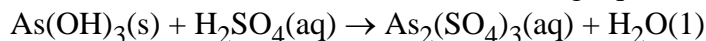


1. What is the coefficient for water when the following equation is balanced?



[A] 6 [B] 12 [C] 4 [D] 1 [E] 2

2. The net ionic equation for the reaction of aluminum sulfate and sodium hydroxide contains which of the following species?

[A] $3\text{OH}^-(\text{aq})$ [B] $2\text{Al}^{3+}(\text{aq})$ [C] $\text{OH}^-(\text{aq})$ [D] $2\text{Al}(\text{OH})_3(\text{s})$ [E] $3\text{Al}^{3+}(\text{aq})$

3. The net ionic equation for the reaction of calcium bromide and sodium phosphate contains which of the following species?

[A] $\text{Ca}^{2+}(\text{aq})$ [B] $\text{PO}_4^{3-}(\text{aq})$ [C] $2\text{Ca}_3(\text{PO}_4)_2(\text{s})$
[D] $6\text{NaBr}(\text{aq})$ [E] $3\text{Ca}^{2+}(\text{aq})$

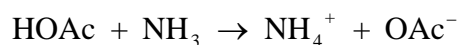
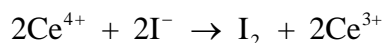
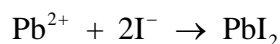
4. Which of the following is *not* a strong base?

[A] NH_3 [B] $\text{Ca}(\text{OH})_2$ [C] LiOH [D] KOH [E] $\text{Sr}(\text{OH})_2$

5. When solutions of cobalt(II) chloride and carbonic acid react, which of the following terms will be present in the net ionic equation?

[A] $2\text{CoCO}_3(\text{s})$ [B] $2\text{Cl}^-(\text{aq})$ [C] $\text{CoCO}_3(\text{s})$ [D] $\text{H}^+(\text{aq})$ [E] two of these

6. The following reactions:



are examples of

[A] unbalanced reactions. [B] acid-base reactions.
[C] precipitation, acid-base, and redox reactions, respectively.
[D] redox, acid-base, and precipitation reactions, respectively.
[E] precipitation, redox, and acid-base reactions, respectively.

- In writing the total ionic equation for the reaction (if any) that occurs when aqueous solutions of KOH and $\text{Mg}(\text{NO}_3)_2$ are mixed, which of the following would *not* be written as ionic species?
[A] KOH [B] KNO_3 [C] $\text{Mg}(\text{NO}_3)_2$
[D] $\text{Mg}(\text{OH})_2$ [E] All of these would be written as ionic species.
- Aqueous solutions of barium chloride and silver nitrate are mixed to form solid silver chloride and aqueous barium nitrate.
The balanced complete ionic equation contains which of the following terms?
[A] $2\text{Ag}^+(\text{aq})$ [B] $2\text{Ba}^{2+}(\text{aq})$ [C] $3\text{NO}_3^-(\text{aq})$ [D] $\text{Cl}^-(\text{aq})$ [E] $\text{NO}_3^-(\text{aq})$
- Which of the following salts is insoluble in water?
[A] Na_2S [B] K_3PO_4 [C] CaCl_2
[D] $\text{Pb}(\text{NO}_3)_2$ [E] All of these are soluble in water.
- Which of the following ions is most likely to form an insoluble sulfate?
[A] Li^+ [B] K^+ [C] Ca^{2+} [D] Cl^- [E] S^{2-}
- In the balanced molecular equation for the neutralization of sodium hydroxide with sulfuric acid, the products are:
[A] $\text{NaSO}_4 + \text{H}_2\text{O}$ [B] $\text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$ [C] $2\text{NaSO}_4 + \text{H}_2\text{O}$
[D] $\text{Na}_2\text{S} + 2\text{H}_2\text{O}$ [E] $\text{NaSO}_3 + 2\text{H}_2\text{O}$
- The following reactions
$$\text{ZnBr}_2(\text{aq}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Zn}(\text{NO}_3)_2(\text{aq}) + 2\text{AgBr}(\text{s})$$
$$\text{KBr}(\text{aq}) + \text{AgNO}_3(\text{aq}) \rightarrow \text{AgBr}(\text{s}) + \text{KNO}_3(\text{aq})$$
are examples of
[A] oxidation-reduction reactions. [B] acid-base reactions.
[C] precipitation reactions. [D] a and c [E] none of these
- All of the following are weak acids *except*
[A] HNO_2 [B] HBr [C] HF [D] HCN [E] HCNO

14. When sodium chloride and lead(II) nitrate react in an aqueous solution, which of the following terms will be present in the balanced molecular equation?

[A] $\text{Pb}_2\text{Cl}(\text{s})$ [B] $2\text{NaNO}_3(\text{aq})$ [C] $2\text{PbCl}_2(\text{s})$ [D] $\text{PbCl}(\text{s})$ [E] $\text{NaNO}_3(\text{aq})$

15. When solutions of phosphoric acid and iron(III) nitrate react, which of the following terms will be present in the balanced molecular equation?

[A] $2\text{HNO}_3(\text{aq})$ [B] $3\text{HNO}_3(\text{aq})$ [C] $2\text{FePO}_4(\text{s})$

[D] $3\text{FePO}_4(\text{s})$ [E] $\text{HNO}_3(\text{aq})$

Reference: 3.7

[1] [A]

Reference: 4.6,8

[2] [A]

Reference: 4.6,8

[3] [E]

Reference: 4.2

[4] [A]

Reference: 4.5,6

[5] [C]

Reference: 4.4-9

[6] [E]

Reference: 4.4,6

[7] [D]

Reference: 4.5,6

[8] [A]

Reference: 4.5

[9] [E]

Reference: 4.5

[10] [C]

Reference: 4.6,8

[11] [B]

Reference: 4.4-9

[12] [C]

Reference: 4.2

[13] [B]

Reference: 4.5,6

[14] [B]

Reference: 4.5,6

[15] [B]