1. In the formula $X_2(SO_4)_3$, the $X$ represents a metal. This metal could be located on the Periodic Table in

   A) Group1 B) Group 2
   C) Group 13 D) Group 14

2. Which formula represents strontium phosphate?

   A) $SrPO_4$ B) $Sr_3PO_8$
   C) $Sr_2(PO_4)_3$ D) $Sr_3(PO_4)_2$

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

   A) FeO B) $Fe_2O_3$ C) $Fe_3O$ D) $Fe_3O_2$

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

   A) CuOH B) $CuOH_2$
   C) $Cu_2(OH)$ D) $Cu(OH)_2$

5. Atoms of metals tend to

   A) lose electrons and form negative ions
   B) lose electrons and form positive ions
   C) gain electrons and form negative ions
   D) gain electrons and form positive ions

6. Which is the formula for the compound that forms when magnesium bonds with phosphorus?

   A) $Mg_2P$ B) $MgP_2$ C) $Mg_2P_3$ D) $Mg_3P_2$

7. What is the IUPAC name for the compound FeS?

   A) iron(II) sulfate B) iron(III) sulfate
   C) iron(II) sulfide D) Iron(III) sulfide

8. Which formula represents a binary compound?

   A) Ne B) $Br_2$ C) $C_3H_8$ D) $H_2SO_4$

9. What is the formula for sodium acetate?

   A) NaClO B) $Na_2O$
   C) $Na_2C_2O_4$ D) $NaC_2H_3O_2$

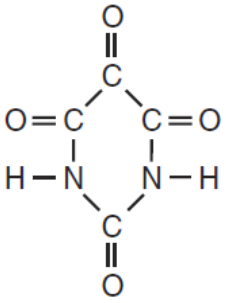
10. What is the correct formula of potassium hydride?

    A) KH B) $KH_2$
    C) KOH D) $K(OH)_2$

11. Which formula is an empirical formula?

    A) $N_2O_4$ B) $NH_3$ C) $C_3H_6$ D) $P_4O_{10}$

12. Given the formula for a compound:



    Which molecular formula and empirical formula represent this compound?

    A) $C_2HNO_2$ and CHNO
    B) $C_2HNO_2$ and $C_2HNO_2$
    C) $C_4H_2N_2O_4$ and CHNO
    D) $C_4H_2N_2O_4$ and $C_2HNO_2$

13. What is the total number of hydrogen atoms required to form 1 molecule of $C_3H_5(OH)_3$?

    A) 1 B) 5 C) 3 D) 8

14. Given the balanced equation:

    $2KI + F_2 \rightarrow 2KF + I_2$

    Which type of chemical reaction does this equation represent?

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

15. 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) decomposition D) synthesis

16. In which type of chemical reaction do two or more reactants combine to form one product, only?

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

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

    $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6$ ___

    What is the formula of the missing product?

    A) $CH_3OH$ B) HCOOH
    C) $H_2O$ D) $H_2O_2$

18. Given the unbalanced equation:

$$\_\_ Fe_2O_3 + \_\_ CO \rightarrow \_\_ Fe + \_\_ CO_2$$

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

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

19. If an equation is balanced properly, both sides of the equation must have the same number of

A) atoms B) coefficients
C) molecules D) moles of molecules

20. When the equation

$$\_\_ C_2H_4 + \_\_ O_2 \rightarrow \_\_ CO_2 + \_\_ H_2O$$

is balanced using smallest whole numbers, what is the coefficient of the $O_2$?

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

21. When the equation

$$\_\_ Al_2(SO_4)_3 + \_\_ ZnCl_2 \rightarrow \_\_ AlCl_3 + \_\_ ZnSO_4$$

is correctly balanced using the smallest whole number coefficients, the sum of the coefficients is

A) 9 B) 8 C) 5 D) 4

22. Given the unbalanced equation:

$$\_\_ Mg(ClO_3)_2(s) \rightarrow \_\_ MgCl_2(s) + \_\_ O_2(g)$$

What is the coefficient of $O_2$ when the equation is balanced correctly using the *smallest* whole number coefficients?

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

23. Given the key:

| Key |
| --- |
| ○ = an atom of element A |
| ● = an atom of element Z |

Which particle model diagram represents a chemical change?

A)

B)

C)

D)

24. Given the balanced equation representing a reaction:

$$K_2CO_3(aq) + BaCl_2(aq) \rightarrow 2KCl(aq) + BaCO_3(s)$$

Which type of reaction is represented by this equation?

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

25. What is the gram-formula mass of $Ca(OH)_2$?

A) 29 g/mol
B) 54 g/mol
C) 57 g/mol
D) 74 g/mol

26. Which equation is correctly balanced?

A) $H_2 + O_2 \rightarrow H_2O$
B) $Ca + Cl_2 \rightarrow CaCl$
C) $2\ H_2 + O_2 \rightarrow 2\ H_2O$
D) $Ca + Cl_2 \rightarrow Ca_2Cl$

27. Given the unbalanced equation:

$$\_\_ Li + \_\_ N_2 \rightarrow \_\_ Li_3N$$

When the equation is correctly balanced using smallest whole numbers, the coefficient of the lithium is

A) 1 B) 2 C) 3 D) 6

28. During all chemical reactions, charge, mass and energy are

A) condensed
B) conserved
C) decayed
D) decomposed

29. Which terms identify two different categories of compounds?

A) covalent and molecular
B) covalent and empirical
C) ionic and molecular
D) ionic and empirical

30. Which statement explains why NaBr is classified as a compound?

A) Na and Br are chemically combined in a fixed proportion.
B) Na and Br are both nonmetals.
C) NaBr is a solid at 298 K and standard pressure.
D) NaBr dissolves in $H_2O$ at 298 K.