Non Sibi High School

Andover's Chem 550/580: Advanced Chemistry

Chapter 10, Review Quiz 1 Answers

1

Write a balanced equation for the combustion of each compound below using the smallest possible whole-number coefficients:

a. butane
b. pentanol
c. C_6H_5SH

a. $2C_4H_{10} + 13O_2 \longrightarrow 8CO_2 + 10H_2O$
b. $2C_5H_{11}OH + 15O_2 \longrightarrow 10CO_2 + 12H_2O$
c. $2C_6H_5SH + 17O_2 \longrightarrow 12CO_2 + 6H_2O + 2SO_2$

2

Write a balanced equation for each reaction described below using the smallest possible whole-number coefficients:

a. lithium oxide reacts with water
b. potassium carbonate decomposes upon heating
c. aluminum metal reacts with chlorine gas
d. cesium metal reacts with water

a. $Li_2O + H_2O \longrightarrow 2Li^+ + 2OH^-$
b. $K_2CO_3 \longrightarrow K_2O + CO_2$
c. $2Al + 3Cl_2 \longrightarrow 2AlCl_3$
d. $2Cs + 2H_2O \longrightarrow 2Cs^+ + 2OH^- + H_2$

3

What is the molarity of each ion in the following solutions?

a. 0.032 M $CrCl_3$

b. 0.12 M $(NH_4)_2SO_4$

a. 0.032 M Cr^{3+} and 0.096 M Cl^-
b. 0.24 M $NH_4{}^+$ and 0.12 M $SO_4{}^{2-}$

4

Indicate if any of the combinations below yield no reaction and also write a balanced net ionic equation, including states of matter, for any combinations that do yield a precipitate:

a. $Cu(NO_3)_2(aq) + K_3PO_4(aq)$
b. $Pb(CH_3COO)_2(aq) + NaCl(aq)$
c. aqueous lithium chloride + aqueous ammonium bromide
d. aqueous iron(III) nitrate + aqueous potassium chromate

a. $3Cu^{2+}(aq) + 2PO_4{}^{3-}(aq) \longrightarrow Cu_3(PO_4)_2(s)$
b. $Pb^{2+}(aq) + 2Cl^-(aq) \longrightarrow PbCl_2(s)$
c. no reaction
d. a. $2Fe^{3+}(aq) + 3CrO_4{}^{2-}(aq) \longrightarrow Fe_2(CrO_4)_3(s)$

5

Write a balanced molecular equation, including states of matter, for the reaction between solutions of sulfuric acid and potassium hydroxide.

$$H_2SO_4(aq) + 2KOH(aq) \longrightarrow 2H_2O(l) + K_2SO_4(aq)$$

6

How many milliliters of 0.117 M strontium hydroxide are required to titrate 32.5 mL of 0.146 M acetic acid?

$$Sr(OH)_2(aq) + 2HCH_3COO(aq) \longrightarrow 2H_2O(l) + Sr(CH_3COO)_2(aq)$$

$$0.0325\,\text{L}\left(\frac{0.146\,\text{mol}\,HCH_3COO}{1\,\text{L}}\right)\left(\frac{1\,\text{mol}\,Sr(OH)_2}{2\,\text{mol}\,HCH_3COO}\right)\left(\frac{1\,\text{L}}{0.117\,\text{mol}\,HCH_3COO}\right)\left(\frac{1000\,\text{mL}}{1\,\text{L}}\right) = 20.3\,\text{mL}$$

Contact: kcardozo@andover.edu