**Chemistry NCFE Study Guide**

*Directions: Complete the sections assigned to you on your checklist. Additional sections can be used for personal review purposes, but will not be graded.*

**Standard 1.1 Analyze the structure of atoms and ions.**

\_\_\_\_\_ 1. The atomic number of an element is the total number of which

 particles in the nucleus?

1. neutrons
2. protons
3. electrons
4. protons and electrons
5. protons, electrons and neutrons

\_\_\_\_\_ 2. Most of the volume of an atom consists of

1. protons
2. protons and neutrons
3. electrons
4. empty space
5. neutrons

\_\_\_\_\_ 3. The mass number of an element is equal to

1. the total number of electrons in the nucleus
2. the total number of protons and neutrons in the nucleus
3. less than twice the atomic number
4. a constant number for the lighter elements

\_\_\_\_\_ 4. All atoms of the same element have the same

1. number of neutrons
2. number of protons
3. mass numbers
4. mass

\_\_\_\_\_ 5. Isotopes of the same element have different

1. numbers of neutrons
2. numbers of protons
3. numbers of electrons
4. atomic numbers
5. symbols

\*Define Isotope: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 6. In which of the following is the number of neutrons correctly

 represented?

1. F-19 has 0 neutrons
2. As-75 has 108 neutrons
3. Mg-24 has 24 neutrons
4. Au-197 has 79 neutrons
5. U-238 has 146 neutrons

\_\_\_\_\_ 7. How does the energy of an electron change when the electron moves

 closer to the nucleus?

1. it decreases
2. it increases
3. it stays the same

\_\_\_\_\_ 8. What particle is emitted in alpha radiation?

1. electron
2. photon
3. helium nucleus
4. hydrogen nucleus

\_\_\_\_\_ 9. The splitting of a nucleus into two similar-sized pieces is called

1. fission
2. fusion
3. neutron absorption
4. transmutation

\_\_\_\_\_ 10. What particle decomposes to produce the electron of beta radiation?

1. proton
2. neutron
3. electron
4. muon

\*The resulting element now has an extra \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_ 11. The most penetrating form of radiation is

1. alpha radiation
2. beta radiation
3. gamma radiation
4. visible radiation

\_\_\_\_\_ 12. In a neon light, when is the light given off?

1. when electrons return to their normal atomic orbital
2. when electrons absorb electrical energy
3. when protons move
4. when atoms collide

13. What color light is given off from a hydrogen atom when its electron drops from the

 n= 4 to n=2 energy level? And how much energy is this?

\_\_\_\_\_ 14. Silicon occurs in nature in three isotopes, Si-28 at 92.21% abundancy, Si-29 at

 4.70% abundancy and Si-30 at 3.09% abundancy. According to this data, what is

 the average atomic mass of silicon?

 A) 29 amu B) 28.11 amu

 C) 29.11 amu D) 40.38 amu

 \*Formula used: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 15. When Carbon-14 undergoes beta decay, what new element is

 formed?

1. Carbon-12
2. Nitrogen-14
3. Oxygen-14
4. No new element can be formed from another element.

\*What is Beta decay? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 16. A certain radioactive isotope has a half life of three days. If 40 g of

 substance is present at the beginning, how much is left nine days

 later?

1. 40 g
2. 20 g
3. 5 g
4. 4.4 g

\*Define half-life: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 17. The heat of the sun is produced by

1. a redox reaction
2. a nuclear fusion reaction
3. a combustion reaction
4. thousands of tiny ants holding up lit matches

\*Define Fusion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Standard 1.2 Understand the bonding that occurs in simple compounds in terms of bond**

 **type, strength and properties.**

\_\_\_\_\_ 18. Which of the following crystals is the most malleable?

1. sodium chloride
2. ammonium nitrate
3. iron
4. sugar

\*What type of substances are malleable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 19. Which of the following has the highest melting point?

1. CO2
2. C6H12O6
3. KBr
4. SO3

\*What type of substances have high melting and boiling points? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_ 20. Which of the following bonds would be MOST polar?

1. B-O
2. B-Br
3. B-N
4. B-F

\*Define Polar: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_21. Which of the following bonds would be the LEAST polar?

1. C-O
2. B) C-C
3. C-F
4. C-N

\_\_\_\_\_ 22. Which of the following has a double bond?

1. H2O
2. C2H2
3. C2H4
4. CN-

\*Draw lewis structure:

\_\_\_\_\_ 23. The VSEPR theory gives information about why \_\_\_

1. atoms share electrons
2. molecules are shaped the way they are
3. electron configurations are the way they are
4. dipole-dipole forces may be attractive or repulsive

\_\_\_\_\_ 24. What is the shape of the water (H2O) molecule?

 A) tetrahedral

 B) bent

 C) linear

 D) trigonal pyramidal

\*Draw lewis structure:

\_\_\_\_\_ 25. Which of the following compounds exhibits hydrogen bonding?

1. HF
2. NH3
3. H2O
4. All of the above

\*What is hydrogen bonding? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 26. How many electrons are shared in a double covalent bond?

1. 1
2. 2
3. 3
4. 4
5. 8

\_\_\_\_\_ 27. The shape of the carbon tetrachloride (CCl4) molecule is \_\_\_.

1. linear
2. bent
3. tetrahedral
4. square

\*Draw lewis structure:

\_\_\_\_\_ 28. If two elements have similar chemical properties, you would expect

 them to have

1. similar atomic masses
2. similar atomic radii
3. the same number of energy levels
4. the same number of outer electrons

\*What do we call the other electron? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 29. Which of the following pairs of elements is most likely to form an

 ionic compound?

1. magnesium and fluorine
2. nitrogen and sulfur
3. oxygen and chlorine
4. sodium and aluminum

\*Define ionic compound: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 30. How many unshared pairs of electrons are in a water molecule?

1. 1
2. 2
3. 3
4. 4

\_\_\_\_\_ 31. Which of the following is the correct formula for nickel (I) chloride?

1. NiCl2
2. Ni2Cl
3. NiCl
4. NiCl3

Name the compounds. Write the correct name for each of the following compounds.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 32. NaC2H3O2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_33. Ba(OH)2

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 34. CaO

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 35. Na3N

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 36. CCl4

 Write the correct chemical formula for each of the following compounds.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 37. Nickel (I) chloride

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 38. Potassium permanganate

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 39. Sodium bicarbonate

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 40. Dinitrogen pentoxide

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 41. Hydrochloric acid

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 42. Boron trifluoride

 \*What do roman numerals represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \*When do you use prefixes such as mono- di- tri-? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 43. In the chemical formula Na2SO4, the subscript 2 indicates

1. that sodium is a diatomic element
2. that sodium is a polyatomic ion
3. that there are two atoms of sodium in one formula unit of sodium sulfate
4. that sodium has a positive 2 charge

**Standard 1.3 Understand the physical and chemical properties of atoms based on their**

 **position on the Periodic Table.**

\_\_\_\_\_ 44. The representative elements are usually called

1. noble gases
2. Group A elements
3. Group B elements
4. Halogens

\_\_\_\_\_ 45. What is the chief characteristic of the noble gases?

1. very low reactivity
2. red color
3. high boiling point
4. high density

\*Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 46. The modern periodic table is arranged according to

 A) atomic mass

 B) atomic number

 C) mass number

 D) alphabetical order

 \*Define atomic number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 47. The category of elements that is characterized by the filling of

 d orbitals is the

1. alkaline earth metals
2. halogens
3. alkali metals
4. transition metals

\_\_\_\_\_ 48. Which of the following is the correct electron configuration for

 an oxygen atom?

1. 1s2 2s2 2p6
2. 1s2 2s2 2p4
3. 1s2 2s2 3s2 4s2
4. 1s2 2s2 2p6 3s1

\_\_\_\_\_\_ 49. What is the next atomic orbital in the series, 1s, 2s, 2p, 3s, 3p, 4s, 3d?

1. 5s
2. 2d
3. 4d
4. 4p

\_\_\_\_\_ 50. Which of the following has the greatest electronegativity?

 A) potassium

 B) zinc

 C) chlorine

 D) calcium

 \*Define electronegativity: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_51. Which of the following has the largest atomic radius?

 A) lithium

 B) sodium

 C) hydrogen

 D) cesium

 \*What is the trend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 52. The amount of energy required to remove an electron completely from an

 atom is called

A) ionization energy

B) electronegativity

C) a quantum

D) atomic absorption

\*What is the trend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_53. Each period number in the periodic table corresponds to

1. a principal energy level
2. an energy sublevel
3. an atomic mass
4. an atomic number

\_\_\_\_\_ 54. Which of the following groupings contains only representative

 elements?

1. Cu, Co, Cd
2. Ni, Fe, Zn
3. Al, Mg, Li
4. Hg, Cr, Ag

\_\_\_\_\_ 55. Why is the radius of a positive ion always less than the radius of its neutral atom?

1. the nucleus pulls the remaining electrons in closer
2. the number of principal energy levels is always reduced
3. the atomic orbitals contract all by themselves
4. electron speeds are reduced

\_\_\_\_\_ 56. Which of the following has the lowest electronegativity?

1. fluorine
2. chlorine
3. sodium
4. potassium

\_\_\_\_\_57. Which of the following occurs when an alkaline earth metal (Group 2A)

 attains a stable electron configuration?

1. it gains two electrons
2. it gains 8 electrons
3. it loses two electrons
4. it loses 8 electrons

\*What would its charge be? \_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 58. The electron configuration of K+ is most similar to that of

1. Ar
2. Ca2+
3. Na+
4. K

\*Define ion: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Standard 2.1 Understand the relationship among pressure, temperature, volume and phase.**

\_\_\_\_59. As the temperature of a substance decreases, the average kinetic

 energy of its particles

1. remains constant
2. increases, then decreases
3. decreases
4. increases

\_\_\_\_\_60. Which of the following substances takes the most heat energy to

 raise the temperature of one gram of the substance by 1oC?

1. aluminum (c = 0.90 J/goC)
2. iron (c = 0.46 J/goC)
3. water (c = 4.18 J/goC)
4. silver (c = 0.24 J/goC)

\*The underlined part is the definition of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_61. When the particles of a solid gain enough kinetic energy to break

 their ordered arrangement and slip past one another, the solid

1. melts
2. freezes
3. decomposes
4. vaporizes

****

Label the graph

\_\_\_\_\_62. What is happening at the part of the graph marked 2?

1. a solid is melting
2. a liquid is freezing
3. the temperature of a solid is increasing
4. the temperature of a liquid is increasing
5. a liquid is boiling

\_\_\_\_\_ 63. What is the boiling point of the substance described by the graph above?

1. 0oC
2. 50oC
3. 100oC
4. 120oC



Label the graph

\_\_\_\_\_ 64. What does point O represent on the diagram above?

1. the melting point
2. the boiling point
3. the normal boiling point
4. the triple point

\_\_\_\_\_ 65. What is happening along curve OM ?

1. melting
2. boiling
3. sublimation
4. vaporization

\_\_\_\_\_ 66. Which of the following processes is exothermic?

1. sublimation
2. vaporization
3. condensation
4. none of these

\*Define exothermic: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

67. If it takes 10.0 kJ of heat to raise the temperature of 100.0 g of a substance by

 50oC, what is the specific heat of the substance?

68. How much heat is required to turn 27.0 g of water at 20.0oC to steam at 100.0oC?

\_\_\_\_\_69. The energy required to change one gram of a solid to a liquid at its melting point is the

1. specific heat
2. heat of vaporization
3. heat of fusion
4. heat of formation

\*What is the variable/symbol for this? \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 70. In what units must temperature be measured for all of the gas laws?

1. degrees Fahrenheit
2. degrees Celsius
3. degrees Centigrade
4. Kelvins

\_\_\_\_\_ 71. According to Gay-Lussac’s Law, what happens to the pressure of a gas if the

 absolute temperature is cut in half?

1. the pressure doubles
2. the pressure is cut in half
3. the pressure quadruples
4. the pressure remains constant

\*Formula:

\_\_\_\_\_ 72. As the temperature of the gas in a balloon decreases \_\_\_.

1. the volume increases
2. the average kinetic energy of the gas decreases
3. the pressure increases
4. all of the above

\*Formula:

**Standard 2.1 Understand the relationship among pressure, temperature, volume and phase. (continued)**

\_\_\_\_\_73. What is the volume occupied by 18 x 1023 molecules of fluorine

 at STP?

1. 22.4 L
2. 44.8 L
3. 56.0 L
4. 67.2 L
5. 78.4 L

\_\_\_\_\_74. What is the pressure when a liquid is boiling at its normal

 boiling point?

1. 0 atm
2. 1 atm
3. 2 atm
4. 5 atm

\_\_\_\_\_75. If heat is added to a boiling liquid, what happens to the

 temperature of the liquid?

1. it increases
2. it decreases
3. it does not change

\_\_\_\_\_76. Which of these changes would NOT cause an increase in

 the pressure of a gaseous system?

1. the container is made larger
2. additional amounts of the same gas are added to the container
3. the temperature is increased
4. another gas is added to the container

\_\_\_\_\_ 77. A sample of gas occupies 40.0 mL at –123oC. What volume does

 it occupy at 27oC?

1. 182 mL
2. 8.80 mL
3. 80.0 mL
4. 20.0 mL

\_\_\_\_\_ 78. What does the ideal gas law allow a scientist to calculate that the

 other laws do not?

1. number of moles
2. pressure
3. volume
4. temperature

\_\_\_\_\_ 79. Under laboratory conditions of 25.0oC and 99.5 kPa, what is

 the maximum number of liters of ammonia that could be

 produced from 1.50 L of nitrogen according to the following

 equation?

 N2(g) + 3H2(g) 🡪 2NH3(g)

1. 3.22 L
2. 3.00 L
3. 2.70 L
4. 3.33 L

**Standard 2.2 Analyze chemical reactions in terms of quantities, product formation, and**

 **energy.**

\_\_\_\_ 80. How does collision theory explain the effect of changing the concentration of

 reactants on the rate of a reaction?

1. Decreasing the concentration decreases the rate of the reaction because there are few reactants to take part in collisions.
2. Decreasing the concentration increases the rate of the reaction because there is more room for particles to collide.
3. Decreasing the concentration increases the rate of reaction because there is more room for particles to rebound after colliding.
4. The collision theory cannot explain the effect of changing the concentration of reactants.



81. On the diagram to the right, label the following:

 reactants, products, activated complex,

 activation energy, enthalpy of reaction (H)

82. Is the reaction shown in the diagram to the right

 exothermic or endothermic and how do you know?

\_\_\_\_\_83. Which of the following is a chemical property?

1. reactivity of a metal (according to the activity series)
2. flammability
3. mass
4. density

A) I only B) II only C) I and II only

 D) II and IV only E) I, II and IV

\_\_\_\_\_ 84. During a lab experiment, a gas is produced in a test tube. A flaming

 wooden splint is held near the opening of the test tube and a loud pop

 is heard. The gas must be

1. oxygen
2. carbon dioxide
3. hydrogen
4. chlorine

\_\_\_\_\_ 85. During another lab experiment, a gas is produced in a test tube. When

 a glowing wooden splint is held near the opening of the test tube, it bursts

 into flame. The gas must be

1. oxygen
2. carbon dioxide
3. hydrogen
4. chlorine

\_\_\_\_\_ 86. During a lab experiment, a piece of zinc is submerged in silver nitrate

 solution. It looks like something fuzzy is forming on the piece of zinc.

 What is the “fuzzy” stuff?

1. mold
2. hydrogen gas
3. nitrogen gas
4. silver crystals

\*Write out reaction: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Predict the products and write a balanced chemical equation for each of the following reactions:

87. A zinc bar is dropped into a beaker of aqueous hydrochloric acid.

88. Ethane (C2H6) undergoes complete combustion.

89. Aqueous solutions of lead (II) nitrate and sodium chloride are mixed.

90. AgNO3 (aq) + Na2SO4 (aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

91. CaCl2 (aq) + Na2SO4 (aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

92. HCl (aq) + Zn (s) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

93. HCl (aq) + Ag(s) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_ 94. An acid-base neutralization reaction is what type of reaction?

1. redox
2. single replacement
3. double replacement
4. synthesis
5. decomposition

Al2(SO4)3(aq) + 6 NaOH(aq) 🡪 3 Na2SO4(aq) + 2 Al(OH)3(s)

95. If 2.0 moles of aluminum sulfate are to be reacted, how many moles of aluminum

 hydroxide will be formed?

96. What is the molar mass of aluminum hydroxide?

97. How many moles of sodium sulfate are 35.5 g of sodium sulfate?

98. How many atoms are in one formula unit of aluminum sulfate?

99. Hydrazine (dinitrogen tetrahydride) is used as a liquid rocket fuel. Hydrazine reacts with

 oxygen gas to produce nitrogen and water.

 a) Write a balanced chemical equation for this reaction.

 b) If 640 g of hydrazine is reacted in the presence of 10 moles of oxygen gas, how

 many grams of nitrogen gas are produced?

100. 25g of zinc chloride reaction with 25 grams of sodium nitrate. What is the limiting reagent? What is the theoretical yield?

\_\_\_\_\_ 101. Carbon disulfide, CS2, is what percent carbon by mass?

1. 76%
2. 16%
3. 42%
4. 84%

\_\_\_\_\_ 102. Which of the following is NOT an empirical formula?

1. NaC2H3O2
2. C2H4
3. CO2
4. CO

\_\_\_\_\_ 103. If the percent composition of a compound is found to be 58.8% C,

 9.8% H, and 31.4% O, what will be the empirical formula of the

 compound?

 A) C5H10O2

1. C6H10O3
2. C4H9O2
3. C2H5O

\_\_\_\_\_ 104. If a compound has an empirical formula of CH3O and a molar mass

 62 g/mol, what is its molecular formula?

1. CH3O
2. C2H3O2
3. C2H6O2
4. C3H18O3

\_\_\_\_\_ 105. If 6.54 g of zinc are reacted with excess hydrochloric acid at STP how much

 hydrogen gas is produced?

1. 2.24 L
2. 2.24 g
3. 4.48 L
4. 1.12 L

\_\_\_\_\_ 106. How much copper metal would have to be reacted with excess AgNO3 in order to

 obtain 10.0 g of silver?

1. 2.94 g
2. 5.88 g
3. 8.49 g
4. 17.0 g

**Standard 3.1 Understand the factors affecting rate of reaction and chemical equilibrium.**

\_\_\_\_\_107. How does a catalyst speed up a chemical reaction?

1. by lowering the activation energy
2. by increasing the concentration of ions in the reaction vessel
3. by providing spectator ions that cheer the other ions on
4. by forming an activated complex
5. by producing enzymes in the cell

\_\_\_\_\_ 108. When a chemical reaction reaches equilibrium, which of the following is true?

1. There are more products than reactants
2. There is an equal amount of products and reactants
3. The rate of the forward reaction equals the rate of the reverse reaction
4. The amount of reactants and products does not change
5. I only B) III only C) I and III only D) III and IV only E) II, III and IV

\_\_\_\_\_ 109. Le Chatelier’s principle states that if a system is in equilibrium and a

 condition is changed, the equilibrium will

1. remain unchanged
2. shift to minimize the amount of reactants
3. shift to minimize the amount of products
4. shift to restore equilibrium

2NO(g) + Cl2(g) 🡨🡪 2NOCl(g)

110. Write the equilibrium constant expression (Keq) for this reaction.

111. If the system is in equilibrium and more chlorine gas is added, which way will the

 equilibrium shift?

112. If the system is in equilibrium and NOCl is removed, which way will the equilibrium shift?

113. If the pressure on the system is increased, which way will the equilibrium shift?

114. If chlorine gas is removed from the system, which way will the equilibrium shift?

**Standard 3.2 Understand solutions and the solution process.**

\_\_\_\_\_ 115. What is the hydrogen ion concentration of a solution with a pH of 7.5?

1. 7.5 x 10-13 M
2. 3.2 x 10-8 M
3. 3.2 x 10-7 M
4. 0.88 M

\_\_\_\_\_ 116. If it takes 35.0 mL of a 0.1 N HCl solution to neutralize 25.0 mL of a

 NaOH solution, what is the concentration of the base?

1. 1.4 N
2. 0.07 N
3. 0.14 N
4. 0.7 N

\_\_\_\_\_ 117. How many grams of potassium dichromate would be needed to

 make 500.0 mL of a 1.500 M solution?

1. 145.5 g
2. 194.0 g
3. 220.5 g
4. 441.0 g

\_\_\_\_\_ 118. A 10.0 mL aliquot from a 6.0 M HCl solution is diluted to 50.0 mL. What is the

 concentration of the new solution?

1. 1.2 M
2. 3.0 M
3. 8.3 M
4. 12.0 M
5. 30.0 M



Use the graph above to answer # 253-255.

119. How much potassium bromide is in 500 mL of a saturated solution at 50 oC?

120. How would you describe a solution of 155 g of KNO3 dissolved in 100 g of water at 75oC?

\_\_\_\_\_ 121. An unknown substance is found. It dissolves in water and the solution

 conducts electricity, has a slippery feel and turns litmus paper blue. The

 substance must be

1. a base
2. an acid
3. a salt
4. there is not enough information to tell

122. Mark each of the following A for an acid, B for a base, S for a salt and N for neither.

\_\_\_\_\_ a) HC2H3O2 \_\_\_\_\_ b) K2SO4 \_\_\_\_\_ c) NH4OH

\_\_\_\_\_ d) Ca(OH)2 \_\_\_\_\_ e) H2CO3 \_\_\_\_\_f) N2O5

\_\_\_\_\_ 123. Another name for a solution is

1. a heterogeneous mixture
2. a homogeneous mixture
3. the Tyndall effect
4. an alloy
5. supersaturated