Net Ionic Equations & Precipitation

INSTRUCTOR / SELF-STUDY ANSWER KEY

Answers and reasoning appear in red. Use these to discuss why incorrect choices are incorrect.

Part A — Concept checks

1. **Which ions are spectators in $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$?**

   Answer: B. Na^+ and NO_3^- — Na^+ and nitrate occur unchanged on both sides.

2. **Which substance is not dissociated in a complete ionic equation?**

   Answer: C. AgCl(s) — An insoluble solid remains a formula unit.

3. **Which substance is generally soluble in water?**

   Answer: C. $NaNO_3$ — All sodium salts and nitrates are generally soluble.

4. **A valid net ionic equation must balance…**

   Answer: C. atoms and charge — Both conservation requirements must be met.

5. **What is the net ionic equation for HCl(aq) + NaOH(aq)?**

   Answer: A. $H^+ + OH^- \rightarrow H_2O$ — For strong acid/strong base neutralization, $H^+ + OH^- \rightarrow H_2O$.

6. **What remains after spectator ions are cancelled?**

   Answer: C. only species involved in net chemical change — The net ionic equation includes only changing species.

Part B — Application and explanation

7. Mix aqueous $AgNO_3$ and NaCl. Write the net ionic equation.

   Model solution: $AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$. Dissociate the soluble salts and cancel Na^+ and NO_3^-. Final answer: $Ag^+(aq) + Cl^-(aq) \rightarrow AgCl(s)$

8. Explain why this guideline matters, with an example of what could go wrong if you ignore it: A solid precipitate stays intact in an ionic equation. Cancelling a reacting ion is not allowed.

   Model explanation: A solid precipitate stays intact in an ionic equation. Cancelling a reacting ion is not allowed. Example/check: Use solubility guidelines to determine which products remain aqueous and which form a precipitate; nitrates and alkali-metal salts are generally soluble.

REFERENCE RELATIONSHIP

molecular → complete ionic → cancel spectators → net ionic