CP Chemistry Final Exam Review

Chapter 8: Chemical Reactions

1. A chemical reaction has not occurred if the products have
   a. the same mass as reactants
   b. more energy than reactants
   c. less energy than reactants
   d. the same chemical properties as the reactants

2. THe state of matter for a reactant or product in a chemical equation is indicated by a
   a. coefficient before the formula
   b. subscript after the formula
   c. symbol after the formula
   d. superscript after the formula

3. An insoluble solid produced by a chemical reaction in a solution is called
   a. a precipitate
   b. a reactant
   c. a molecule
   d. the mass of the product

4. What is the balanced equation when aluminum reacts with copper (II) sulfate?
   a. $Al + Cu_2S \rightarrow Al_2S + Cu$
   b. $2Al + CuSO_4 \rightarrow Al_2(SO_4)_3$
   c. $Al + CuSO_4 \rightarrow AlSO_4 + Cu$
   d. $2Al + Cu_2SO_4 \rightarrow Al_2SO_4 + 2Cu$

5. THe products of the reaction $C_2H_5OH + 3CO_2 \rightarrow 2CO_2 + 3H_2O$ have the same _____ as the reactants,
   a. atoms
   b. coefficients
   c. molecules
   d. subscripts

6. After the correct formula for a reactant in an equation has been written, the
   a. subscripts are adjusted to balance the equation
   b. formula should not be changed
   c. same formula must appear as the product
   d. symbols in the formula must not appear on the product side of the equation

7. Which equation is NOT balance?
   a. $2H_2 + O_2 \rightarrow 2H_2O$
   b. $4H_2 + 2O_2 \rightarrow 4H_2O$
   c. $H_2 + H_2 + O_2 \rightarrow H_2O + H_2O$
   d. $2H_2 + O_2 \rightarrow H_2O$

8. Which coefficients correctly balance the equation $CaO + H_2O \rightarrow Ca(OH)_2$?
   a. 2, 1, 2
   b. 1, 2, 3
   c. 1, 2, 1
   d. 1, 1, 1

9. Which observation does not indicate that a chemical reaction has occurred?
   a. formation of a precipitate
   b. production of a gas
   c. evolution of energy
   d. change in mass

10. A reaction in which carbon dioxide and water are produced, is classified as
    a. decomposition
    b. double- displacement
    c. synthesis
    d. combustion

11. In what kind of reaction do two or more substances combine to form a new compound?
    a. decomposition
    b. ionic
    c. synthesis
    d. double displacement

12. The reaction $2KClO_3(s) \rightarrow 2KCl(s) + 3O_2(g)$ is a(n)
    a. decomposition
    b. synthesis
    c. double displacement
    d. combustion

13. The reaction $Cl_2(g) + 2KBr(aq) \rightarrow 2KCl(aq) + Br_2(l)$ is a(n)
    a. double displacement
    b. synthesis
    c. single displacement
    d. combustion

CHAPTER 7 & 9: Mole and Stoichiometry

14. The number of atoms in a mole of any pure substance is called
    a. its atomic number
    b. avogadro's number
    c. its mass number
    d. its gram-atomic number

15. What can be said about 1 mol Ag and 1 mol Au
    a. They are equal in mass
    b. They contain the same number of atoms
    c. Their molar masses are equal
    d. They have the same atomic mass

16. An Avogadro's number of any element is equivalent to
    a. the atomic number of that element
    b. the mass number of that element
    c. 6.02×10^{23} particles
    d. 12 g of that element

17. Using a periodic table, what is the average atomic mass of zinc?
    a. 69.723 amu
    b. 58.693 amu
    c. 63.546 amu
    d. 65.39 amu

18. A chemical formula includes the symbols of elements in the compound and subscripts that indicate
    a. the number of molecules present
    b. the number of atoms or ions of each type
    c. the formula mass
    d. the charges of the elements

19. The molar mass of an element is the mass of one
    a. atom of the element
    b. liter of the element
    c. gram of the element
    d. mole of the element

20. To determine the molar mass of an element, one must know the element's
    a. avogadros number
    b. atomic number
    c. number of isotopes
    d. average atomic mass

21. A balanced equation allows one to determine the
    a. mole ratio if any two substances in the reaction
    b. energy released in the reaction
    c. electron configuration of all elements in the reaction
    d. mechanisms involved in the reaction

22. The coefficients in a chemical equation represents the
    a. masses, in grams, of all reactants and products
    b. relative number of moles of reactants and products
    c. number of atoms in each compound in a reaction
    d. number of valence electrons involved in the reaction

23. In the balanced equation, $Ca + Cl_2 \rightarrow CaCl_2$, what is the mole ratio of chlorine to calcium chloride?
    a. 2:3
    b. 2:1
    c. 1:2
    d. 1:1

24. In the balance equation, $2H_2 + O_2 \rightarrow 2H_2O$, what is the mole ratio of oxygen to water?
    a. 1:2
    b. 2:1
    c. 8:1
    d. 1:4

25. In the reaction $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$, a mass of 25 grams is produced by reacting with excess oxygen. THe following expression calculates the

$$25 g CO2 \, x \frac{1 mole CO2}{44.01 g CO2} \, x \frac{1 mol CH4}{1 mol CO2}$$

    a. mass of water produced
    b. moles of carbon dioxide produced
    c. minimum mass of oxygen neeed
    d. moles of methane consumed

26. The molar mass of barium nitrate

$$Ba(NO_3)_2 \qquad 1(137) + 2(14) + 6(16) = 261g$$

27. What is the mass of 2.5 mole of C?

$$2.5 \text{ mol } C \times \frac{12.01g \, C}{1 \text{ mol } C} = 30.03g \, C$$

28. How many grams of ammonium sulfate can can be produced from 30 moles of H_2SO_4 according to the following equation?

$$2 \, NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$$

$$30 \text{ mol } H_2SO_4 \times \frac{1 \text{ mol } (NH_4)_2SO_4}{1 \text{ mol } H_2SO_4} \times \frac{132 \, g \, (NH_4)_2SO_4}{1 \text{ mol } (NH_4)_2SO_4} = 3960g$$

29. How many moles of copper are present in 180 g Cu?

$$180g \, Cu \times \frac{1 \text{ mol } Cu}{63.55g} = 2.83 \text{ mol } Cu$$

Chapter 12: Gases

30. Standard temperature and pressure for a gas is
    a. 0°C and 1 atm
    b. 0 K and 1 atm
    c. 0°C and 1 Pa
    d. 0°C and 1 Pa

31. As you decrease the pressure of a gas, the volume will
    a. decrease
    b. increase
    c. stay the same

32. As you increase the temperature of a gas, the speed of the molecules
    a. increase
    b. decrease
    c. stays the same

33. According to the Kinetic Molecular Theory, the arrangement and movement of molecules of a gas are
    a. tightly compacted and vibrating in place
    b. touching but slightly moving
    c. chaotic and spaced far apart
    d. I cannot see the molecules so I have no clue

34. As the temperature of a gas is increased the volume of the sample will
    a. increase
    b. decrease
    c. stay the same
    d. continue to change

35. Which of the following is not a property of gases?
    a. gases are fluid
    b. gases have a low density
    c. gases have a definite volume
    d. gases are compressible

36. What happens to the volume of a gas during compression?
    a. Volume increases
    b. volume decreases
    c. volume remains constant
    d. it is impossible to tell because all gases are different

37. A sample of gas has a volume of 150 ml when its pressure is 0.947 atm. What will the volume of the gas be at a pressure of 0.987 atm, if the temperature remains constant?
    a. 140 ml
    b. 144 ml
    c. 152 ml
    d. 156 ml

    $(150)(.947) = V(.987)$

    $V = 144$

38. A sample of gas has a pressure of 3.00 atm at 25°C. What would the gas pressure be at 52°C, if the volume remains constant?
    a. 1.44 atm
    b. 2.75 atm
    c. 3.27 atm
    d. 6.24 atm

    $\dfrac{(3)}{298} = \dfrac{P}{325}$ $P = 3.27$

39. A sample of a gas occupies a volume of 752 ml at 25°C. What volume will the gas occupy if the temperature increased to 50°C, if the pressure remains constant?
   a. 376 ml
   b. 694 ml
   c. 815 ml
   d. 1500 ml

$$\frac{752}{298} = \frac{V}{323}$$

40. If a 3L sample of gas at standard temperature and pressure is heated to 360 K in a 5L container, what is the new pressure?
   a. 3.96 atm
   b. 30 atm
   c. 0.79 atm
   d. 600 atm

$$\frac{(1atm)(3)}{273} = \frac{(5) P}{360}$$

Chapter 13: Solutions

41. Which of the following expresses concentration?
   a. molarity
   b. parts per hundred
   c. parts per million
   d. all of the above

42. What is the molarity of a solution that contains 0.202 mol KCl in 7.98 L os solution?
   a. 0.0132 M
   b. 0.0253 mol /L
   c. 0.0253 M
   d. 1.363 mol/ L

$$\frac{0.202}{7.98}$$

43. When you dissolve this kind of substance into solution it does not conduct.
   a. chromatography
   b. electrolyte
   c. nonelectrolyte
   d. colloid

44. A 1000 gram drinking water sample is brought to lab. The analyst determines that it contains 0.04 grams of lead. What is the concentration in ppm? Is this above or below the allowable limit of 5 ppm of lead in drinking water?
   a. 40 ppm, above
   b. 40 ppm, below
   c. 400 ppm, above
   d. 400 ppm, below

$$\frac{.04g}{1000.04}$$

45. In a solution
    a. settling will occur
    b. the solute is evenly distributed
    c. you will find a stable homogeneous mixture
    d. both a & b
    e. both b & c

46. If the amount of solute in a solution is much less than the maximum amount that cen be dissolved, the solution is called
    a. unsaturated
    b. saturated
    c. supersaturated
    d. none of the above

47. Calculate the percent solution for a solution that is 25 grams of solute and 132 grams of solvent.
    a. 14.9%
    b. 15.9%
    c. 17.8%
    d. 18.9%

$$\frac{25}{157}$$

48. What is the molarity of a solution which contains 55 grams of NaCl and 750 ml of water?
    a. 0.073 M
    b. 73.3 M
    c. 0.001 M
    d. 1.26 M

$$55g \times \frac{1 mol}{58g} = \frac{.948}{.750}$$

49. Adding salt to water will change its colligative properties. This kind of property _____ depend on the concentration of the solute particles.
    a. may
    b. does
    c. does not
    d. cannot

Chapter 15: Acids and Bases

50. Which of the following would be considered a base?
    a. HCl
    b. $CaSO_4$
    c. $NaOH$
    d. $HC_2H_3O_2$

51. If substance A has a pH of 1 and substance B has a pH of 6, which of the following is true?
    a. substance A is acidic, substance B is basic and substance A is stronger
    b. substance A is basic, substance B is basic and substance A is stronger
    c. substance A is acidic, substance B is acidic and substance B is stronger
    d. substance A is acidic, substance B is acidic and substance A is stronger

52. Which number corresponds to neutral on the pH scale?
    a. 0
    b. 1
    c. 7
    d. 20

53. How is a strong acid difference from a weak acid?
    a. strong acids completely break apart and weak acids do not
    b. weak acids carry a current better than strong acids
    c. strong acids are more concentrated than weak acids
    d. strong acids turn pink with phenolphthalein and weak acids do not

54. Which of the following is NOT a property of a base?
    a. bitter
    b. conducts electricity
    c. reacts with magnesium
    d. slippery

55. Acids taste
    a. sweet
    b. sour
    c. bitter
    d. salty

56. Strong acids are
    a. strong electrolytes
    b. weak electrolytes
    c. nonelectrolytes
    d. nonionized

57. Strong bases are
    a. strong electrolytes
    b. weak electrolytes
    c. nonelectrolytes
    d. also strong acids