Name: _____ Class: _____ Date: _____ ID: A

Summer Study Guide. 100 random questions from the first four chapters.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1) Solids have a _____ shape and are not appreciably _____.
   Ⓐ definite, compressible
   Ⓑ definite, incompressible
   Ⓒ indefinite, compressible
   Ⓓ indefinite, incompressible
   Ⓔ sharp, convertible

2) A concise verbal statement or mathematical equation that summarizes a broad variety of observations and experiences is called a(n) _____.
   Ⓐ law
   Ⓑ theory
   Ⓒ hypothesis
   Ⓓ experiment
   Ⓔ test

3) A common English set of units for expressing velocity is miles/hour. The SI unit for velocity is _____.
   Ⓐ km/hr
   Ⓑ km/s
   Ⓒ m/hr
   Ⓓ m/s
   Ⓔ cm/s

4) A temperature of 400. K is the same as _____°F.
   Ⓐ 260
   Ⓑ 286
   Ⓒ 88
   Ⓓ 103
   Ⓔ 127

5) A certain liquid has a density of 2.67 g/cm^3. 30.5 mL of this liquid would have a mass of _____ Kg.
   Ⓐ 81.4
   Ⓑ 11.4
   Ⓒ 0.0875
   Ⓓ 0.0814
   Ⓔ 0.0114

6) 45 m/s = _____ km/hr
   Ⓐ 2.7
   Ⓑ 0.045
   Ⓒ 1.6×10^2
   Ⓓ 2.7×10^3
   Ⓔ 1.6×10^5

7) $\dfrac{(0.002843)(12.80184)}{0.00032}$ = _____
   Ⓐ 113.73635
   Ⓑ 113.736
   Ⓒ 113.74
   Ⓓ 113.7
   Ⓔ 1.1×10^2

8) _____ significant figures should be retained in the result of the following calculation.

$$\frac{(11.13 - 2.6) \times 10^4}{(103.05 + 16.9) \times 10^{-6}}$$

   Ⓐ 1
   Ⓑ 2
   Ⓒ 3
   Ⓓ 4
   Ⓔ 5

9) There are _____ ng in a pg.
   Ⓐ 0.001
   Ⓑ 1000
   Ⓒ 0.01
   Ⓓ 100
   Ⓔ 10

10) In the following list, only _____ is not an example of matter.
   Ⓐ planets
   Ⓑ light
   Ⓒ dust
   Ⓓ elemental phosphorus
   Ⓔ table salt

11) Which one of the following elements has a symbol that is not derived from its foreign name?
   Ⓐ tin
   Ⓑ aluminum
   Ⓒ mercury
   Ⓓ copper
   Ⓔ lead

12) For which of the following can the composition vary?
   Ⓐ pure substance
   Ⓑ element
   Ⓒ both homogeneous and heterogeneous mixtures
   Ⓓ homogeneous mixture
   Ⓔ heterogeneous mixture

13) The law of constant composition says _____.
   Ⓐ that the composition of a compound is always the same
   Ⓑ that all substances have the same composition
   Ⓒ that the composition of an element is always the same
   Ⓓ that the composition of a homogeneous mixture is always the same
   Ⓔ that the composition of a heterogeneous mixture is always the same

14) Gases and liquids share the property of _____.
   Ⓐ compressibility
   Ⓑ definite volume
   Ⓒ incompressibility
   Ⓓ indefinite shape
   Ⓔ definite shape

15) Of the following, only _____ is a chemical reaction.
   Ⓐ melting of lead
   Ⓑ dissolving sugar in water
   Ⓒ tarnishing of silver
   Ⓓ crushing of stone
   Ⓔ dropping a penny into a glass of water

16) Which calculation clearly shows a conversion between temperatures in degrees Celsius, t(°C), and temperature in Kelvins, T(K)?
   Ⓐ $T(K) = t(°C) + 273.15$
   Ⓑ $T(K) = 273.15 - t(°C)$
   Ⓒ $T(K) = [t(°C) - 32] / 1.8$
   Ⓓ $T(K) = [t(°C) + 32] \times 1.8$
   Ⓔ $T(K) = t(°C)$

17) Gold has a density of 0.01932 kg/cm^3. What volume (in cm^3) would be occupied by a 33.3 g sample of gold?
   Ⓐ 0.663
   Ⓑ 5.80×10^{-4}
   Ⓒ 5.80
   Ⓓ 0.581
   Ⓔ 1.72

18) Precision refers to _____.
   Ⓐ how close a measured number is to other measured numbers
   Ⓑ how close a measured number is to the true value
   Ⓒ how close a measured number is to the calculated value
   Ⓓ how close a measured number is to zero
   Ⓔ how close a measured number is to infinity

19) Round the number 3456.5 to two significant figures.
Ⓐ 3400.0
Ⓑ 3400
Ⓒ 3000
Ⓓ 3500
Ⓔ 3000.0

20) What decimal power does the abbreviation pico represent?
Ⓐ 1×10^{6}
Ⓑ 1×10^{9}
Ⓒ 1×10^{-1}
Ⓓ 1×10^{-12}
Ⓔ 1×10^{-15}

21) The recommended adult dose of Elixophyllin®, a drug used to treat asthma, is 6.00 mg/kg of body mass. Calculate the dose in milligrams for a 115-lb person. 1 lb = 453.59g.
Ⓐ 24
Ⓑ 1,521
Ⓒ 1.5
Ⓓ 313
Ⓔ 3.1×10^{5}

22) The density of air under ordinary conditions at 25°C is 1.19 g/L. How many kilograms of air are in a room that measures 11.0 ft × 11.0 ft and has an 10.0 ft ceiling? 1 in. = 2.54 cm (exactly); 1 L = 10^3 cm^3
Ⓐ 3.66
Ⓑ 0.152
Ⓒ 4.08×10^{4}
Ⓓ 0.0962
Ⓔ 40.8

23) The nucleus of an atom contains _____.
Ⓐ electrons
Ⓑ protons, neutrons, and electrons
Ⓒ protons and neutrons
Ⓓ protons and electrons
Ⓔ protons

24) The element _____ is the most similar to strontium in chemical and physical properties.
Ⓐ Li
Ⓑ At
Ⓒ Rb
Ⓓ Ba
Ⓔ Cs

25) Lithium is a _____ and magnesium is a _____.
Ⓐ nonmetal, metal
Ⓑ nonmetal, nonmetal
Ⓒ metal, metal
Ⓓ metal, metalloid
Ⓔ metalloid, metalloid

26) Calcium is a _____ and silver is a _____.
Ⓐ nonmetal, metal
Ⓑ metal, metal
Ⓒ metalloid, metal
Ⓓ metal, metalloid
Ⓔ nonmetal, metalloid

27) _____ are found uncombined, as monatomic species in nature.
Ⓐ Noble gases
Ⓑ Chalcogens
Ⓒ Alkali metals
Ⓓ Alkaline earth metals
Ⓔ Halogens

28) The formula of a salt is XCl_2. The X-ion in this salt has 28 electrons. The metal X is _____.
Ⓐ Ni
Ⓑ Zn
Ⓒ Fe
Ⓓ V
Ⓔ Pd

29) Iodine forms an ion with a charge of _____.
Ⓐ 7-
Ⓑ 1+
Ⓒ 2-
Ⓓ 2+
Ⓔ 1-

30) The correct name for CCl_4 is _____.
Ⓐ carbon chloride
Ⓑ carbon tetrachlorate
Ⓒ carbon perchlorate
Ⓓ carbon tetrachloride
Ⓔ carbon chlorate

31) The correct name for $HClO_3$ is _____.
Ⓐ hydrochloric acid
Ⓑ perchloric acid
Ⓒ chloric acid
Ⓓ chlorous acid
Ⓔ hydrochlorous acid

32) Magnesium and sulfur form an ionic compound with the formula _____.
Ⓐ MgS
Ⓑ Mg_2S
Ⓒ MgS_2
Ⓓ Mg_2S_2
Ⓔ Mg_2S_3

33) The name of the ionic compound $(NH_4)_3PO_4$ is _____.
Ⓐ ammonium phosphate
Ⓑ nitrogen hydrogen phosphate
Ⓒ tetrammonium phosphate
Ⓓ ammonia phosphide
Ⓔ triammonium phosphate

34) What is the formula for perchloric acid?
Ⓐ HClO
Ⓑ $HClO_3$
Ⓒ $HClO_4$
Ⓓ $HClO_2$
Ⓔ HCl

35) _____-rays consist of fast-moving electrons.
Ⓐ Alpha
Ⓑ Beta
Ⓒ Gamma
Ⓓ X
Ⓔ none of the above

36) In the Rutherford nuclear-atom model, _____.
Ⓐ the heavy subatomic particles, protons and neutrons, reside in the nucleus
Ⓑ the three principal subatomic particles (protons, neutrons, and electrons) all have essentially the same mass
Ⓒ the light subatomic particles, protons and neutrons, reside in the nucleus
Ⓓ mass is spread essentially uniformly throughout the atom
Ⓔ the three principal subatomic particles (protons, neutrons, and electrons) all have essentially the same mass and mass is spread essentially uniformly throughout the atom

37) Cathode rays are _____.
Ⓐ neutrons
Ⓑ x-rays
Ⓒ electrons
Ⓓ protons
Ⓔ atoms

38) In the absence of magnetic or electric fields, cathode rays _____.
Ⓐ do not exist
Ⓑ travel in straight lines
Ⓒ cannot be detected
Ⓓ become positively charged
Ⓔ bend toward a light source

39) Of the three types of radioactivity characterized by Rutherford, which are particles?
Ⓐ β-rays
Ⓑ α-rays, β-rays, and γ-rays
Ⓒ γ-rays
Ⓓ α-rays and γ-rays
Ⓔ α-rays and β-rays

40) Which combination of protons, neutrons, and electrons is correct for the isotope of copper, $^{63}_{29}Cu$?

Ⓐ 29 p^+, 34 n°, 29 e^-
Ⓑ 29 p^+, 29 n°, 63 e^-
Ⓒ 63 p^+, 29 n°, 63 e^-
Ⓓ 34 p^+, 29 n°, 34 e^-
Ⓔ 34 p^+, 34 n°, 29 e^-

41) In the symbol below, X = _____.

$^{13}_{6}X$

Ⓐ N
Ⓑ C
Ⓒ Al
Ⓓ K
Ⓔ not enough information to determine

42) Silver has two naturally occurring isotopes with the following isotopic masses:

$^{107}_{47}Ar$	$^{107}_{47}Ar$
106.90509	108.9047

The average atomic mass of silver is 107.8682 amu. The fractional abundance of the lighter of the two isotopes is _____.

Ⓐ 0.24221
Ⓑ 0.48168
Ⓒ 0.51835
Ⓓ 0.75783
Ⓔ 0.90474

43) The atomic mass unit is presently based on assigning an exact integral mass (in amu) to an isotope of _____.

Ⓐ hydrogen
Ⓑ oxygen
Ⓒ sodium
Ⓓ carbon
Ⓔ helium

44) An unknown element is found to have three naturally occurring isotopes with atomic masses of 35.9675 (0.337%), 37.9627 (0.063%) and 39.9624 (99.600%). Which of the following is the unknown element?

Ⓐ Ar
Ⓑ K
Ⓒ Cl
Ⓓ Ca
Ⓔ None of the above could be the unknown element.

45) Which pair of elements below should be the most similar in chemical properties?

Ⓐ C and O
Ⓑ B and As
Ⓒ I and Br
Ⓓ K and Kr
Ⓔ Cs and He

46) Which one of the following does not occur as diatomic molecules in elemental form?

Ⓐ oxygen
Ⓑ nitrogen
Ⓒ sulfur
Ⓓ hydrogen
Ⓔ bromine

47) Which compounds do not have the same empirical formula?

Ⓐ C_2H_2, C_6H_6
Ⓑ CO, CO_2
Ⓒ C_2H_4, C_3H_6
Ⓓ $C_2H_4O_2$, $C_6H_{12}O_6$
Ⓔ $C_2H_5COOCH_3$, CH_3CHO

48) The molecular formula of a compound is always _____ the empirical formula.

Ⓐ more complex than
Ⓑ different from
Ⓒ an integral multiple of
Ⓓ the same as
Ⓔ simpler than

49) Which of the following compounds would you expect to be ionic?
Ⓐ SF_6
Ⓑ H_2O
Ⓒ H_2O_2
Ⓓ NH_3
Ⓔ CaO

50) Which species below is the nitride ion?
Ⓐ Na^+
Ⓑ NO_3^-
Ⓒ NO_2^-
Ⓓ NH_4^+
Ⓔ N^{3-}

51) Barium reacts with a polyatomic ion to form a compound with the general formula $Ba_3(X)_2$. What would be the most likely formula for the compound formed between sodium and the polyatomic ion X?
Ⓐ NaX
Ⓑ Na_2X
Ⓒ Na_2X_2
Ⓓ Na_3X
Ⓔ Na_3X_2

52) A correct name for $Fe(NO_3)_2$ is _____.
Ⓐ iron nitrite
Ⓑ ferrous nitrite
Ⓒ ferrous nitrate
Ⓓ ferric nitrite
Ⓔ ferric nitrate

53) Which element forms an ion with the same charge as the sulfate ion?
Ⓐ magnesium
Ⓑ copper
Ⓒ iron
Ⓓ phosphorus
Ⓔ oxygen

54) Which metal does not form cations of differing charges?
Ⓐ Na
Ⓑ Cu
Ⓒ Co
Ⓓ Fe
Ⓔ Sn

55) An atom of ^{17}O contains _____ protons.
Ⓐ 8
Ⓑ 25
Ⓒ 9
Ⓓ 11
Ⓔ 17

56) The atomic number of an atom of 80_{Br} is _____.
Ⓐ 115
Ⓑ 35
Ⓒ 45
Ⓓ 73
Ⓔ 80

57) How many electrons does the Al^{3+} ion possess?
Ⓐ 16
Ⓑ 10
Ⓒ 6
Ⓓ 0
Ⓔ 13

58) How many protons does the Br^- ion possess?
Ⓐ 34
Ⓑ 36
Ⓒ 6
Ⓓ 8
Ⓔ 35

59) Predict the charge of the most stable ion of potassium.
Ⓐ 3+
Ⓑ 1-
Ⓒ 2+
Ⓓ 2-
Ⓔ 1+

60) When the following equation is balanced, the coefficient of H_3PO_4 is _____.

H_3PO_4 (aq) + NaOH (aq) → Na_3PO_4 (aq) + H_2O (l)

Ⓐ 1
Ⓑ 2
Ⓒ 3
Ⓓ 4
Ⓔ 0

61) When the following equation is balanced, the coefficient of H_2 is _____.

CO (g) + H_2 (g) → H_2O (g) + CH_4 (g)

Ⓐ 1
Ⓑ 2
Ⓒ 3
Ⓓ 4
Ⓔ 0

62) When the following equation is balanced, the coefficient of hydrogen is _____.

K (s) + H_2O (l) → KOH (aq) + H_2 (g)

Ⓐ 1
Ⓑ 2
Ⓒ 3
Ⓓ 4
Ⓔ 5

63) When the following equation is balanced, the coefficient of oxygen is _____.

PbS (s) + O_2 (g) → PbO (s) + SO_2 (g)

Ⓐ 1
Ⓑ 3
Ⓒ 2
Ⓓ 4
Ⓔ 5

64) The balanced equation for the decomposition of sodium azide is _____.
Ⓐ $2NaN_3$ (s) → 2Na (s) + $3N_2$ (g)
Ⓑ $2NaN_3$ (s) → Na_2 (s) + $3N_2$ (g)
Ⓒ NaN_3 (s) → Na (s) + N_2 (g)
Ⓓ NaN_3 (s) → Na (s) + N_2 (g) + N (g)
Ⓔ $2NaN_3$ (s) → 2Na (s) + $2N_2$ (g)

65) There are _____ molecules of methane in 0.123 mol of methane (CH_4).
Ⓐ 5
Ⓑ 2.46×10^{-2}
Ⓒ 2.04×10^{-25}
Ⓓ 7.40×10^{22}
Ⓔ 0.615

66) A 22.5-g sample of ammonium carbonate contains _____ mol of ammonium ions.
Ⓐ 0.468
Ⓑ 0.288
Ⓒ 0.234
Ⓓ 2.14
Ⓔ 3.47

67) Combustion of a 1.031-g sample of a compound containing only carbon, hydrogen, and oxygen produced 2.265 g of CO_2 and 1.236 g of H_2O. What is the empirical formula of the compound?
Ⓐ C_3H_8O
Ⓑ C_3H_5O
Ⓒ $C_6H_{16}O_2$
Ⓓ $C_3H_9O_3$
Ⓔ $C_3H_6O_3$

68) The combustion of ammonia in the presence of excess oxygen yields NO_2 and H_2O:

4 NH_3 (g) + 7 O_2 (g) → 4 NO_2 (g) + 6 H_2O (g)

The combustion of 43.9 g of ammonia produces _____ g of NO_2.
Ⓐ 2.58
Ⓑ 178
Ⓒ 119
Ⓓ 0.954
Ⓔ 43.9

69) The combustion of propane (C_3H_8) in the presence of excess oxygen yields CO_2 and H_2O:

$C_3H_8\ (g) + 5O_2\ (g) \rightarrow 3CO_2\ (g) + 4H_2O\ (g)$

When 2.5 mol of O_2 are consumed in their reaction, _____ mol of CO_2 are produced.
Ⓐ 1.5
Ⓑ 3.0
Ⓒ 5.0
Ⓓ 6.0
Ⓔ 2.5

70) Under appropriate conditions, nitrogen and hydrogen undergo a combination reaction to yield ammonia:

$N_2\ (g) + 3H_2\ (g) \rightarrow 2NH_3\ (g)$

A 7.1-g sample of N_2 requires _____ g of H_2 for complete reaction.
Ⓐ 0.51
Ⓑ 0.76
Ⓒ 1.2
Ⓓ 1.5
Ⓔ 17.2

71) What is the mass % of carbon in dimethylsulfoxide (C_2H_6SO) rounded to three significant figures?
Ⓐ 60.0
Ⓑ 20.6
Ⓒ 30.7
Ⓓ 7.74
Ⓔ 79.8

72) The mass % of F in the binary compound KrF_2 is _____.
Ⓐ 18.48
Ⓑ 45.38
Ⓒ 68.80
Ⓓ 81.52
Ⓔ 31.20

73) A sample of CH_4O with a mass of 32.0 g contains _____ molecules of CH_4O.
Ⓐ 5.32×10^{-23}
Ⓑ 1.00
Ⓒ 1.88×10^{22}
Ⓓ 6.02×10^{23}
Ⓔ 32.0

74) What is the mass in grams of 9.76×10^{12} atoms of naturally occurring sodium?
Ⓐ 22.99
Ⓑ 1.62×10^{-11}
Ⓒ 3.73×10^{-10}
Ⓓ 7.05×10^{-13}
Ⓔ 2.24×10^{14}

75) Lithium and nitrogen react to produce lithium nitride:

$6Li\ (s) + N_2\ (g) \rightarrow 2Li_3N\ (s)$

How many moles of lithium nitride are produced when 0.450 mol of lithium react in this fashion?
Ⓐ 0.150
Ⓑ 0.900
Ⓒ 0.0750
Ⓓ 1.35
Ⓔ 0.225

76) When aqueous solutions of $AgNO_3$ and KI are mixed, AgI precipitates. The balanced net ionic equation is _____.
Ⓐ $Ag^+\ (aq) + I^-\ (aq) \rightarrow AgI\ (s)$
Ⓑ $Ag^+\ (aq) + NO_3^-\ (aq) \rightarrow AgNO_3\ (s)$
Ⓒ $Ag^+\ (aq) + NO_3^-\ (aq) \rightarrow AgNO_3\ (aq)$
Ⓓ $AgNO_3\ (aq) + KI\ (aq) \rightarrow AgI\ (s) + KNO_3\ (aq)$
Ⓔ $AgNO_3\ (aq) + KI\ (aq) \rightarrow AgI\ (aq) + KNO_3\ (s)$

77) A neutralization reaction between an acid and a metal hydroxide produces _____.
Ⓐ water and a salt
Ⓑ hydrogen gas
Ⓒ oxygen gas
Ⓓ sodium hydroxide
Ⓔ ammonia

78) How many grams of H_3PO_4 are in 175 mL of a 3.5 M solution of H_3PO_4?
Ⓐ 0.61
Ⓑ 60
Ⓒ 20
Ⓓ 4.9
Ⓔ 612

79) How many grams of NaOH (MW = 40.0) are there in 500.0 mL of a 0.175 M NaOH solution?
Ⓐ 2.19×10^{-3}
Ⓑ 114
Ⓒ 14.0
Ⓓ 3.50
Ⓔ 3.50×10^{3}

80) What are the respective concentrations (M) of Na^+ and SO_4^{2-} afforded by dissolving 0.500 mol Na_2SO_4 in water and diluting to 1.33 L?
Ⓐ 0.665 and 0.665
Ⓑ 0.665 and 1.33
Ⓒ 1.33 and 0.665
Ⓓ 0.376 and 0.752
Ⓔ 0.752 and 0.376

81) The molarity (M) of an aqueous solution containing 22.5 g of sucrose ($C_{12}H_{22}O_{11}$) in 35.5 mL of solution is _____.
Ⓐ 0.0657
Ⓑ 1.85×10^{-3}
Ⓒ 1.85
Ⓓ 3.52
Ⓔ 0.104

82) The molarity (M) of an aqueous solution containing 52.5 g of sucrose ($C_{12}H_{22}O_{11}$) in 35.5 mL of solution is _____.
Ⓐ 5.46
Ⓑ 1.48
Ⓒ 0.104
Ⓓ 4.32
Ⓔ 1.85

83) How many grams of sodium chloride are there in 550.0 mL of a 1.90 M aqueous solution of sodium chloride?
Ⓐ 61.1
Ⓑ 1.05
Ⓒ 30.5
Ⓓ 6.11×10^{4}
Ⓔ 122

84) The concentration of species in 500 mL of a 2.104 M solution of sodium sulfate is _____ M sodium ion and _____ M sulfate ion.
Ⓐ 2.104, 1.052
Ⓑ 2.104, 2.104
Ⓒ 2.104, 4.208
Ⓓ 1.052, 1.052
Ⓔ 4.208, 2.104

85) Of the species below, only _____ is <u>not</u> an electrolyte.
Ⓐ HCl
Ⓑ Rb_2SO_4
Ⓒ Ar
Ⓓ KOH
Ⓔ NaCl

86) Which one of the following compounds is insoluble in water?
Ⓐ Na_2CO_3
Ⓑ K_2SO_4
Ⓒ $Fe(NO_3)_3$
Ⓓ ZnS
Ⓔ $AgNO_3$

87) One method for removal of metal ions from a solution is to convert the metal to its elemental form so it can be filtered out as a solid. Which metal can be used to remove aluminum ions from solution?
Ⓐ zinc
Ⓑ cobalt
Ⓒ lead
Ⓓ copper
Ⓔ none of these

88) The net ionic equation for the dissolution of zinc metal in aqueous hydrobromic acid is _____.
Ⓐ $Zn\ (s) + 2Br^-\ (aq) \rightarrow ZnBr_2\ (aq)$
Ⓑ $Zn\ (s) + 2HBr\ (aq) \rightarrow ZnBr_2\ (aq) + 2H^+\ (aq)$
Ⓒ $Zn\ (s) + 2HBr\ (aq) \rightarrow ZnBr_2\ (s) + 2H^+\ (aq)$
Ⓓ $Zn\ (s) + 2H^+\ (aq) \rightarrow Zn^{2+}\ (aq) + H_2\ (g)$
Ⓔ $2Zn\ (s) + H^+\ (aq) \rightarrow 2Zn^{2+}\ (aq) + H_2\ (g)$

89) Oxidation and _____ mean essentially the same thing.
Ⓐ activity
Ⓑ reduction
Ⓒ metathesis
Ⓓ decomposition
Ⓔ corrosion

90) A 0.200 M K_2SO_4 solution is produced by _____.
Ⓐ dilution of 250.0 mL of 1.00 M K_2SO_4 to 1.00 L
Ⓑ dissolving 43.6 g of K_2SO_4 in water and diluting to a total volume of 250.0 mL
Ⓒ diluting 20.0 mL of 5.00 M K_2SO_4 solution to 500.0 mL
Ⓓ dissolving 20.2 g of K_2SO_4 in water and diluting to 250.0 mL, then diluting 25.0 mL of this solution to a total volume of 500.0 mL
Ⓔ dilution of 1.00 mL of 250 M K_2SO_3 to 1.00 L

91) What are the respective concentrations (M) of Cu^{+2} and Cl^- afforded by dissolving 0.200 mol $CuCl_2$ in water and diluting to 345 mL?
Ⓐ 0.200 and 0.200
Ⓑ 0.580 and 1.16
Ⓒ 0.200 and 0.400
Ⓓ 1.16 and 2.32
Ⓔ 0.580 and 0.290

92) You are given two clear solutions of the same unknown monoprotic acid, but with different concentrations. Which statement is true?
Ⓐ There is no chemical method designed to tell the two solutions apart.
Ⓑ It would take more base solution (per milliliter of the unknown solution) to neutralize the more concentrated solution.
Ⓒ A smaller volume of the less concentrated solution contains the same number of moles of the acid compared to the more concentrated solution.
Ⓓ If the same volume of each sample was taken, then more base solution would be required to neutralize the one with lower concentration.
Ⓔ The product of concentration and volume of the less concentrated solution equals the product of concentration and volume of the more concentrated solution.

93) What volume (mL) of a concentrated solution of sodium hydroxide (6.00 M) must be diluted to 200. mL to make a 1.50 M solution of sodium hydroxide?
Ⓐ 0.0500
Ⓑ 50.0
Ⓒ 45.0
Ⓓ 800.
Ⓔ 0.800

94) What volume (ml) of a 3.45 M lead nitrate solution must be diluted to 450.0 ml to make a 0.990 M solution of lead nitrate?
Ⓐ 129
Ⓑ 109
Ⓒ 101
Ⓓ 56
Ⓔ 45

95) Which of the following would require the largest volume of 0.100 M sodium hydroxide solution for neutralization?
Ⓐ 10.0 mL of 0.0500 M phosphoric acid
Ⓑ 20.0 mL of 0.0500 M nitric acid
Ⓒ 5.0 mL of 0.0100 M sulfuric acid
Ⓓ 15.0 mL of 0.0500 M hydrobromic acid
Ⓔ 10.0 mL of 0.0500 M perchloric acid

96) A 13.8 mL aliquot of 0.176 M H_3PO_4 (aq) is to be titrated with 0.110 M NaOH (aq). What volume (mL) of base will it take to reach the equivalence point?
Ⓐ 7.29
Ⓑ 22.1
Ⓒ 199
Ⓓ 66.2
Ⓔ 20.9

97) Pure acetic acid ($HC_2H_3O_2$) is a liquid and is known as glacial acetic acid. Calculate the molarity of a solution prepared by dissolving 10.00 mL of glacial acetic acid at 25°C in sufficient water to give 500.0 mL of solution. The density of glacial acetic acid at 25°C is 1.05 g/mL.
Ⓐ 1.26×10^{3}
Ⓑ 21.0
Ⓒ 0.0210
Ⓓ 0.350
Ⓔ 3.50×10^{-4}

98) A solution is prepared by mixing 50.0 mL of 0.100 M HCl and 10.0 mL of 0.200 M NaCl. What is the molarity of chloride ion in this solution?
Ⓐ 0.183
Ⓑ 8.57
Ⓒ 3.50
Ⓓ 0.0500
Ⓔ 0.117

99) What is the molarity of a NaOH solution if 28.2 mL of a 0.355 M H_2SO_4 solution is required to neutralize a 25.0-mL sample of the NaOH solution?
Ⓐ 0.801
Ⓑ 0.315
Ⓒ 0.629
Ⓓ 125
Ⓔ 0.400

100) Lead ions can be precipitated from aqueous solutions by the addition of aqueous iodide:

$Pb^{2+}(aq) + 2I^{-}(aq) \rightarrow PbI_2(s)$

Lead iodide is virtually insoluble in water so that the reaction appears to go to completion. How many milliliters of 3.550 M HI(aq) must be added to a solution containing 0.700 mol of $Pb(NO_3)_2(aq)$ to completely precipitate the lead?
Ⓐ 2.54×10^{-3}
Ⓑ 394
Ⓒ 197
Ⓓ 0.197
Ⓔ 0.394