

4 • Chemical Equations and Stoichiometry

PRACTICE TEST

- Balance the following equation:

$$\underline{\hspace{1cm}} \text{NH}_3 + \underline{\hspace{1cm}} \text{O}_2 \rightarrow \underline{\hspace{1cm}} \text{NO}_2 + \underline{\hspace{1cm}} \text{H}_2\text{O}$$
 The balanced equation shows that 1.00 mole of NH_3 requires mole(s) of O_2 .
 a) 0.57 c) 1.33
 b) 1.25 d) 1.75
- Write a balanced equation for the combustion of acetaldehyde, CH_3CHO .
 When properly balanced, the equation indicates that mole(s) of O_2 are required for each mole of CH_3CHO .
 a) 1 c) 2.5
 b) 2 d) 3
- Balance the following equation with the **SMALLEST WHOLE NUMBER COEFFICIENTS** possible. Select the number that is the sum of the coefficients in the balanced equation:

$$\underline{\hspace{1cm}} \text{KClO}_3 \rightarrow \underline{\hspace{1cm}} \text{KCl} + \underline{\hspace{1cm}} \text{O}_2$$
 a) 5 b) 6 c) 7 d) 8
- Write a balanced equation for the combustion of propane, C_3H_8 .
 When properly balanced, the equation indicates that moles of O_2 are required for each mole of C_3H_8 .
 a) 3 b) 3.5 c) 5 d) 8
- What is the **total** mass of products formed when 16 grams of CH_4 is burned with excess oxygen?
 a) 80 g c) 36 g
 b) 44 g d) 32 g
- Calculate the mass of hydrogen formed when 25 g of aluminum reacts with excess hydrochloric acid.

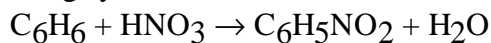
$$2\text{Al} + 6\text{HCl} \rightarrow 2\text{AlCl}_3 + 3\text{H}_2$$
 a) 0.41 g c) 1.2 g
 b) 0.92 g d) 2.8 g
- How many grams of the mixed oxide, Fe_3O_4 , are formed when 6.00 g of O_2 react with Fe according to

$$3\text{Fe} + 2\text{O}_2 \rightarrow \text{Fe}_3\text{O}_4$$
 a) 43.4 c) 174
 b) 86.8 d) 21.7
- For the reaction:

$$2\text{MnO}_2 + 4\text{KOH} + \text{O}_2 + \text{Cl}_2 \rightarrow 2\text{KMnO}_4 + 2\text{KCl} + 2\text{H}_2\text{O}$$
 there is 100. g of each reactant available. Which reagent is the limiting reagent? [Molar Masses: $\text{MnO}_2=86.9$; $\text{KOH}=56.1$; $\text{O}_2=32.0$; $\text{Cl}_2=70.9$]
 a) MnO_2 c) O_2
 b) KOH d) Cl_2
- How many grams of nitric acid, HNO_3 , can be prepared from the reaction of 92.0 g of NO_2 with 36.0 g H_2O ?

$$3\text{NO}_2 + \text{H}_2\text{O} \rightarrow 2\text{HNO}_3 + \text{NO}$$
 a) 64 c) 84
 b) 76 d) 116

10. The reaction of 25.0 g benzene, C_6H_6 , with excess HNO_3 resulted in 21.4 g $C_6H_5NO_2$. What is the percentage yield?

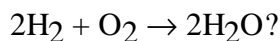


- a) 100% c) 54.3%
b) 27.4% d) 85.6%

14. Styrene, the building block of polystyrene, is a hydrocarbon, a compound containing only C and H. A given sample is burned completely and it produces 1.481 g of CO_2 and 0.303 g of H_2O . Determine the empirical formula of the compound.

- a) CH c) C_2H_3
b) CH_2 d) C_2H_5

11. How many grams of H_2O will be formed when 16.0 g H_2 is allowed to react with 16.0 g O_2 according to

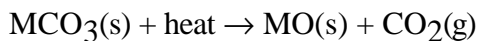


- a) 18.0 g c) 9.00 g
b) 144 g d) 32.0 g

12. When 8.00 g of H_2 reacts with 32.0 g of O_2 in an explosion, $2H_2 + O_2 \rightarrow 2H_2O$, the final gas mixture will contain:

- a) H_2 , H_2O , and O_2 c) O_2 and H_2O only
b) H_2 and H_2O only d) H_2 and O_2 only

13. 1.056 g of metal carbonate, containing an unknown metal, M, were heated to give the metal oxide and 0.376 g CO_2 .



What is the identity of the metal M?

- a) Mg c) Zn
b) Cu d) Ba

Answers:

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|----|---|-----|---|
| 1. | D | 8. | B |
| 2. | C | 9. | C |
| 3. | C | 10. | C |
| 4. | C | 11. | A |
| 5. | A | 12. | B |
| 6. | D | 13. | B |
| 7. | D | 14. | A |