_3^- as the only negative ions in solution
- 14 A student tests the conductivity of an unknown substance and determines it to be a good conductor of electricity. Based on this, he decides that it is an acid. Is there enough evidence to warrant this conclusion? What additional tests could be performed to confirm this conclusion? For each test, indicate the result that would verify the substance to be an acid.

The conductivity shows the substance to be an electrolyte. Add bromthymol blue, yellow indicates an acid, green indicates a salt, and blue indicates a base.

Explanations of the multiple choice answers:

1. Definition of Arrhenius acid: a substance that produces H^+ ions as the only positive ions in a water solution.
2. Acids and bases are electrolytes. Electrolytes dissolve in water to produce ions that can carry electric current.
3. Definition of Arrhenius acid: a substance that produces H^+ ions as the only positive ions in a water solution.
4. Check Table K.
5. Definition of Arrhenius base: a substance that produces OH^- ions as the only negative ions in a water solution.
6. H_3O^+ , the hydronium ion, another way to write $\text{H}^+_{(\text{aq})}$ ions. Check Table K for acids.
7. Acids and bases are electrolytes. (1) and (2) are sugars. (3) is an alcohol. (4) is an acid, see Table K.
8. Definition of Arrhenius base: a substance that produces OH^- ions as the only negative ions in a water solution.
9. Definition of Arrhenius acid, H_2S is the only substance that starts with H^+ and ends with a nonmetallic ion.
10. Definition of Arrhenius base. LiOH is the only option that begins with a metal ion and ends with an OH^- ion
11. Definition of an Arrhenius base.
12. Definition of a strong acid (ionizes 100%). The only strong acids on Table K are HCl , HNO_3 , and H_2SO_4
13. Definition of an Arrhenius acid.