

## 6.1 Balancing (#1-5)

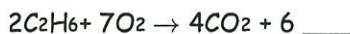
1. Which equation illustrates conservation of mass?

- A)  $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$     ~~B)  $\text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$~~   
 C)  $\text{H}_2 + \text{Cl}_2 \rightarrow 2 \text{HCl}$     ~~D)  $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$~~

2. Which equation is correctly balanced?

- ~~A)  $\text{CaO} + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$~~   
~~B)  $\text{Cu} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{H}_2\text{O} + \text{SO}_2$~~   
 C)  $\text{NH}_3 + 2\text{O}_2 \rightarrow \text{HNO}_3 + \text{H}_2\text{O}$   
 D)  $\text{Ca}(\text{OH})_2 + 2\text{H}_3\text{PO}_4 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + 3\text{H}_2\text{O}$

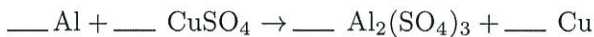
3. Given the incomplete equation for the combustion of ethane:



What is the formula of the missing product?

- A)  $\text{HCOOH}$                       B)  $\text{CH}_3\text{OH}$   
 C)  $\text{H}_2\text{O}$                             D)  $\text{H}_2\text{O}_2$

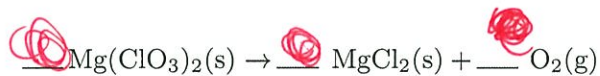
4. Given the unbalanced equation:



When the equation is balanced using the *smallest* whole-number coefficients, what is the coefficient of Al?

- A) 1                      B) 2                      C) 3                      D) 4

5. Given the unbalanced equation:

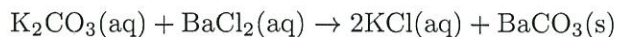


What is the coefficient of  $\text{O}_2$  when the equation is balanced correctly using the *smallest* whole number coefficients?

- A) 1                      B) 2                      C) 3                      D) 4

## 6.2 Types of Reactions (#6-10)

6. Given the balanced equation representing a reaction:



Which type of reaction is represented by this equation?

- A) synthesis
- B) double replacement
- C) decomposition
- D) single replacement

7. Which equation represents a single replacement reaction?

- A)  $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$
- B)  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- C)  $\text{HCl} + \text{KOH} \rightarrow \text{KCl} + \text{H}_2\text{O}$
- D)  $\text{H}_2\text{SO}_4 + \text{Mg} \rightarrow \text{H}_2 + \text{MgSO}_4$

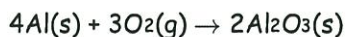
8. Given the word equation:

sodium chlorate  $\rightarrow$  sodium chloride + oxygen

Which type of chemical reaction is represented by this equation?

- A) double replacement
- B) single replacement
- C) synthesis
- D) decomposition

9. Given the balanced equation representing a reaction:



Which type of chemical reaction is represented by this equation?

- A) double replacement
- B) synthesis
- C) substitution
- D) single replacement

10. Which change results in the formation of different substances?

- A) deposition of  $\text{CO}_2(\text{g})$
- B) melting of  $\text{NaCl}(\text{s})$
- C) solidification of water
- D) burning of propane

## 6.3 Molar Mass (#11-13)

11. The molar mass of  $\text{Ba}(\text{OH})_2$  is

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

12. The gram formula mass of  $\text{NH}_4\text{Cl}$  is

- A) 22.4 g/mole      B) 95.5 g/mole  
C) 53.5 g/mole      D) 28.0 g/mole

13. The formula mass of a compound is the

- A) sum of the atomic numbers of its atoms  
B) products of the atomic numbers of its atoms  
C) product of the atomic masses of its atoms  
D) sum of the atomic masses of its atoms

## 6.4 Percent Composition (#14-16)

14. What is the percent composition by mass of nitrogen in  $(\text{NH}_4)_2\text{CO}_3$  (gram-formula mass = 96.0 g/mol)?

- A) 58.4%      B) 14.6%  
C) 29.2%      D) 87.5%

15. Which compound has the *smallest* percent composition by mass of chlorine?

- A)  $\text{HCl}$     B)  $\text{KCl}$     C)  $\text{LiCl}$     D)  $\text{NaCl}$

16. A sample of a substance containing only magnesium and chlorine was tested in the laboratory and was found to be composed of 74.5% chlorine by mass. If the total mass of the sample was 190.2 grams, what was the mass of the magnesium?

- A) 24.3 g      B) 48.5 g  
C) 142 g      D) 70.9 g

## 6.4 Formula Type & Hydrates (#17-22)

17. A student determining the percent by mass of water in a hydrated crystal obtained the following data.

Mass of crystal before heating.....5.0 g

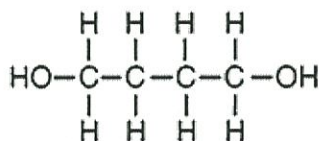
Mass of crystal after 1st heating.....4.0 g

Mass of crystal after 2nd heating.....4.0 g

What is the percent by mass of water in the hydrate?

- A) 20.0%                      B) 80.0%  
C) 0.20%                      D) 0.80%

18. Given the structural formula:



What is the empirical formula of this compound?

- A)  $\text{CH}_3\text{O}$                       B)  $\text{C}_2\text{H}_5\text{O}$   
C)  $\text{C}_4\text{H}_{10}\text{O}_2$                       D)  $\text{C}_8\text{H}_{20}\text{O}_4$

19. Which type of formula shows an element symbol for each atom and a line for each bond between atoms?

- A) empirical                      B) structural  
C) molecular                      D) ionic

20. The formula  $\text{H}_2\text{O}_2$  is an example of

- A) an ionic formula  
B) an organic formula  
C) a molecular formula  
D) an empirical formula

21. Which molecular formula is also an empirical formula?

- A)  $\text{N}_2\text{O}_5$    B)  $\text{C}_6\text{H}_6$    C)  $\text{N}_2\text{H}_4$    D)  $\text{H}_2\text{O}_2$

22. A 10.0 gram sample of a hydrate was heated until all the water of hydration was driven off. The mass of anhydrous product remaining was 8.00 grams. What is the percent of water in the hydrate?

- A) 20.0%                      B) 80.0%  
C) 12.5%                      D) 25.0%

## 6.6 Gram $\leftrightarrow$ Mole Conversions (#23-27)

23. What is the total mass in grams of 0.75 mole of  $\text{SO}_2$ ?

- A) 16 g   B) 24 g   C) 32 g   D) 48 g

24. What is the mass in grams of 2.0 moles of  $\text{NO}_2$ ?

- A) 92   B) 60.   C) 30.   D) 46

25. The total number of moles represented by 20 grams of  $\text{CaCO}_3$  is

- A) 1   B) 2   C) 0.1   D) 0.2

26. What is the total mass of 2.0 moles of  $\text{H}_2(\text{g})$ ?

- A) 1.0 g   B) 2.0 g   C) 3.0 g   D) 4.0 g

27. Which quantity is equivalent to 39 grams of  $\text{LiF}$ ?

- A) 1.0 mole                      B) 2.0 moles  
C) 0.50 mole                      D) 1.5 moles