



# Standardized Test Prep

Answer the following items on a separate piece of paper.

## MULTIPLE CHOICE

- Acetic acid is a weak electrolyte because it
  - is miscible with water.
  - forms hydronium and hydroxide ions in aqueous solution.
  - lowers the freezing point of water.
  - ionizes only slightly in aqueous solution.
- Which of the following solutions would contain the highest concentration of hydronium ions,  $\text{H}_3\text{O}^+$ ?
  - 0.10 M HCl
  - 0.10 M HF
  - 0.10 M  $\text{CH}_3\text{COOH}$
  - 0.10 M NaCl
- Which of the following is the best representation of the precipitation reaction that occurs when aqueous solutions of sodium carbonate and calcium chloride are mixed?
  - $\text{Na}^+(aq) + \text{Cl}^-(aq) \longrightarrow 2\text{NaCl}(s)$
  - $2\text{Na}^+(aq) + \text{CO}_3^{2-}(aq) + \text{Ca}^{2+}(aq) + 2\text{Cl}^-(aq) \longrightarrow \text{CaCO}_3(s) + 2\text{NaCl}(s)$
  - $\text{Ca}^{2+}(aq) + \text{CO}_3^{2-}(aq) \longrightarrow \text{CaCO}_3(s)$
  - No precipitation reaction occurs.
- Which of the following is *not* a colligative property?
  - molality
  - vapor-pressure lowering
  - boiling-point elevation
  - osmotic pressure
- Solution A contains 0.1 mol of sucrose,  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ , dissolved in 500 g of water. Solution B contains 0.1 mol of sodium chloride, NaCl, in 500 g of water. Which of the following statements about these solutions is true?
  - Both solutions have the same vapor pressure.
  - Solution A would boil at a higher temperature than solution B would.
  - Solution A would freeze at a higher temperature than solution B would.
  - Both solutions would boil at the same temperature.

The table below shows the freezing points of solutions of three nonvolatile solutes, X, Y, and Z, in water. Refer to the table to answer items 6 and 7. The  $K_f$  for water is  $-1.86^\circ\text{C}/m$ .

Solute	Solute (mol)	Water (g)	Freezing point ( $^\circ\text{C}$ )
X	1.00	1000	-5.58
Y	1.00	1000	-1.86
Z	1.00	1000	-3.72

- Which of the following statements is *not* true?
  - All three solutes are nonelectrolytes.
  - Solute X could be  $\text{Ca}(\text{NO}_3)_2$ .
  - Solute Y could be sucrose.
  - Solute Z could be KCl.
- Which of the solutions described in the table would have the highest boiling point?
  - the solution of solute X
  - the solution of solute Y
  - the solution of solute Z
  - All three solutions would have the same boiling point.

## SHORT ANSWER

- An aqueous solution of an unknown quantity of a nonelectrolyte solute is found to have a freezing point of  $-0.58^\circ\text{C}$ . What is the molal concentration of the solution?
- Give the names and formulas of two strong electrolytes.

## EXTENDED RESPONSE

- Write the formula equation, the overall ionic equation, and the net ionic equation for the precipitation reaction that occurs when solutions of zinc chloride,  $\text{ZnCl}_2$ , and sodium sulfide,  $\text{Na}_2\text{S}$ , are mixed.
- Distinguish between dissociation and ionization. Write one chemical equation to illustrate each of these terms.

### Test TIP

Before choosing an answer to a question, try to answer the question without looking at the answer choices on the test.