ST4
Practice

More Particle Model and Balancing Equations

1. Which of the following chemical equations is balanced correctly?

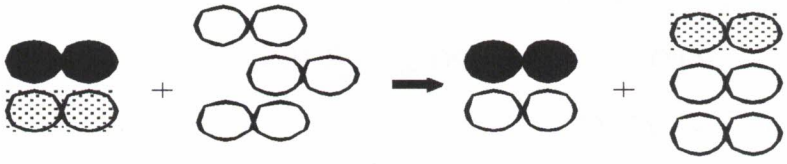
A) $5\ HI + HIO_3 \rightarrow 3\ H_2O + 3\ I_2$
B) $HI + 6\ HIO_3 \rightarrow 3\ H_2O + I_2$
C) $HI + HIO_3 \rightarrow H_2O + I_2$
D) $6\ HI + HIO_3 \rightarrow 3\ H_2O + 3\ I_2$

2. Galena is an ore that contains lead sulfide (PbS). To extract lead from galena, the ore is first heated in the presence of dioxygen (O_2). The balanced equation of this reaction is :

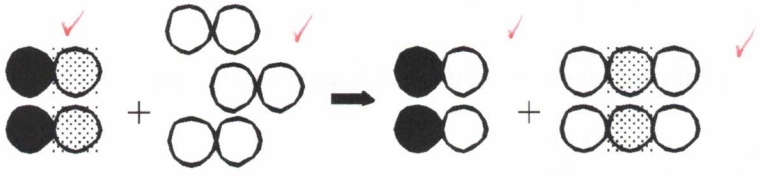
$$2\ PbS + 3\ O_2 \rightarrow 2\ PbO + 2\ SO_2$$

Which of the models below represents this reaction?
lead : ● sulfur : ▒ oxygen : ○

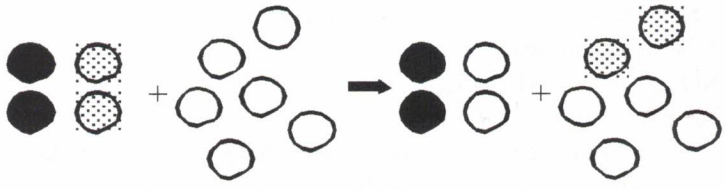
A)



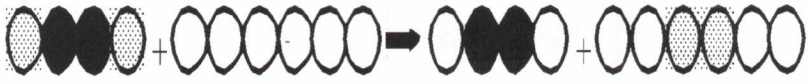
B)



C)



D)



3. Which of the following chemical equations is correctly balanced?

A) $CH_4 + O_2 \rightarrow CO_2 + 2\ H_2O$
B) $2\ Na + H_2O \rightarrow 2\ NaOH + H_2$
C) $V_2O_5 + 5\ CaS \rightarrow 5\ CaO + V_2S_5$
D) $NaBr + Pb(ClO_4)_2 \rightarrow NaClO_4 + PbBr_2$

4. The following is the unbalanced equation for a chemical reaction involving iron (Fe) and water (H_2O):

$$2Fe + 3H_2O \rightarrow Fe_2O_3 + 3H_2$$

In its reduced form, what is the coefficient of hydrogen in the balanced equation form?

A) 3 B) 6 C) 2 D) 1

5. When 12.5 g of calcium carbonate ($CaCO_3$) reacts with a certain amount of sodium chloride (NaCl), 13.9 g of calcium chloride ($CaCl_2$) and 13.2 g of sodium carbonate (Na_2CO_3) are produced.

The balanced equation for this reaction is as follows:

$$CaCO_{3(aq)} + 2\,NaCl_{(aq)} \rightarrow CaCl_{2(aq)} + Na_2CO_{3(s)}$$

What is the mass of the sodium chloride (NaCl) involved in this reaction?

A) 7.3 g B) 14.6 g C) 27.1 g D) 29.2 g

Short Answer /8

6. Four unbalanced chemical equations are given below. Balance these equations by including the coefficients so that the equations are in their simplest form. /4

a) $2\,Mg_{(s)} + O_{2(g)} \rightarrow 2\,MgO_{(s)}$

b) $3\,NaOH_{(aq)} + H_3PO_{4(aq)} \rightarrow Na_3PO_{4(aq)} + 3\,H_2O_{(l)}$

c) $2\,Fe + 3\,Cl_2 \rightarrow 2\,FeCl_3$

d) $4\,FeS_2 + 11\,O_2 \rightarrow 2\,Fe_2O_3 + 8\,SO_2$

7. Ammonia gas, NH_3, is used extensively in industry. It is prepared according to the following chemical equation:

$$N_{2(g)} + 3\,H_{2(g)} \rightarrow 2\,NH_{3(g)}$$

28 kg + 6 kg = 34 kg

Ammonium nitrates, NH_4NO_3, is an organic compound used in agriculture and is prepared using NH_3 gas and nitric acid, HNO_3, as follows:

$$NH_{3(g)} + HNO_{3(aq)} \rightarrow NH_4NO_{3(aq)}$$

34 kg + 126 kg = 160 kg

In an industrial process, 28 kg of nitrogen gas, N_2, reacts with 6 kg of hydrogen gas. H_2, to produce NH_3. This amount of NH_3, is then reacted with 126 kg of HNO_3 to produce NH_4NO_3. What was the mass of NH_4NO_3? /4

160 kg