

1. Which two compounds are electrolytes?

- A) $C_6H_{12}O_6$ and CH_3CH_2OH
- B) $C_6H_{12}O_6$ and HCl
- C) $NaOH$ and HCl
- D) $NaOH$ and CH_3CH_2OH

2. A student tested a 0.1 M aqueous solution and made the following observations:

- conducts electricity
- turns blue litmus to red
- reacts with $Zn(s)$ to produce gas bubbles

Which compound could be the solute in this solution?

- A) CH_3OH
- B) $LiBr$
- C) HBr
- D) $LiOH$

3. Which 0.1 M solution contains an electrolyte?

- A) $C_6H_{12}O_6(aq)$
- B) $CH_3COOH(aq)$
- C) $CH_3OH(aq)$
- D) $CH_3OCH_3(aq)$

4. Which sample of HCl most readily conducts electricity?

- A) $HCl(s)$
- B) $HCl(\ell)$
- C) $HCl(g)$
- D) $HCl(aq)$

5. When dissolved in water, an Arrhenius base yields

- A) hydrogen ions
- B) hydronium ions
- C) hydroxide ions
- D) oxide ions

6. Which compound is an Arrhenius acid?

- A) CaO
- B) HCl
- C) K_2O
- D) NH_3

7. When one compound dissolves in water, the only positive ion produced in the solution is $H_3O^+(aq)$. This compound is classified as

- A) a salt
- B) a hydrocarbon
- C) an Arrhenius acid
- D) an Arrhenius base

8. According to the Arrhenius theory, an acid is a substance that

- A) changes litmus from red to blue
- B) changes phenolphthalein from colorless to pink
- C) produces hydronium ions as the only positive ions in an aqueous solution
- D) produces hydroxide ions as the only negative ions in an aqueous solution

9. Which formula represents a hydronium ion?

- A) H_3O^+
- B) NH_4^+
- C) OH^-
- D) HCO_3^-

10. The compound $NaOH(s)$ dissolves in water to yield

- A) hydroxide ions as the only negative ions
- B) hydroxide ions as the only positive ions
- C) hydronium ions as the only negative ions
- D) hydronium ions as the only positive ions

11. Which chemical equation represents the reaction of an Arrhenius acid and an Arrhenius base?

- A) $HC_2H_3O_2(aq) + NaOH(aq) \rightarrow NaC_2H_3O_2(aq) + H_2O(\ell)$
- B) $C_3H_8(g) + 5 O_2(g) \rightarrow 3 CO_2(g) + 4 H_2O(\ell)$
- C) $Zn(s) + 2 HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$
- D) $BaCl_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s) + 2 NaCl(aq)$

12. A solution with a pH of 11 is first tested with phenolphthalein and then with litmus. What is the color of each indicator in this solution?

- A) Phenolphthalein is colorless and litmus is blue.
- B) Phenolphthalein is colorless and litmus is red.
- C) Phenolphthalein is pink and litmus is blue.
- D) Phenolphthalein is pink and litmus is red.

13. Water containing phenolphthalein will change from colorless to pink with the addition of

- A) HOH
- B) HCl
- C) KOH
- D) KCl

14. A student records the following observations about an unknown solution:

- conducts electricity
- turns blue litmus red

The student should conclude that the unknown solution is most likely

- A) an acid
- B) a base
- C) an ester
- D) an alcohol

15. An aqueous solution turns litmus red. The pH of this solution could be

- A) 14
- B) 11
- C) 8
- D) 5

16. Which pH indicates a basic solution?

- A) 1
- B) 5
- C) 7
- D) 12

17. Which of these pH numbers indicates the highest level of acidity?

- A) 5
- B) 8
- C) 10
- D) 12

18. Which products are formed when an acid reacts with a base?

- A) an alcohol and carbon dioxide
- B) an ester and water
- C) a soap and glycerine
- D) a salt and water