Final Exam in Chemistry!

Good Luck!

Q: what did one ion say to the other?
A: I got my ion you!

Use the following information to answer questions 1-2.

Boron trifluoride is manufactured by the reaction of various boron oxides with hydrogen fluoride. An example of this is illustrated in the following reaction.

$$\_\_B_2O_3 + \_\_HF \rightarrow \_\_BF_3 + \_\_H_2O$$

1. What type of reaction is this?
   - A. single replacement only
   - B. double replacement only
   - C. synthesis
   - D. decomposition

① Doctors amputated his leg (bottom half), but left his _____.

2. What numbers balance this equation?
   - A. 1, 1, 1, 1
   - B. 2, 3, 2,4
   - C. 1, 6, 2, 3
   - D. 1, 6, 1, 3

Use the following information to answer questions 3-4

Maurice He knows that the reaction of $CaCl_2$ and $AgNO_3$ will proceed according to the following equation.

$$\_\_CaCl_2 + \_\_AgNO_3 \rightarrow \_\_Ca(NO_3)_2 + \_\_AgCl$$

3. Which numbers balance the equation?
   - A. 1, 1, 2, 2
   - B. 1, 2, 1, 2
   - C. 1, 2, 2, 1
   - D. 2, 1, 2, 2

4. What mass of $CaCl_2$ does Maurice require to make 100 mL of 0.1 M $CaCl_2$ solution?
   - A. 110.98 g
   - B. 11.10 g
   - C. 1.11 g
   - D. 0.009 g

Use the electronegativity chart to answer question 5.

1 H 2.1																	2 He —
3 Li 1.0	4 Be 1.5											5 B 2.0	6 C 2.5	7 N 3.1	8 O 3.5	9 F 4.0	10 Ne —
11 Na 1.0	12 Mg 1.3											13 Al 1.5	14 Si 1.8	15 P 2.1	16 S 2.4	17 Cl 2.9	18 Ar —
19 K 0.9	20 Ca 1.1																

5. Which of the following compounds contains the least polar covalent bonds?
   - A. HCl
   - B. H_2O
   - C. CH_4
   - D. CO

6. One of the most important commodity chemicals on the world market today is sodium sulfate. One method of production is the Mannheim process. This process combines sodium chloride and sulfuric acid to sodium sulfate and hydrochloric acid. Which of the following is a balanced chemical equation that correctly describes the Mannheim process?
   - A. $2NaCl + H_2SO_4 \rightarrow 2HCl + Na_2SO_4$
   - B. $NaCl + H_2SO_4 \rightarrow HCl + NaSO_4$
   - C. $2NaCl + H_2SO_4 \rightarrow 2HCl + 2NaSO_4$
   - D. $NaCl + 2H_2SO_4 \rightarrow HCl + Na(SO_4)_2$

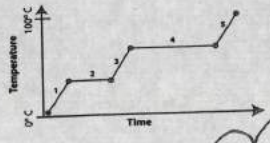
7. Select the change that will DECREASE the rate at which a solid solute dissolves in a liquid solvent.
   - A. cooling the solvent
   - B. shaking the solvent
   - C. adding a catalyst to the solvent
   - D. increasing the pressure over the solvent

② A prisoner who acts in a silly manner is called a _____.

Use the information, graph and table to answer question 8

Laine's teacher tells her to do some research and identify her liquid sample. Laine conducts an experiment to determine the temperatures at which the sample undergoes phase changes. She also looks up boiling point data for several liquid substances.

Substance	Boiling Point
methanol	64.7°C
isopentane	28°C
water	100°C
octane	125.5°C



8. Which of the following could be the identity of her sample?

A. methanol
B. isopentane
C. water
D. octane

3. If you find that your cat has been run over, you have to _____.

9. Kara is a research chemist in an industrial laboratory. She is responsible for developing a procedure to produce rubidium chloride in bulk. She wants to use a synthesis procedure because it has no by-products. Which of the following procedures should Kara choose?

A. $RbOH(aq) + HCl(aq) \rightarrow RbCl(aq) + H_2O(l)$
B. $2Rb(s) + Cl_2(g) \rightarrow 2RbCl(s)$
C. $Rb(s) + NaCl(s) \rightarrow RbCl(l) + Na(s)$
D. $RbCl(s) \rightarrow R(s) + \frac{1}{2}Cl_2(g)$

10. Which of the following reactions is the MOST exothermic?

A. $C(s) + O_2(g) \rightarrow CO_2(g)$ $\Delta H°_f = -394$ kJ/mol ← this is the answer! Freebie! ☺ From Ms. Efird
B. $H_2(g) + \frac{1}{2}O_2(g) \rightarrow H_2O(l)$ $\Delta H°_f = -286$ kJ/mol
C. $\frac{1}{2}N_2(g) + O_2(g) \rightarrow NO_2(g)$ $\Delta H°_f = 34$ kJ/mol
D. C(graphite) $\rightarrow$ C (diamond) $\Delta H°_f = 1.9$ kJ/mol

11. Which sample contains particles in a rigid, fixed, geometric pattern?

A. $CO_2(aq)$
B. $HF(g)$
C. $H_2O_2(l)$
D. $SiO_2(s)$

12. Which of the following particles is the lightest?

A. electron
B. proton
C. neutron
D. nucleus

13. Identify the element with an [Ar] $4s^2$ electron configuration?

A. potassium
B. calcium
C. titanium
D. germanium

14. A radioactive isotope, Pu-241, has a half-life of 14.4 years. If you start with 10 g of pure Pu-241, how much will be left in 28.8 years?

A. 14.4 g
B. 5 g
C. 20 g
D. 2.5 g

15. A gas has a volume of 16 liters at a pressure of 200 kilopascals. If the temperature of the gas is kept constant, identify the volume the gas will have at a pressure of 100 kilopascals.

A. 4 liters
B. 8 liters
C. 32 liters
D. 256 liters

16. There are 37 isotopes of iodine. Only one is stable. How many protons does this isotope have?

A. 53
B. 73
C. 74
D. 127

17. Which of the following diatomic molecules has a triple bond?

A. F_2
B. O_2
C. N_2
D. H_2

18. What is the pH of a solution of 0.10 M LiOH?

A. 1
B. 0
C. 13
D. 14

19. Which of the following elements will have the largest atomic radius?

A. boron
B. carbon
C. nitrogen
D. oxygen

20. What is the percent composition of oxygen in $Sr(NO_3)_2$?

A. 7.6%
B. 45.4%
C. 22.7%
D. 32.1%

4. Another name for a police officer?

21. The chemical compound NCl_3 is a yellow, oily compound that is highly reactive. Name this compound.

A. nitrogen tetrachloride
B. nitrogen trichloride
C. nitrogen (III) chloride
D. nitrogen (IV) chloride

22. What particle will complete this reaction?

$$^{209}_{83}Bi \rightarrow \_\_\_\_\_ + {}^{205}_{81}Tl$$

A. a neutron
B. an electron
C. a beta particle
D. an alpha particle

23. A sample of SO_2 gas has a volume of 5.75 L at a temperature of 15°C and 1.7 atm. How many moles of gas are in the sample?

A. 0.38 moles
B. 0.41 moles
C. 7.94 moles
D. 6.19 moles

24. What is the mass of a sample that contains 0.62 mols of $SO_2(g)$?

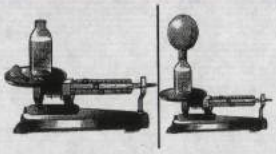
A. 29.8 g
B. 39.7 g
C. 103.3 g
D. 9.7 mg

25. Which of the following molecules has a trigonal planar framework?

A. NH_3
B. BF_3
C. HCl
D. CCl_4

5. What you do to flowers...

26. Carl investigated the change of mass during a chemical reaction. This experimental setup is illustrated in the diagram below. He massed a balloon, two seltzer tablets and a plastic bottle that contained 50 mL of water. He recorded a total mass of 200g. The combined mass of the two seltzer tablets before they were dropped into the water was 5 g. Carl put the seltzer tablets inside the balloon and pulled the balloon over the neck of the bottle. He shook the balloon so the seltzer tablets fell into the water. Carl observed the tablets fizzing and the balloon expanding. Carl again massed his apparatus after the fizzing and the expansion of the balloon stopped.



Select the mass of Carl's apparatus at the end of his investigation.

A. 195 g
B. between 195 g and 200 g
C. 200 g
D. more than 200 g

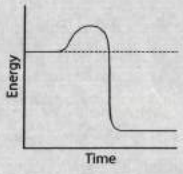
27. Which of the following compounds does not feature covalent bonding?

A. CCl_4
B. KCl
C. H_2O
D. O_2

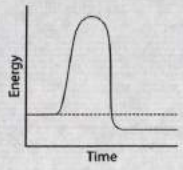
5

28. Which of the following diagrams has the lowest activation energy?

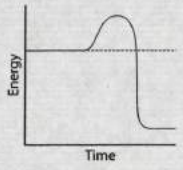
A.



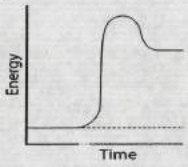
B.



C.



D.



29. In which of the following laboratory scenarios has a chemical change occurred?

A. A 100 mL beaker filled with an aqueous solution is placed on ice.
B. Two immiscible solvents are shaken together to form an emulsion.
C. A white crystalline solid is heated to produce a metallic solid and a yellowish gas.
D. A liquid is heated past its boiling point to produce a gaseous vapor.

30. In a lab experiment, 1M solutions of each of four acids are compared. The acid with the highest pH will be

A. the most concentrated acid.
B. the weakest acid.
C. the strongest acid.
D. the weakest base.

6. This is what happens when you lose a horse.

31. Select the largest atom from the following list.

A. Br
B. Cl
C. S
D. Se

32. What is the molecular geometry of carbon tetrachloride?

A. linear
B. trigonal planar
C. trigonal pyramidal
D. tetrahedral

6

. Consider the following equation.

$MgO + H_2O \rightarrow$ _____

33. What compound correctly completes this reaction?

A. MgOH
B. $Mg(OH)_2$
C. 2MgOH
D. $2Mg(OH)_2$

7. This is what a doctor does to their patients.

34. Hans Geiger and Ernest Marsden performed the gold foil experiment in 1909, under the supervision of Ernest Rutherford. The experiment involved firing alpha particles at a thin sheet of gold foil. What surprising result was generated by this experiment? 2.01

A. Atoms are larger than anyone expected them to be.
B. Atoms have a dense, positively charged core.
C. Atoms are surrounded by orbiting electrons.
D. Atoms undergo radioactive decay at a predictable rate.

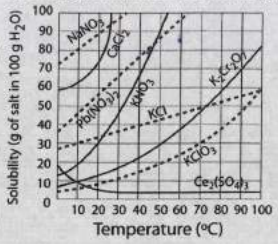
35. Which statement best describes the difference between green light and violet light?

A. Green light has a greater speed than violet light.
B. Violet light has a greater speed than green light.
C. Violet light has a higher frequency than green light.
D. Green light has a higher frequency than violet light.

36. Select the type of ion produced when a strong acid is added to water.

A. hydrated
B. hydride
C. hydroxide
D. hydronium

Use the figure below to answer question 37



37. According to the graph, how is $Ce_2(SO_4)_3$ different from the other compounds shown?

A. The solubility of $Ce_2(SO_4)_3$ does not change with temperature.
B. The solubility of $Ce_2(SO_4)_3$ decreases when the temperature is increased.
C. All of the other compounds are more soluble at 0°C.
D. All of the other compounds are less soluble at 10°C.

Use the following electronegativity chart to answer question 38

H 2.1						He —
Li 1.0	Be 1.5	B 2.0	C 2.5	N 3.1	O 3.5	F 4.0	Ne —
Na 1.0	Mg 1.2	Al 1.5	Si 1.8	P 2.1	S 2.4	Cl 2.9	Ar —
K 0.9	Ca 1.1						

38. Which of the following compounds contain ionic bonds?

A. $SOCl_2$
B. $P(OH)_4$
C. $Mg(OH)_2$
D. HCN

17

39. Which of the following statements describe the movement of electrons about a central nucleus?

A. Electrons orbit the nucleus in an ellipitcal pattern.
B. Electrons are found in orbitals, which are defined spaces predicted by mathematical probability functions.
C. Electrons are found in orbitals when the atom is in its elemental state, but are scattered once the atom chemically bonds.
D. Electron locations cannot be defined or predicted because of their high velocity.

40. Select the element that has this electron configuration.

$1s^2\ 2s^2\ 2p^6\ 3s^1$

A. Li
B. Na
C. Mg
D. K

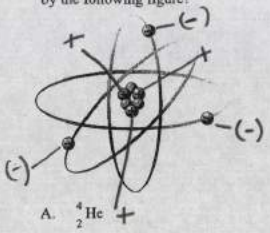
41. An atom of Li forms the ion Li^+. Which statement best describes the difference in size between Li and Li^+?

A. Li is larger than Li^+.
B. Li^+ is larger than Li.
C. Li and Li^+ are the same size.
D. The size of Li^+ cannot be accurately determined.

42. Select the product of radioactive decay that has the greatest ability to penetrate matter.

A. alpha particles
B. beta particles
C. gamma rays
D. neutrons

43. What atom or ion is represented by the following figure?



A. ^4_2He
B. ^7_3Li
C. ^6_3Li
D. $^6_3Li^+$

8. This is what you do to ripped jeans.

44. Which statement below correctly explains the polarity of water?

A. Hydrogen atoms are much smaller than oxygen atoms.
B. Water molecules have a bond angle greater than 100 degrees.
C. Water molecules form hydrogen bonds with other water molecules.
D. Oxygen nuclei attract electrons more strongly than hydrogen nuclei attract electrons.

45. Mark continues to add NaOH until the solution pH is 10. What concentration of OH^- ions is in the solution?

A. 1×10^{-10}
B. 1×10^{-4}
C. 1×10^{-6}
D. 1×10^{-7}

8

46. Andrew has a 0.1 mol sample of 4 gases: chlorine, neon, argon and krypton. Each gaseous sample is contained in a balloon. All the balloons are at the same temperature. Which of the following correctly represents the relative sizes of the balloons?

A. 

B. 

C. 

D. 

47. Hydrogen bonding is an important type of intermolecular force. In which of the following compounds is hydrogen bonding not observed?

A. HF(aq)
B. $H_2O(l)$
C. $NH_3(aq)$
D. $CH_4(g)$

48. Electronic transitions result in the emission of photons of characteristic wavelengths. Which of the following hydrogen electron transitions would produce the highest energy light emission?

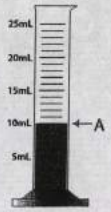
A. n=3 to n=1
B. n=4 to n=1
C. n=6 to n=3
D. either B or C

Use the following information to answer question 49.

Rita obtains an unknown liquid sample from her teacher. It has a mass of 7 grams, and it fills a graduated cylinder to Level A on the graduated cylinder. She is given the densities of the following four liquids to help her identify the sample.

49. Which one is it?

	g/mL
water	1.00
vegetable oil	0.93
honey	1.42
gasoline	0.70



A. water
B. vegetable oil
C. honey
D. gasoline

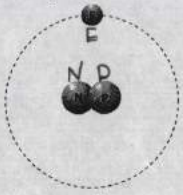
50. The only stable isotope of a particular alkali metal has 78 neutrons. Identify this element

A. $^{223}_{87}Fr$
B. $^{134}_{56}Ba$
C. $^{133}_{55}Cs$
D. $^{139}_{57}La$

9. The "tasty" part of your mouth...

(9)

51. Which of the following atoms does this figure illustrate?



A. hydrogen- $^{1}_{1}H$
B. helium- $^{4}_{2}He$
C. hydrogen ion- $^{1}_{1}H^{+}$
D. deuterium- $^{2}_{1}H$

52. Emily reads a science fiction story that describes an alien invasion. In it, the aliens are using α-particle guns on humans. Upon contact with the alpha particles, the humans perish instantly. Is the science correct in this science fiction story?

A. No, because α-particles are too heavy and slow to travel far or cause external injury.
B. Yes, because α-particles are highly energetic and penetrating.
C. No, because the direction that an α-particle will travel is unknown and cannot be controlled. They could not be "fired" at people.
D. Yes, because α-particles combust easily in air.

10. If you are extinct, you _____.

Use the following information to answer questions 53-54

Steven mixes solid aluminum in NaOH solution, according to the following highly exothermic reaction.

$$2Al(s) + 6NaOH(aq) \rightarrow 3H_2(g) + 2Na_3AlO_3(aq)$$

53. If 3 moles of Al(s) are used with excess NaOH, how many moles of H_2 (g) would be produced?

A. 3 moles H_2
B. 2 moles H_2
C. 4.5 moles H_2
D. 9 moles H_2

54. The concentration of the reacting NaOH is 0.1M. What is its pH?

A. 13.9
B. 0.1
C. 13
D. 1

55. Troy has an unknown acid. A pH paper test indicates that the pH of the unknown solution is less than 1. Which of the following is definitely NOT Troy's unknown?

Unknown	Acid	Concentration
A	HNO_3	0.15M
B	H_3CCOOH	0.75M
C	H_2SO_4	0.12M
D	HCl	0.75M

A. HNO_3
B. H_3CCOOH
C. H_2SO_4
D. HCl

↑ This is the answer! From Mrs. Morley!

(10)

56. Propane (C_3H_8) burns in the presence of oxygen to produce two compounds. Which of the following reactions correctly describes the combustion of propane?

A. $C_3H_8 + 3O_2 \rightarrow 3CO_2 + 2H_2O$ + heat
B. $C_3H_8 + O_2 \rightarrow 3/2CO_2 + 4H_2$ + heat
C. $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ + heat
D. $C_3H_8 + 7O_2 \rightarrow 3CO_2 + 8H_2O$ + heat

57. A scientist examines a species is aqueous solution. Through experimentation, he determines that species X has lost 2 electrons. How should he record the new symbol for species X in his lab notebook?

A. 2X
B. X_2^-
C. X^{2-}
D. X^{2+}

58. When hydrogen sulfide gas is passed over a bed of zinc oxide, it is absorbed and converted to solid zinc sulfide.

$H_2S(g) + ZnO(s) \rightarrow ZnS(s) + H_2O(l)$

If 100 grams of ZnO are present in the bed, how many grams of H_2S will be absorbed?

A. 100 grams
B. 41.9 grams
C. 1.2 grams
D. 81.8 grams

59. The air we breath is made up of 78% nitrogen, 21% oxygen and 1 % argon and other gases. Which of the following correctly lists the solute(s) in this gaseous solution?

A. oxygen and other gases
B. nitrogen
C. oxygen, argon and other gases
D. nitrogen and oxygen

Use the relative sizes of the atoms in the image to answer question 60

60. Which compound can be represented by the image?

A. HCN
B. $MgCl_2$
C. CO_2
D. O_3

61. Select the volume of space taken up by one mole of N_2 gas at 25°C and 1 atm.

A. 22.4 L
B. 24.4 L
C. 2.05 L
D. 0.28 L

62. What is the total number of electrons found in an atom of phosphorus?

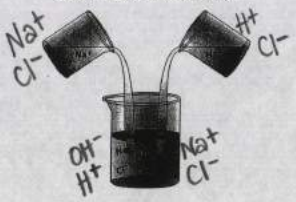
A. 3
B. 5
C. 15
D. 31

63. Which of the following processes is accompanied by an increase in kinetic energy?

A. freezing
B. condensing
C. subliming
D. cooling

11. At the end of the day as a car salesman, your boss asks, "Did you ____?"

64. What type of reaction is taking place in the following figure?



A. neutralization
B. single replacement
C. combustion
D. synthesis

65. Which of the following scientists most clearly illustrated that atoms have a nucleus, which contains the great majority of the mass of the atom?

A. Niels Bohr
B. J.J. Thomson
C. Albert Einstein
D. Ernest Rutherford

66. Baking soda is a white powder. It is a base with the formula $NaHCO_3$. When vinegar containing acetic acid is poured onto the powder, bubbles appear. This reaction is called

A. carbonation.
B. titration.
C. neutralization.
D. combustion.

67. Which of the following atoms can be described by the Bohr model?

A. HCl
B. H
C. Li
D. He

Or... which model is on your cheat sheet!?

68. Select the number of electrons a beryllium atom will gain or lose when it forms a beryllium ion.

A. gain 2
B. gain 4
C. lose 2
D. lose 4

69. Aluminum is mined from an ore called bauxite. The formula for bauxite is $Al(OH)_3$. What is the oxidation state of aluminum in this compound?

A. –1
B. +1
C. +2
D. +3

70. The nucleus of an atom emits a particle. The particle is equal in size to a helium nucleus. What is this particle?

A. an alpha particle
B. a beta particle
C. a neutron
D. a gamma ray

71. What is the volume of a 3 mol sample of helium at STP?

A. 67.2 L
B. 7.5 L
C. 0.13 L
D. This cannot be determined without additional information.

72. Give the name of the compound $NH_4C_2H_3O_2$.

A. ammonium acetate
B. ammonium (IV) acetate
C. ammonium carbonate
D. acetylammonia

12. Five times two is ____.

73. Which of the following atoms commonly ionizes to form a cation?

A. carbon
B. fluorine
C. neon
D. lithium

74. Which of the following BEST describes the electron cloud of an atom?

A. a specific orbit where an electron will be found
B. the poorly defined area where d electrons are held
C. the approximate space that an electron is likely to be found
D. a spherical area of constant radius

75. Lithium hydroxide is a strong base. What is the molarity of a 100 mL solution that contains 0.75 grams of LiOH?

A. 0.11 M
B. 0.31 M
C. 1.08 M
D. 0.09 M

76. Which of the following intermolecular forces is the strongest?

A. London forces
B. hydrogen bonding
C. dipole-dipole
D. van der Waals

77. A spectroscopist knows that an increase in the wavelength of electromagnetic radiation means

A. a decrease in its energy.
B. an increase in its frequency.
C. a change in its velocity.
D. a decrease in the distance it can travel.

Examine the following reaction to answer question 78.

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

78. If four moles of methane are used, calculate the mass of CO_2 produced.

A. 176.04 g
B. 88.02 g
C. 44.01 g
D. 11.00 g

79. Vanadium (V) oxide is used as the catalyst in manufacturing sulfuric acid. What is the formula for this compound?

A. VO_5
B. V_5O_5
C. V_2O_5
D. V_2O_{10}

80. A spectroscopist tracks the following four waves. Which is the infrared range of the electromagnetic spectrum?

λ (m)

A. 5.87×10^{-7}
B. 2.01×10^{-9}
C. 1.16×10^{-7}
D. 1.29×10^{-6}

81. Which of the following is a measure of the average kinetic energy of the particles in a sample of matter?

a) chemical kinetics
b) thermochemistry
c) reaction rate
d) temperature

82. How is a Celsius temperature reading converted to a Kelvin temperature reading?

a) by adding 273.15
b) by subtracting 273.15
c) by dividing by 273.15
d) by multiplying by 273.15

83. What is the heat required to raise the temperature of 1 g of a substance by 1 °C or 1 K?

a) specific heat
b) heat energy
c) heat capacity
d) heat of formation

84. How much heat does a copper sample gain if its specific heat is 0.384 J/g·°C, its mass is 8.00 g, and it is heated from 10.0°C to 40.0°C?

a) 0.0016 J/g·°C
b) 0.0016 J
c) 92.2 J
d) 92.2 J/g·°C

85. Find the specific heat of a material if a 6-g sample absorbs 50 J when it is heated from 30°C to 50°C.

a) 6000 J
b) 6000 J/g·°C
c) 0.4 J
d) 0.4 J/g·°C

86. Which of the following travels fastest?

a) alpha particles
b) beta particles
c) gamma rays
d) All travel at the same speed.

87. Which of the following generally have the lowest penetrating ability?

a) alpha particles
b) beta particles
c) gamma rays
d) All have the same penetrating ability.

Use the graph below to answer question 88

Half-Life of Element X

Time	Amount of sample
0 days	200.0 grams
20 days	100.0 grams
40 days	50.0 grams
60 days	25.0 grams
80 days	? ?
100 days	? ?

88. If the trend in the table shown above continues, how much of element X will be left after 100 days of decay?

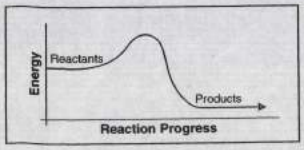
A 5.25 g

B 6.25 g

C 8.50 g

D 12.50 g

Use the diagram below to answer question 89.



89. How would the addition of a catalyst affect this reaction?

A The presence of a catalyst would decrease the activation energy.

B The catalyst would increase the activation energy.

C The presence of a catalyst would make the reaction more spontaneous.

D The catalyst would be consumed during the reaction and make more product.

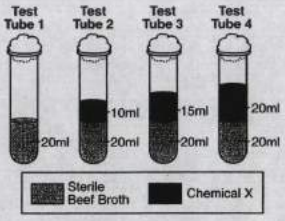
90. Which of these is NOT a type of radiation?

A Alpha radiation

B Beta radiation

C Gamma radiation

D Delta radiation



91. A biochemist is performing an experiment to determine the effects of Chemical X on the growth of bacteria. Which is the control?

A Test tube 1

B Test tube 2

C Test tube 3

D Test tube 4

92. Which of the following would NOT increase the rate of a reaction?

A an increase in the concentration of reactants

B the removal of a catalyst

C an increase in solvent volume

D an increase in temperature

93. Which of these is required for a reaction to be called exothermic?

A The enthalpy of the reactants must be less than that of the products.

B The sign of the change in enthalpy for the reaction must be positive.

C The enthalpy of the products must be less than that of the reactants.

D Heat must flow from the surroundings into the system.

must flow

94. If the theoretical yield for a reaction was 156 grams and I actually made 122 grams of the product, what is my percent yield?
a. 78.2% b. 128% c. 19.0% d. 2%

95. Hydrochloric acid reacts with calcium to form hydrogen and calcium chloride. If 100 grams of hydrochloric acid reacts with 100 grams of calcium chloride, what is the limiting reagent?
a. hydrochloric acid b. hydrogen
c. calcium chloride d. calcium

96. For the reaction in problem 95, how much of the nonlimiting reagent will be left over after the reaction is complete?
a. 54.8 grams b. 45.2 grams c. 2.74 grams d. 26 grams

97. What is the empirical formula of the compound whose molecular formula is P_4O_{10}?
a. PO b. PO_2 c. P_2O_5 d. P_8O_{20}

98. What is the total number of moles of H_2SO_4 needed to prepare 5.0 liters of a 2.0 M solution of H_2SO_4?
a. 2.5 b. 5.0 c. 10 d. 20

99. The B—F bond in BF_3 (electronegativity for B is 2.0; electronegativity for F is 4.0) is
a) polar covalent. b) ionic.
c) nonpolar covalent. d) pure covalent.

100. The process of nuclear fusion involves the —

A splitting up of a nucleus into smaller fragments

B combining of atomic nuclei

C splitting up of electrons into smaller fragments

D combining of highly unstable nuclei