1. In the reaction 2KClO3(s) 🡪 2KCl(aq) + 3O2(g) , the molecule of oxygen is a:

a. coefficient b. subscript c. reactant d. product

2. In the equation 2C2H2 (g) + 5O2 (g) 🡪 4CO2 (g) + 2H2O(l), the coefficient for oxygen is:

a. 5 b. 2 c. (g) d. 10

3. Write formulas for the reaction between potassium and water to produce potassium hydroxide and hydrogen is:

4. Which of the following symbols indicates that the substance is in water solution?

a. (l) b. (s) c. (aq) d. (cr)

5. What is the coefficient for carbon monoxide in the following balanced equation?

5 C + 2 SO2 🡪 CS2 + 4 CO

a. 2 b. 3 c. 4 d. 5

6. Write formulas for the reaction of aluminum with manganese oxide to produce aluminum oxide and manganese.

7. In the equation 2Fe + 3H2O 🡪 Fe2O3 + 3H2 , iron is a:

a. coefficient b. subscript c. reactant d. product

8. In balancing a chemical equation the coefficients are manipulated so that:

1. the sum of the reactant coefficients equals the sum of the product coefficients
2. the sum of the product coefficients is greater than the sum of the reactant coefficients
3. the equation shows an equal number of atoms for each element on both sides
4. at least one substance in each of the three physical states is represented

9. In the equation: 4NH3 (g) + 5O2 (g) 🡪 6H2O (g) + 4NO (g) , the subscript for oxygen is:

a. 5 b. 2 c. (g) d. 10

10. Write formulas for the reaction between calcium and water to produce calcium hydroxide and hydrogen.

11. Which of the following symbols indicates that a substance is a solid?

a. (l) b. (s) c. (aq) d. (g)

12. Which of the following is NOT an intermolecular bond?

1. network solid (e.g. diamond)
2. metallic bond (e.g. Na---Na)
3. covalent bond (e.g. H—Br)
4. London dispersion forces (Ca+Se- ----- Ca+Se-)

13. One name for Cu+2 is: a. cuprous b. cupric c. copper (I) d. copper (III)

14. The symbol for the ferric ion is: a. Fe+1 b. Fe+2 c. Fe+3 d. Fe+4

15. Carbon tetrachloride contains how many chlorine atoms?

a. 1 b. 2 c. 4 d. 8

16. The apparent charge of sulfur in SO3 is: a. –2 b. +2 c. –6 d. +6

17. The name of the CO3-2 ion is: a. carbonic acid b. carbide c. carbonate d. oxalate

18. The name of an aqueous solution of HCl is:

a. hydrochloric acid b. hydrogen chloride c. hydrochlorinate d. hydrogen (I) chloride

19. The name of the dry gas that forms sulfuric acid in water is:

a. hydrogen sulfide b. hydrogen sulfate c. sulfuric acid d. hydrosulfurate

20. Which of the following would NOT be considered a polyatomic ion?

a. CN- b. OH- c. CO2  d. CO3-2

21. Another name for dinitrogen pentoxide could be:

a. nitrogen (IV) oxide b. nitrous acid c. nitrogen Oxide (II) d. nitrogen (V) oxide

22. The empirical formula for benzene, C6H6 is:

a. (CH)6  b. C2H2 c. C3H3  d. C6H6

23. An ion with an oxidation number of +3 can combine with three identical ions, each having an oxidation number of: a. +1 b. –1 c. +3 d. -3

24. Which of the following is a molecule?

a. Na+ b. KCl c. NO2- d. H2

25. How many oxygen atoms are in Al(C3H5O3) 3?

a. 12 b. 9 c. 4 d. 3

26. Which of the following is used to represent one atom of an element?

a. chemical formula b. formula unit c. chemical symbol d. monatomic ion

27. The oxidation number of ammonium is: a. +1 b. –1 c. +2 d. -2

28. Which is not true concerning an sp3 orbital?

a. it usually forms a tetrahedral geometric shape

b. it uses an s orbital and 3 p orbitals

c. it usually forms a linear geometric shape

d. they help explain hybridization

29. The amount of energy needed to remove the most loosely held electron from a neutral atom in the gaseous phase is called the:

a. electronegativity b. electron affinity c. ionization energy d. excited state

30. The type of bond that holds a molecule of fluorine together is:

a. ionic b. network c. metallic d. covalent

31. Which of the following is a non-polar molecule?

a. CO b. H2O c. Br2 d. HCl

32. Which substance would have the lowest melting point at room temperature?

a. NaCl (s) b. H2O (l) c. Br2 (g) d. NaCl (aq)

33. Hydrogen bonding accounts for all the following characteristics of water except:

a. its low density in the solid phase

b. the non-symmetrical shape of its molecules

c. its liquid state at room temperature

d. its unusually high melting point

34. Potassium (K) is a: a. non-metal b. metalloid c. transition element d. metal

Give the common names for the following acids:

35. HClO4

36. HBr

Write the name of the following compounds:

37. KH

38. CuCl

39. (NH4)2SO4

Write the formulas for each of the following compounds:

40. lead (II) chloride

41. potassium chlorite

42. lithium sulfate

List the empirical formulas for the following molecules:

43. magnesium oxide

44. glucose: C6H12O6

Write the names for each formula in the following equations:

45. 6 CaO + P4O10 🡪 2 Ca3(PO4)2

46. 1 BaCO3 + C + H2O 🡪 2 CO + Ba(OH)2

47. Two compounds that contain Cu and Cl have the following masses:

Cpd A: 64.20 g Cu and 35.80 g Cl

Cpd B: 70.92 g Cu and 79.11 g Cl

Are the compounds the same? If not, what is the lowest whole-number mass ratio of Cu that combines with a given mass of Cl?

ANSWERS

1. In the reaction 2KClO3(s) 🡪 2KCl(aq) + 3O2(g) , the molecule of oxygen (implies the molecule O2) is a:

a. coefficient b. subscript c. reactant **d. product**

**Reactants combine to form products. The arrow (**🡪**) acts like an “=” sign**

2. In the equation 2C2H2 (g) + 5O2 (g) 🡪 4CO2 (g) + 2H2O(l), the coefficient for oxygen is:

**a. 5** b. 2 c. (g) d. 10

3. Write formulas for the reaction between potassium and water to produce potassium hydroxide and hydrogen is:

**2K + 2H2O 🡪 2KOH + H2**

*We will learn about balancing the equations in chapter 10 & 11 (coefficients)*

4. Which of the following symbols indicates that the substance is in water solution?

a. (l) b. (s) **c. (aq)** d. (cr)

5. What is the coefficient for carbon monoxide in the following balanced equation?

5 C + 2 SO2 🡪 CS2 + 4 CO

a. 2 b. 3 **c. 4** d. 5

6. Write formulas for the reaction of aluminum with manganese oxide to produce aluminum oxide and manganese.

**2 Al + 3 MnO 🡪 Al2O3 + 3 Mn**

*We will learn about balancing the equations in chapter 10 & 11 (coefficients)*

7. In the equation 2Fe + 3H2O 🡪 Fe2O3 + 3H2 , iron is a:

a. coefficient b. subscript **c. reactant** d. product

**Reactants combine to form products. The arrow (**🡪**) acts like an “=” sign**

8. In balancing a chemical equation the coefficients are manipulated so that:

1. the sum of the reactant coefficients equals the sum of the product coefficients
2. the sum of the product coefficients is greater than the sum of the reactant coefficients
3. **the equation shows an equal number of atoms for each element on both sides**
4. at least one substance in each of the three physical states is represented

9. In the equation: 4NH3 (g) + 5O2 (g) 🡪 6H2O (g) + 4NO (g) , the subscript for oxygen (implies the molecule O2) is:

a. 5 **b. 2** c. (g) d. 10

10. Write formulas for the reaction between calcium and water to produce calcium hydroxide and hydrogen.

**Ca + 2H2O 🡪 Ca(OH)2 + H2**

*We will learn about balancing the equations in chapter 10 & 11 (coefficients)*

11. Which of the following symbols indicates that a substance is a solid?

a. (l) **b. (s)** c. (aq) d. (g)

12. Which of the following is NOT an intermolecular bond?

1. network solid (e.g. diamond)
2. metallic bond (e.g. Na---Na)
3. **covalent bond (e.g. H—Br)**
4. London dispersion forces (Ca+Se- ----- Ca+Se-)

13. One name for Cu+2 is: a. cuprous **b. cupric** c. copper (I) d. copper (III)

14. The symbol for the ferric ion is: a. Fe+1 b. Fe+2 **c. Fe+3** d. Fe+4

15. Carbon tetrachloride contains how many chlorine atoms?

a. 1 b. 2 **c. 4** d. 8

16. The apparent charge of sulfur in SO3 is: a. –2 b. +2 c. –6 **d. +6**

17. The name of the CO3-2 ion is: a. carbonic acid b. carbide **c. carbonate** d. oxalate

18. The name of an aqueous solution of HCl is:

**a. hydrochloric acid** b. hydrogen chloride c. hydrochlorinate d. hydrogen (I) chloride

19. The name of the dry gas that forms sulfuric acid in water is:

a. hydrogen sulfide **b. hydrogen sulfate** c. sulfuric acid d. hydrosulfurate

20. Which of the following would NOT be considered a polyatomic ion?

a. CN- b. OH- **c. CO2** d. CO3-2

21. Another name for dinitrogen pentoxide (N2O5) could be:

a. nitrogen (IV) oxide b. nitrous acid c. nitrogen Oxide (II) **d. nitrogen (V) oxide**

22. The empirical formula for benzene, C6H6 is:

**a. (CH)6** b. C2H2 c. C3H3  d. C6H6

23. An ion with an oxidation number of +3 can combine with three identical ions, each having an oxidation number of: a. +1 **b. –1** c. +3 d. -3 **… sum of charges = 0**

24. Which of the following is a molecule?

a. Na+ b. KCl c. NO2- **d. H2 … others are ions or ionic compound**

25. How many oxygen atoms are in Al(C3H5O3) 3?

a. 12 **b. 9** c. 4 d. 3

26. Which of the following is used to represent one atom of an element?

a. chemical formula b. formula unit **c. chemical symbol** d. monatomic ion

27. The oxidation number of ammonium **[(NH4)+1]** is: **a. +1** b. –1 c. +2 d. -2

28. Which is not true concerning an sp3 orbital?

a. it usually forms a tetrahedral geometric shape

b. it uses an s orbital and 3 p orbitals

**c. it usually forms a linear geometric shape**

d. they help explain hybridization

29. The amount of energy needed to remove the most loosely held electron from a neutral atom in the gaseous phase is called the:

a. electronegativity b. electron affinity **c. ionization energy** d. excited state

30. The type of bond that holds a molecule of fluorine together is:

a. ionic b. network c. metallic **d. covalent**

31. Which of the following is a non-polar molecule?

a. CO b. H2O **c. Br2** d. HCl

32. Which substance would have the lowest melting point at room temperature?

a. NaCl (s) b. H2O (l) **c. Br2 (g)** d. NaCl (aq)

33. Hydrogen bonding accounts for all the following characteristics of water except:

a. its low density in the solid phase

**b. the non-symmetrical shape of its molecules … that is based on bond polarity**

c. its liquid state at room temperature

d. its unusually high melting point

34. Potassium (K) is a: a. non-metal b. metalloid c. transition element **d. metal**

Give the common names for the following acids:

35. HClO4 (aq) **Perchloric acid**

36. H**+**Br**-(aq) Hydrobromic acid**

Write the name of the following compounds:

37. K**+**H**- Potassium hydride**

38. Cu**+**Cl**- copperI chloride** or cuprous chloride or monocopper monochloride

39. (NH4)2**+(**SO4)**-2****ammonium sulfate**

Write the formulas for each of the following compounds:

40. lead (II) chloride **Pb+2Cl2-**

41. potassium chlorite **K+Cl+3O2-2**

42. lithium sulfate **Li2+(SO4)-2**

List the empirical formulas (**simplest whole number ratio**) for the following molecules:

43. magnesium oxide Mg+2O-2 = Mg2O2 … 2:2 ratio = 1:1 = MgO

44. C6H12O6 …for organic molecules, designate the number of atoms: **(CH2O)6**

Write the names for each formula in the following equations:

45. 6 CaO + 1 P4O10 🡪 2 Ca3(PO4)2

**calcium oxide + tetra phosphorus decaoxide 🡪 calcium phosphate**

*We will learn about balancing the equations in chapter 10 & 11 (coefficients)*

46. 1 BaCO3 + 1 C + 1 H2O 🡪 2 CO + 1 Ba(OH)2

**barium carbonate + carbon + dihydrogen oxide 🡪 carbon monoxide + barium hydroxide**

*We will learn about balancing the equations in chapter 10 & 11 (coefficients)*

47. Two compounds that contain copper (Cu) and chlorine (Cl) have the following masses:

Cpd A: 64.20 g Cu and 35.80 g Cl

Cpd B: 70.92 g Cu and 79.11 g Cl

Are the compounds the same? If not, what is the lowest whole-number mass ratio of Cu that combines with a given mass of Cl?

Cpd A: 64.20 g Cu / 35.80 g Cl = 1.79 [1]

Cpd B: 70.92 g Cu / 79.11 g Cl = 0.90 [1]

Since the definite proportion of compound A and B are different, they are NOT the same compounds. [1]

The lowest whole-number mass ratio of Cu that combines with a given mass of Cl is 1.79/0.9 = 2/1 [2]