

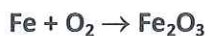
**Unit 4B - Chemical Reactions Test****Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- A 1. A(n) \_\_\_\_\_ chemical equation has the same number of atoms of each element on each side of the equation.
- balanced
  - complex
  - simple
  - unbalanced
- D 2. Each substance on the left side of the arrow in a chemical equation is a \_\_\_\_\_.
- catalyst
  - coefficient
  - product
  - reactant
- C 3. Which of the following is a balanced chemical equation?
- $\text{AgNO}_3 + \text{NaCl} \rightarrow 4\text{AgCl} + 2\text{NaNO}_3$
  - $2\text{AgNO}_3 + 2\text{NaCl} \rightarrow 3\text{AgCl} + 2\text{NaNO}_3$
  - $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
  - $\text{AgNO}_3 + 2\text{NaCl} \rightarrow \text{AgCl} + 3\text{NaNO}_3$
- B 4. The energy required to break the original bonds is less than the energy release when new bonds form in a(n) \_\_\_\_\_ reaction.
- endergonic
  - exergonic
  - precipitate
  - aqueous
- B 5. If heat must be added to a chemical reaction for the reaction to take place, the reaction is \_\_\_\_\_.
- balanced
  - endothermic
  - exothermic
  - reactant
- D 6. What type of reaction is shown in the following chemical equation:  $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$ ?
- decomposition
  - double-displacement
  - single-displacement
  - synthesis
- A 7. Which of the following could represent a decomposition reaction?
- compound = element + element
  - compound + compound = compound + compound
  - element + compound = element + compound
  - element + element = compound
- C 8. When one element replaces another element in a compound, the reaction is a \_\_\_\_\_ reaction.
- decomposition
  - double-displacement
  - single-displacement
  - synthesis
- A 9. The breaking down of a substance into two or more simpler substances is \_\_\_\_\_.
- decomposition
  - displacement
  - a catalyst
  - synthesis

- D 10. Each substance to the right of the arrow in a chemical equation is a(n) \_\_\_\_.
- catalyst
  - inhibitor
  - reactant
  - product
- B 11. Numbers that precede symbols and formulas in a chemical equation are \_\_\_\_.
- catalysts
  - coefficients
  - superscripts
  - subscripts
- D 12. According to the law of conservation of mass, how does the mass of the products in a chemical reaction compare to the mass of the reactants?
- There is no relationship.
  - The mass of the products is greater.
  - The mass of the reactants is greater.
  - The masses are equal.
- C 13. According to the law of conservation of mass, if two atoms of hydrogen are used as a reactant, how many atoms of hydrogen must be part of the product?
- 0
  - 1
  - 2
  - 4
- A 14. What type of reaction is shown in the following chemical equation:  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$ ?
- decomposition
  - double-displacement
  - single-displacement
  - synthesis
- D 15. When a chemical change occurs:
- atoms are rearranged.
  - the law of conservation of mass is always obeyed.
  - the chemical properties of new substances are different from the ones you started with.
  - All of the above

Answer the following questions about the chemical reaction for the formation of rust:



- B 16. Identify the reactant(s):
- Fe and  $\text{Fe}_2\text{O}_3$
  - Fe and  $\text{O}_2$
  - $\text{Fe}_2\text{O}_3$
  - $\text{O}_2$  and  $\text{Fe}_2\text{O}_3$
- C 17. Identify the product(s):
- Fe and  $\text{Fe}_2\text{O}_3$
  - Fe and  $\text{O}_2$
  - $\text{Fe}_2\text{O}_3$
  - $\text{O}_2$  and  $\text{Fe}_2\text{O}_3$

- C 18. Is the chemical reaction for the formation of rust balanced? If not, select the correct equation from the ones listed below.
- Yes, it is balanced.
  - No, this is balanced:  $2\text{Fe} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3$
  - No, this is balanced:  $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$
  - No, this is balanced:  $3\text{Fe} + 2\text{O}_2 \rightarrow 3\text{Fe}_2\text{O}_3$
- A 19. What is the chemical formula for a compound that contains the aluminum ion ( $\text{Al}^{3+}$ ) and the hydroxide ion ( $\text{OH}^-$ )?
- $\text{Al}(\text{OH})_3$
  - $\text{AlO}_3\text{H}_3$
  - $\text{AlOH}_3$
  - None of the above
- A 20. Balance the following equation to demonstrate the conservation of atoms in a reaction. Choose the answer that provides the correct coefficients for each reactant and product:
- $$\underline{\quad} \text{Al}_2\text{O}_3 \rightarrow \underline{\quad} \text{Al} + \underline{\quad} \text{O}_2$$
- (2, 4, 3)
  - (4, 3, 2)
  - (3, 2, 4)
  - (2, 3, 4)
- B 21. What would be the most likely product(s) of the following reaction?
- $$\text{H}_2 + \text{O}_2 \rightarrow \underline{\quad}$$
- $\text{H}_3 + \text{O}_3$
  - $\text{H}_2\text{O}$
  - $\text{O}_3\text{H}_3$
  - No reaction would occur.
- B 22. The compound  $\text{CaCl}_2$  contains which of the following ions?
- $\text{Ca}^+$  and  $\text{Cl}^-$
  - $\text{Ca}^{2+}$  and  $\text{Cl}^-$
  - $\text{Ca}^{4+}$  and  $\text{Cl}^{2-}$
  - $\text{Ca}^{2+}$  and  $\text{Cl}^{4-}$

**Short Answer**

23. What type of reaction is
- $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$
- ?

Decomposition

24. What type of reaction is
- $2\text{K} + 2\text{H}_2\text{O} \rightarrow 2\text{KOH} + \text{H}_2$
- ?

Single Replacement

25. What type of reaction is  $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$ ?

Synthesis

26. What type of reaction is  $\text{Pb}(\text{NO}_3)_2 + 2\text{KI} \rightarrow \text{PbI}_2 + 2\text{KNO}_3$ ?

Double Replacement

27. For the following antacid reaction, list the reactants and the products:



Reactants                      Products

### Problem

28. Balance the following chemical equation:  $\text{NaOH} + \text{FeCl}_3 \rightarrow \text{NaCl} + \text{Fe}(\text{OH})_3$ . What type of reaction is indicated?



Double

29. Balance the following chemical equation:  $\text{KClO}_3 \rightarrow \text{KCl} + \text{O}_2$ . What type of reaction is indicated?



Decomposition

30. Balance the following chemical equation:  $\text{CaBr}_2 + \text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + \text{NaBr}$ . What type of reaction is indicated?



Double