1. What is the gram formula mass of $Na_2CO_3 \cdot 10H_2O$?

2. The sum of the atomic masses of the atoms in one molecule of $C_3H_6Br_2$ is called the

   A) formula mass B) isotopic mass
   C) percent abundance D) percent composition

3. The molar mass of $Ba(OH)_2$ is

   A) 154.3 g B) 155.3 g
   C) 171.3 g D) 308.6 g

4. Which equation shows a conservation of mass?

   A) $Na + Cl_2 \rightarrow NaCl$ B) $Al + Br_2 \rightarrow AlBr_3$
   C) $H_2O \rightarrow H_2 + O_2$ **D) $PCl_5 \rightarrow PCl_3 + Cl_2$**

5. Which equation illustrates conservation of mass?

   A) $H_2 + Cl_2 \rightarrow HCl$ **B) $H_2 + Cl_2 \rightarrow 2\ HCl$**
   C) $H_2 + O_2 \rightarrow H_2O$ D) $H_2 + O_2 \rightarrow 2\ H_2O$

6. Balance the following equation:

   $\_\_Fe_2O_3 + \_\_CO \rightarrow \_\_Fe + \_\_CO_2$

7. Balance the following equation:

   $\_\_Mg(ClO_3)_2(s) \rightarrow \_\_MgCl_2(s) + \_\_O_2(g)$

8. Base your answer to the following question on the information below.

   A 1.0-gram strip of zinc is reacted with hydrochloric acid in a test tube. The unbalanced equation below represents the reaction.

   $$\_\_\_\_ Zn(s) + \_\_\_\_HCl(aq) \rightarrow \_\_\_\_H_2(g) + \_\_\_\_ ZnCl_2(aq)$$

   Balance the equation for the reaction of zinc and hydrochloric acid, using the smallest whole-number coefficients.

9. Given the balanced equation:

   $X + Cl_2 \rightarrow C_2H_5Cl + HCl$

   Which molecule is represented by *X*?

   A) C_2H_4 **B) C_2H_6** C) C_3H_6 D) C_3H_8

10. Given the incomplete equation:

    $2\ N_2O_5(g) \rightarrow$

    Which set of products completes and balances the incomplete equation?

    A) $2\ N_2(g) + 3\ H_2(g)$ B) $2\ N_2(g) + 2\ O_2(g)$
    C) $4\ NO_2(g) + O_2(g)$ D) $4\ NO(g) + SO_2(g)$

11. Base your answer to the following question on Given the balanced equation representing a reaction:

$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$

What is the total number of moles of $O_2(g)$ required for the complete combustion of 3 moles of $C_3H_8(g)$?

12. Given the balanced equation representing a reaction:

$$2CO(g) + O_2(g) \rightarrow 2CO_2(g)$$

What is the mole ratio of $CO(g)$ to $CO_2(g)$ in this reaction?

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

13. Base your answer to the following question on Given the balanced equation:

$$2C + 3H_2 \rightarrow C_2H_6$$

What is the total number of moles of C that must completely react to produce 2.0 moles of C_2H_6?

14. Given the reaction:

$N_2(g) + 3\ H_2(g) \leftrightarrow 2\ NH_3(g)$

What is the mole-to-mole ratio between nitrogen gas and hydrogen gas?

A) 1:2 **B) 1:3** C) 2:2 D) 2:3

15. Base your answer to the following question on Given the balanced equation:

$2\ C_4H_{10}(g) + 13\ O_2(g) \rightarrow 8\ CO_2(g) + 10\ H_2O(g)$

What is the total number of moles of $O_2(g)$ that must react completely with 5.00 moles of $C_4H_{10}(g)$?

16. Given the reaction:

$PbCl_2(aq) + Na_2CrO_4(aq) \rightarrow$
$PbCrO_4(s) + 2\ NaCl(aq)$

What is the total number of moles of NaCl formed when 2 moles of Na_2CrO_4 react completely?

A) 1 mole B) 2 moles
C) 3 moles **D) 4 moles**

17. Given the equation:

$2\ C_2H_2(g) + 5\ O_2(g) \rightarrow 4\ CO_2(g) + 2\ H_2O(g)$

How many moles of oxygen are required to react completely with 1.0 mole of C_2H_2?

A) 2.5 B) 2.0 C) 5.0 D) 10

18. Given the reaction:

$2\ C_2H_2(g) + 5\ O_2(g) \rightarrow 4\ CO_2(g) + 2\ H_2O(g)$

What is the total number of grams of $O_2(g)$ needed to react completely with 0.50 mole of $C_2H_2(g)$?

19. Given the reaction:

$N_2 + 3\ H_2 \rightarrow 2\ NH_3$

How many grams of ammonia are produced when 1.0 mole of nitrogen reacts?

20. In the reaction

$Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$,

what is the total number of moles of CO used to produce 112 grams of iron?

21. Given the reaction:

$3\ Cu + 8\ HNO_3 \rightarrow 3\ Cu(NO_3)_2 + 2\ NO + 4\ H_2O$

The total number of grams of Cu needed to produce 1.0 mole of $Cu(NO_3)_2$ is

A) 32 **B) 64** C) 128 D) 192

22. Given the reaction:

$2\ H_2 + O_2 \rightarrow 2\ H_2O$

The total number of grams of O_2 needed to produce 54 grams of water is

23. Given the reaction:

$Cu + 4\ HNO_3 \rightarrow Cu(NO_3)_2 + 2\ H_2O + 2\ NO_2$

What is the total mass of H_2O produced when 32 grams of Cu is completely consumed?

24. What is the chemical formula for copper(II) hydroxide?

25. What is the total number of different elements present in NH_4NO_3?

26. What is the chemical formula for iron(III) oxide?

27. Which is the correct formula for nitrogen (I) oxide?

A) NO **B) N_2O** C) NO_2 D) N_2O_3

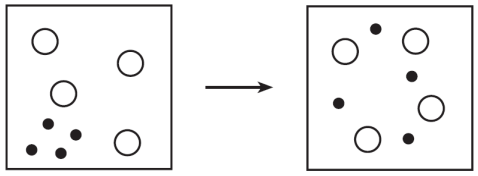
28. Which formula represents sodium sulfate?

A) $NaSO_4$ B) $NaSO_3$
C) Na_2SO_4 D) Na_2SO_3

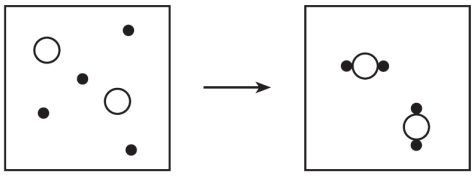
29. Which diagram represents a physical change, only?

Key
• = an atom of an element
○ = an atom of a different element

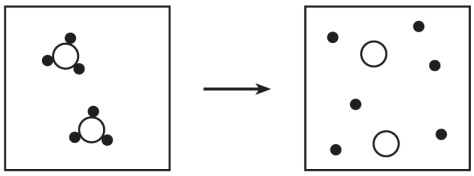
A)



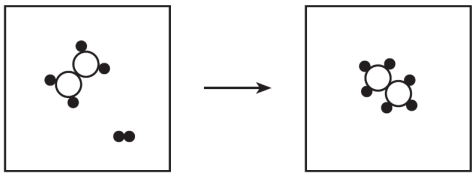
B)



C)



D)



30. Which substance can *not be broken down by a chemical change?*

A) ammonia **B) mercury**
C) propane D) water

Answer Key
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1. 286 g
2. **A**
3. **C**
4. **D**
5. **B**
6. 3
7. 3
8. Answer:____ Zn(s) + __2__HCI(aq) → ____H_2(g) + ____ $ZnCl_2$(aq)
9. **B**
10. **C**
11. 7.5 mol
12. **A**
13. 4.0 mol
14. **B**
15. 32.5
16. **D**
17. **A**
18. 40. g
19. 34
20. 3.0
21. **B**
22. 48
23. 18 g
24. $Cu(OH)_2$
25. 3
26. Fe_2O_3
27. **B**
28. **C**
29. **A**
30. **B**