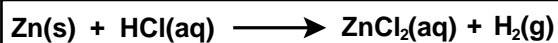


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Refer to the diagram below to answer questions 1–6.



- 1 The skeleton equation represents a chemical reaction. Which of these are the reactants?
- A Zn and HCl
 - B ZnCl_2 and H_2
 - C HCl and ZnCl_2
 - D Zn and H_2
- 2 The skeleton equation for this chemical reaction violates the law of conservation of mass. Which of these is the correct balanced chemical equation?
- A $2\text{Zn(s)} + \text{HCl(aq)} \longrightarrow 2\text{ZnCl}_2\text{(aq)} + \text{H}_2\text{(g)}$
 - B $\text{Zn(s)} + 2\text{HCl(aq)} \longrightarrow \text{ZnCl}_2\text{(aq)} + 2\text{H}_2\text{(g)}$
 - C $\text{Zn(s)} + 2\text{HCl(aq)} \longrightarrow \text{ZnCl}_2\text{(aq)} + \text{H}_2\text{(g)}$
 - D $2\text{Zn(s)} + 2\text{HCl(aq)} \longrightarrow 2\text{ZnCl}_2\text{(aq)} + \text{H}_2\text{(g)}$
- 3 The chemical reaction represented by the equation would be classified as a —
- A synthesis reaction
 - B decomposition reaction
 - C single-replacement reaction
 - D double-replacement reaction
- 4 HCl(aq) and $\text{ZnCl}_2\text{(aq)}$ both exist as ions in aqueous solutions. Which of these is the complete ionic equation for this chemical reaction?
- A $\text{Zn(aq)} + 2\text{H}^+\text{(aq)} + \text{Cl}^-\text{(aq)} \longrightarrow \text{Zn}^{2+}\text{(aq)} + \text{Cl}^-\text{(aq)} + \text{H}_2\text{(g)}$
 - B $\text{Zn(s)} + 2\text{H}^+\text{(aq)} + 2\text{Cl}^-\text{(aq)} \longrightarrow \text{Zn}^{2+}\text{(aq)} + 2\text{Cl}^-\text{(aq)} + \text{H}_2\text{(g)}$
 - C $2\text{Zn(s)} + \text{H}^+\text{(aq)} + \text{Cl}^-\text{(aq)} \longrightarrow 2\text{Zn}^{2+}\text{(aq)} + \text{Cl}^-\text{(aq)} + \text{H}_2\text{(g)}$
 - D $\text{Zn(aq)} + 2\text{H}^+\text{(aq)} + 2\text{Cl}^-\text{(aq)} \longrightarrow \text{Zn}^{2+}\text{(s)} + \text{Cl}^-\text{(aq)} + 2\text{H}_2\text{(g)}$



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5 Which of these is a spectator ion in this chemical reaction?

- A $\text{Cl}^{-}(\text{aq})$
- B $\text{H}^{+}(\text{aq})$
- C $\text{H}_2(\text{g})$
- D $\text{Zn}^{2+}(\text{aq})$

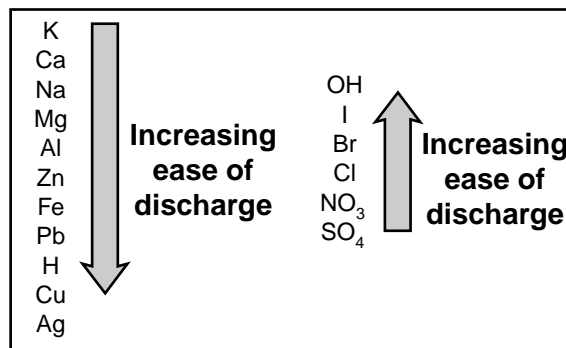
6 Which of these is the net ionic equation for this chemical reaction?

- A $\text{Zn}(\text{s}) + 2\text{Cl}^{-}(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq})$
- B $\text{Zn}^{2+}(\text{aq}) + 2\text{H}^{+}(\text{aq}) \rightarrow \text{Zn}(\text{s}) + \text{H}_2(\text{g})$
- C $2\text{H}^{+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq}) \rightarrow 2\text{HCl}(\text{aq})$
- D $\text{Zn}(\text{s}) + 2\text{H}^{+}(\text{aq}) \rightarrow \text{Zn}^{2+}(\text{aq}) + \text{H}_2(\text{g})$

7 Which of these is NOT evidence of a chemical reaction?

- A An iron nail changes to a brownish-orange color.
- B An ice cube melts into liquid water.
- C An antacid tablet produces bubbles of gas when placed in water.
- D A piece of zinc raises the temperature of an acid as it reacts with it.

Use the diagram below to answer question 8.



8 The diagram shows the activity series of some metals (left) and nonmetals (right). A student set up four beakers, each containing 100 mL of dilute hydrochloric acid ($\text{HCl}[\text{aq}]$). She added 5 g of a metal to each beaker in this order: aluminum (Al), copper (Cu), sodium (Na), and zinc (Zn). Which metal will NOT react with the acid?

- A Aluminum
- B Copper
- C Sodium
- D Zinc

