

- Which type of substance yields hydrogen ions,  $H^+$ , in an aqueous solution?
  - an Arrhenius acid
  - an Arrhenius base
  - a saturated hydrocarbon
  - an unsaturated hydrocarbon
- What can be explained by the Arrhenius theory?
  - the behavior of many acids and bases
  - the effect of stress on a phase equilibrium
  - the operation of an electrochemical cell
  - the spontaneous decay of some nuclei
- Which compounds are classified as Arrhenius acids?
  - $HCl$  and  $NaOH$
  - $HNO_3$  and  $NaCl$
  - $NH_3$  and  $H_2CO_3$
  - $HBr$  and  $H_2SO_4$
- When dissolved in water, an Arrhenius base yields
  - hydrogen ions
  - hydronium ions
  - hydroxide ions
  - oxide ions
- Potassium hydroxide is classified as an Arrhenius base because  $KOH$  contains
  - $OH^-$  ions
  - $O^{2-}$  ions
  - $K^+$  ions
  - $H^+$  ions
- Which compound is an Arrhenius acid?
  - $CaO$
  - $HCl$
  - $K_2O$
  - $NH_3$
- Which compound when dissolved in water is an Arrhenius acid?
  - $CH_3OH$
  - $HCl$
  - $NaCl$
  - $NaOH$
- When one compound dissolves in water, the only positive ion produced in the solution is  $H_3O^+$  (aq). This compound is classified as
  - a salt
  - a hydrocarbon
  - an Arrhenius acid
  - an Arrhenius base
- The only positive ion found in  $H_2SO_4(aq)$  is the
  - ammonium ion
  - hydronium ion
  - hydroxide ion
  - sulfate ion
- An aqueous solution of lithium hydroxide contains hydroxide ions as the only negative ion in the solution. Lithium hydroxide is classified as an
  - aldehyde
  - alcohol
  - Arrhenius acid
  - Arrhenius base
- The Arrhenius theory explains the behavior of
  - acids and bases
  - alcohols and amines
  - isomers and isotopes
  - metals and nonmetals
- According to the Arrhenius theory, an acid is a substance that
  - changes litmus from red to blue
  - changes phenolphthalein from colorless to pink
  - produces hydronium ions as the only positive ions in an aqueous solution
  - produces hydroxide ions as the only negative ions in an aqueous solution
- Which compound releases hydroxide ions in an aqueous solution?
  - $CH_3COOH$
  - $CH_3OH$
  - $HCl$
  - $KOH$
- Which substance is an Arrhenius acid?
  - $Ba(OH)_2$
  - $CH_3COOCH_3$
  - $H_3PO_4$
  - $NaCl$
- Which compound is an Arrhenius acid?
  - $H_2SO_4$
  - $KCl$
  - $NaOH$
  - $NH_3$
- Which formula represents a hydronium ion?
  - $H_3O^+$
  - $NH_4^+$
  - $OH^-$
  - $HCO_3^-$
- An Arrhenius base yields which ion as the only negative ion in an aqueous solution?
  - hydride ion
  - hydrogen ion
  - hydronium ion
  - hydroxide ion

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18. Which two formulas represent Arrhenius acids?

- A)  $\text{CH}_3\text{COOH}$  and  $\text{CH}_3\text{CH}_2\text{OH}$
- B)  $\text{HC}_2\text{H}_3\text{O}_2$  and  $\text{H}_3\text{PO}_4$
- C)  $\text{KHCO}_3$  and  $\text{KHSO}_4$
- D)  $\text{NaSCN}$  and  $\text{Na}_2\text{S}_2\text{O}$

19. Which ion is the only negative ion produced by an Arrhenius base in water?

- A)  $\text{NO}_3^-$  B)  $\text{Cl}^-$  C)  $\text{OH}^-$  D)  $\text{H}^-$

20. The compound  $\text{NaOH}(s)$  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

21. When an Arrhenius acid dissolves in water, the only positive ion in the solution is

- A)  $\text{H}^+$  B)  $\text{Li}^+$  C)  $\text{Na}^+$  D)  $\text{K}^+$

22. The compound  $\text{HNO}_3$  can be described as an

- A) Arrhenius acid and an electrolyte
- B) Arrhenius acid and a nonelectrolyte
- C) Arrhenius base and an electrolyte
- D) Arrhenius base and a nonelectrolyte

23. Which compound is an Arrhenius base?

- A)  $\text{CH}_3\text{OH}$  B)  $\text{CO}_2$
- C)  $\text{LiOH}$  D)  $\text{NO}_2$

24. Hydrogen chloride,  $\text{HCl}$ , is classified as an Arrhenius acid because it produces

- A)  $\text{H}^+$  ions in aqueous solution
- B)  $\text{Cl}^-$  ions in aqueous solution
- C)  $\text{OH}^-$  ions in aqueous solution
- D)  $\text{NH}_4^+$  ions in aqueous solution

25. A sample of  $\text{Ca}(\text{OH})_2$  is considered to be an Arrhenius base because it dissolves in water to yield

- A)  $\text{Ca}^{2+}$  ions as the only positive ions in solution
  - B)  $\text{H}_3\text{O}^+$  ions as the only positive ions in solution
  - C)  $\text{OH}^-$  ions as the only negative ions in solution
  - D)  $\text{H}^-$  ions as the only negative ions in solution
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