

Questions 1-4 refer to the following information.

Salts containing halide anions are soluble except for those containing Ag^+ , Pb^{2+} , and Hg_2^{2+} .

Salts containing carbonate anions are insoluble except for those containing alkali metals or ammonium.

1. If solutions of iron (III) nitrate and sodium carbonate are mixed, what would be the formula of the precipitate?

- A. Fe_3CO_3
- B. $\text{Fe}_2(\text{CO}_3)_3$
- C. NaNO_3
- D. No precipitate would form.

2. If solutions containing equal amounts of AgNO_3 and KCl are mixed, what is the identity of the spectator ions?

- A. Ag^+ , NO_3^- , K^+ , and Cl^-
- B. Ag^+ and Cl^-
- C. K^+ and Ag^+
- D. K^+ and NO_3^-

3. If equimolar solutions of $\text{Pb}(\text{NO}_3)_2$ and NaCl are mixed, which ion will NOT be present in significant amounts in the resulting solution after equilibrium is established?

- A. Pb^{2+}
- B. NO_3^-
- C. Na^+
- D. Cl^-

4. Choose the correct net ionic equation representing the reaction that occurs when solutions of potassium carbonate and copper (I) chloride are mixed.

- A. $\text{K}_2\text{CO}_3(\text{aq}) + 2\text{CuCl}(\text{aq}) \rightarrow 2\text{KCl}(\text{aq}) + \text{Cu}_2\text{CO}_3(\text{s})$
- B. $\text{K}_2\text{CO}_3(\text{aq}) + 2\text{CuCl}(\text{aq}) \rightarrow 2\text{KCl}(\text{s}) + \text{Cu}_2\text{CO}_3(\text{aq})$
- C. $\text{CO}_3^{2-} + 2\text{Cu}^+ \rightarrow \text{Cu}_2\text{CO}_3(\text{s})$
- D. $\text{CO}_3^{2-} + \text{Cu}^{2+} \rightarrow \text{CuCO}_3(\text{s})$

5. A strip of metal X is placed into a solution containing Y^{2+} ions and no reaction occurs. When metal X is placed in a separate solution containing Z^{2+} ions, metal Z starts to form on the strip. Which of the following choices organizes the reduction potentials for metals X, Y, and Z from greatest to least?

- A. $X > Y > Z$
- B. $Y > Z > X$
- C. $Z > X > Y$
- D. $Y > X > Z$

6. In which of the following compounds is the oxidation number of chromium the greatest?

- A. CrO_4^{2-}
- B. CrO
- C. Cr^{3+}
- D. $Cr(s)$

7. What is the mass of oxygen in 148 grams of calcium hydroxide ($Ca(OH)_2$)?

- A. 24 grams
- B. 32 grams
- C. 48 grams
- D. 64 grams

8. A sample of a compound known to consist of only carbon, hydrogen, and oxygen is found to have a total mass of 29.05 g. If the mass of the carbon is 18.02 g and the mass of the hydrogen is 3.03 g, what is the empirical formula of the compound?

- A. C_2H_4O
- B. C_3H_6O
- C. $C_2H_6O_3$
- D. $C_3H_8O_2$

Questions 9-11 refer to the following information.

When heated in a closed container in the presence of a catalyst, potassium chlorate decomposes into potassium chloride and oxygen gas via the following reaction:



9. If 12.25 g of potassium chlorate decomposes, how many grams of oxygen gas will be generated?

- A. 1.60 g
- B. 3.20 g
- C. 4.80 g
- D. 18.37 g

10. Approximately how many liters of oxygen gas will be evolved at STP?

- A. 2.24 L
- B. 3.36 L
- C. 4.48 L
- D. 22.4 L

11. If the temperature of the gas is doubled while the volume is held constant, what will happen to the pressure exerted by the gas and why?

- A. It will also double, because the gas molecules will be moving faster.
- B. It will also double, because the gas molecules are exerting a greater force on each other.
- C. It will be cut in half, because the molecules will lose more energy when colliding.
- D. It will increase by a factor of 4, because the kinetic energy will be four times greater.