Chemical Reactions and Equations: Chapter Introduction

A burning magnesium ribbon leaves only white powder: the same atoms in a new arrangement. How to spot a reaction, write and balance its equation, and name its type.

Name: Date: Score: ____ / 19

A. Fill in the blanks

1. When magnesium burns in air, it forms ____.

2. A substance that forms in a reaction is called a ____.

3. An insoluble solid formed in a reaction is a ____.

4. A balanced equation obeys the law of conservation of ____.

5. Rusting of iron is an example of ____.

B. True or False

6. In a chemical reaction new substances are formed. True / False

7. $Mg + O_2 \rightarrow MgO$ is balanced. True / False

8. Chips packets are filled with oxygen to keep chips fresh. True / False

9. A change of colour can show that a reaction has occurred. True / False

C. Assertion and reason

10. Assertion (A): A balanced equation has equal atoms of each element on both sides.
Reason (R): Mass is neither created nor destroyed in a reaction.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

11. Assertion (A): Iron articles are painted.
Reason (R): Paint keeps air and moisture away and prevents rusting.

(a) Both A and R are true, and R explains A
(b) Both A and R are true, but R does not explain A
(c) A is true, R is false
(d) A is false, R is true

Answer: _____

D. Choose the correct option

12. $CaCO_3 \rightarrow CaO + CO_2$ is a:

(a) combination
(b) decomposition
(c) displacement
(d) double displacement

Answer: _____

13. Which is a combination reaction?

(a) $CaO + H_2O \rightarrow Ca(OH)_2$

(b) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

(c) $2H_2O \rightarrow 2H_2 + O_2$

(d) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$

Answer: _____

14. In a redox reaction:

(a) only oxidation occurs

(b) only reduction occurs

(c) oxidation and reduction occur together

(d) no electrons move

Answer: _____

15. The white powder left after burning magnesium is:

(a) MgO

(b) Mg

(c) $MgCO_3$

(d) $Mg(OH)_2$

Answer: _____

E. Numerical problems

16. Balance: $H_2 + O_2 \rightarrow H_2O$.

17. Balance: $Fe + H_2O \rightarrow Fe_3O_4 + H_2$.

F. Short answer questions

18. List four observations that show a chemical reaction has taken place.

G. Match the columns

19. Match each item in Column A with the correct item in Column B.

Column A	Column B	Your answer
1. A + B → AB	(a) Decomposition	1 → ____
2. AB → A + B	(b) Double displacement	2 → ____
3. A + BC → AC + B	(c) Displacement	3 → ____
4. AB + CD → AD + CB	(d) Combination	4 → ____

Detailed solutions

1. magnesium oxide

2. product

3. precipitate

4. mass

5. corrosion

6. True. The atoms rearrange into new substances.

7. False. O: 2 on the left, 1 on the right; balanced form is $2Mg + O_2 \rightarrow 2MgO$.

8. False. They are flushed with nitrogen to prevent rancidity.

9. True. It is one of the signs of a chemical reaction.

10. (a) R explains A.

11. (a) R explains A.

12. (b) decomposition. One substance breaks into two.

13. (a) $CaO + H_2O \rightarrow Ca(OH)_2$. Two substances combine into one.

14. (c) oxidation and reduction occur together. Oxidation and reduction happen together.

15. (a) MgO. Magnesium oxide.

16. O: 2 vs 1 → $2H_2O$; H: 2 vs 4 → $2H_2$. **Answer: $2H_2 + O_2 \rightarrow 2H_2O$**

17. Fe: 3Fe; O: $4H_2O$; H: $4H_2$. **Answer: $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$**

18. Evolution of a gas, change in colour, change in temperature, formation of a precipitate (also change in state).

19. 1 → (d), 2 → (a), 3 → (c), 4 → (b). Each pattern matches its reaction type.