

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/cm³. 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) $\frac{(0.002843)(12.80184)}{0.00032} =$ _____
- Ⓐ 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, $t(^{\circ}\text{C})$, and temperature in Kelvins, $T(\text{K})$?
Ⓐ $T(\text{K}) = t(^{\circ}\text{C}) + 273.15$
Ⓑ $T(\text{K}) = 273.15 - t(^{\circ}\text{C})$
Ⓒ $T(\text{K}) = [t(^{\circ}\text{C}) - 32] / 1.8$
Ⓓ $T(\text{K}) = [t(^{\circ}\text{C}) + 32] \times 1.8$
Ⓔ $T(\text{K}) = t(^{\circ}\text{C})$
- 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

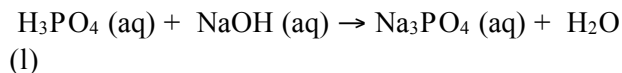
- 19) Round the number 3456.5 to two significant figures.
- Ⓐ 3400.0
 - Ⓑ 3400
 - Ⓒ 3000
 - Ⓓ 3500
 - Ⓔ 3000.0
- 20) What decimal power does the abbreviation pico represent?
- Ⓐ 1×10^6
 - Ⓑ 1×10^9
 - Ⓒ 1×10^{-1}
 - Ⓓ 1×10^{-12}
 - Ⓔ 1×10^{-15}
- 21) The recommended adult dose of Elixophyllin®, a drug 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 a 10.0 ft ceiling? 1 in. = 2.54 cm (exactly); 1 L = 10^3 cm³
- Ⓐ 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 XCl₂. 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 _____.
- (A) 7-
 - (B) 1+
 - (C) 2-
 - (D) 2+
 - (E) 1-
- 30) The correct name for CCl_4 is _____.
- (A) carbon chloride
 - (B) carbon tetrachlorate
 - (C) carbon perchlorate
 - (D) carbon tetrachloride
 - (E) carbon chlorate
- 31) The correct name for HClO_3 is _____.
- (A) hydrochloric acid
 - (B) perchloric acid
 - (C) chloric acid
 - (D) chlorous acid
 - (E) hydrochlorous acid
- 32) Magnesium and sulfur form an ionic compound with the formula _____.
- (A) MgS
 - (B) Mg_2S
 - (C) MgS_2
 - (D) Mg_2S_2
 - (E) Mg_2S_3
- 33) The name of the ionic compound $(\text{NH}_4)_3\text{PO}_4$ is _____.
- (A) ammonium phosphate
 - (B) nitrogen hydrogen phosphate
 - (C) tetrammonium phosphate
 - (D) ammonia phosphide
 - (E) triammonium phosphate
- 34) What is the formula for perchloric acid?
- (A) HClO
 - (B) HClO_3
 - (C) HClO_4
 - (D) HClO_2
 - (E) HCl
- 35) _____-rays consist of fast-moving electrons.
- (A) Alpha
 - (B) Beta
 - (C) Gamma
 - (D) X
 - (E) none of the above
- 36) In the Rutherford nuclear-atom model, _____.
- (A) the heavy subatomic particles, protons and neutrons, reside in the nucleus
 - (B) the three principal subatomic particles (protons, neutrons, and electrons) all have essentially the same mass
 - (C) the light subatomic particles, protons and neutrons, reside in the nucleus
 - (D) mass is spread essentially uniformly throughout the atom
 - (E) 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 _____.
- (A) neutrons
 - (B) x-rays
 - (C) electrons
 - (D) protons
 - (E) atoms
- 38) In the absence of magnetic or electric fields, cathode rays _____.
- (A) do not exist
 - (B) travel in straight lines
 - (C) cannot be detected
 - (D) become positively charged
 - (E) bend toward a light source
- 39) Of the three types of radioactivity characterized by Rutherford, which are particles?
- (A) β -rays
 - (B) α -rays, β -rays, and γ -rays
 - (C) γ -rays
 - (D) α -rays and γ -rays
 - (E) α -rays and β -rays

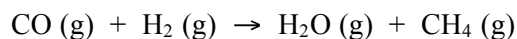
- 40) Which combination of protons, neutrons, and electrons is correct for the isotope of copper, ${}^{63}_{29}\text{Cu}$?
- (A) 29 p^+ , 34 n^0 , 29 e^-
 (B) 29 p^+ , 29 n^0 , 63 e^-
 (C) 63 p^+ , 29 n^0 , 63 e^-
 (D) 34 p^+ , 29 n^0 , 34 e^-
 (E) 34 p^+ , 34 n^0 , 29 e^-
- 41) In the symbol below, X = _____.
- $${}^{13}_6\text{X}$$
- (A) N
 (B) C
 (C) Al
 (D) K
 (E) not enough information to determine
- 42) Silver has two naturally occurring isotopes with the following isotopic masses:
- | | |
|--------------------------|--------------------------|
| ${}^{107}_{47}\text{Ag}$ | ${}^{107}_{47}\text{Ag}$ |
| 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 _____.
- (A) 0.24221
 (B) 0.48168
 (C) 0.51835
 (D) 0.75783
 (E) 0.90474
- 43) The atomic mass unit is presently based on assigning an exact integral mass (in amu) to an isotope of _____.
- (A) hydrogen
 (B) oxygen
 (C) sodium
 (D) carbon
 (E) 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?
- (A) Ar
 (B) K
 (C) Cl
 (D) Ca
 (E) None of the above could be the unknown element.
- 45) Which pair of elements below should be the most similar in chemical properties?
- (A) C and O
 (B) B and As
 (C) I and Br
 (D) K and Kr
 (E) Cs and He
- 46) Which one of the following does not occur as diatomic molecules in elemental form?
- (A) oxygen
 (B) nitrogen
 (C) sulfur
 (D) hydrogen
 (E) bromine
- 47) Which compounds do not have the same empirical formula?
- (A) C_2H_2 , C_6H_6
 (B) CO, CO_2
 (C) C_2H_4 , C_3H_6
 (D) $\text{C}_2\text{H}_4\text{O}_2$, $\text{C}_6\text{H}_{12}\text{O}_6$
 (E) $\text{C}_2\text{H}_5\text{COOCH}_3$, CH_3CHO
- 48) The molecular formula of a compound is always _____ the empirical formula.
- (A) more complex than
 (B) different from
 (C) an integral multiple of
 (D) the same as
 (E) simpler than

- 49) Which of the following compounds would you expect to be ionic?
- Ⓐ SF₆
 - Ⓑ H₂O
 - Ⓒ H₂O₂
 - Ⓓ NH₃
 - Ⓔ CaO
- 50) Which species below is the nitride ion?
- Ⓐ Na⁺
 - Ⓑ NO₃⁻
 - Ⓒ NO₂⁻
 - Ⓓ NH₄⁺
 - Ⓔ N³⁻
- 51) Barium reacts with a polyatomic ion to form a compound with the general formula Ba₃(X)₂. What would be the most likely formula for the compound formed between sodium and the polyatomic ion X?
- Ⓐ NaX
 - Ⓑ Na₂X
 - Ⓒ Na₂X₂
 - Ⓓ Na₃X
 - Ⓔ Na₃X₂
- 52) A correct name for Fe(NO₃)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 ¹⁷O contains _____ protons.
- Ⓐ 8
 - Ⓑ 25
 - Ⓒ 9
 - Ⓓ 11
 - Ⓔ 17
- 56) The atomic number of an atom of ⁸⁰Br is _____.
- Ⓐ 115
 - Ⓑ 35
 - Ⓒ 45
 - Ⓓ 73
 - Ⓔ 80
- 57) How many electrons does the Al³⁺ 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+

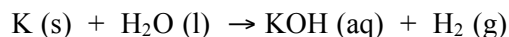
- 60) When the following equation is balanced, the coefficient of H_3PO_4 is _____.



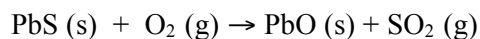
- (A) 1
(B) 2
(C) 3
(D) 4
(E) 0
- 61) When the following equation is balanced, the coefficient of H_2 is _____.



- (A) 1
(B) 2
(C) 3
(D) 4
(E) 0
- 62) When the following equation is balanced, the coefficient of hydrogen is _____.

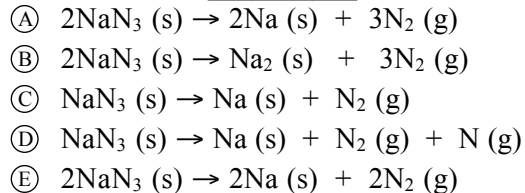


- (A) 1
(B) 2
(C) 3
(D) 4
(E) 5
- 63) When the following equation is balanced, the coefficient of oxygen is _____.



- (A) 1
(B) 3
(C) 2
(D) 4
(E) 5

- 64) The balanced equation for the decomposition of sodium azide is _____.



- 65) There are _____ molecules of methane in 0.123 mol of methane (CH_4).

- (A) 5
(B) 2.46×10^{-2}
(C) 2.04×10^{-25}
(D) 7.40×10^{22}
(E) 0.615

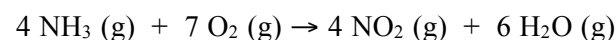
- 66) A 22.5-g sample of ammonium carbonate contains _____ mol of ammonium ions.

- (A) 0.468
(B) 0.288
(C) 0.234
(D) 2.14
(E) 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?

- (A) $\text{C}_3\text{H}_8\text{O}$
(B) $\text{C}_3\text{H}_5\text{O}$
(C) $\text{C}_6\text{H}_{16}\text{O}_2$
(D) $\text{C}_3\text{H}_9\text{O}_3$
(E) $\text{C}_3\text{H}_6\text{O}_3$

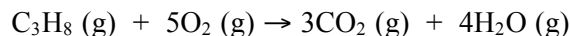
- 68) The combustion of ammonia in the presence of excess oxygen yields NO_2 and H_2O :



The combustion of 43.9 g of ammonia produces _____ g of NO_2 .

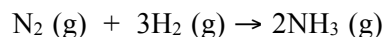
- (A) 2.58
(B) 178
(C) 119
(D) 0.954
(E) 43.9

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



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:



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

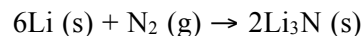
- 73) A sample of CH_4O with a mass of 32.0 g contains _____ molecules of CH_4O .

- Ⓐ 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:



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 ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) 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 ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) 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 not 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
 - Ⓒ $\text{Fe}(\text{NO}_3)_3$
 - Ⓓ 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 _____.
- Ⓐ $\text{Zn (s)} + 2\text{Br}^- (\text{aq}) \rightarrow \text{ZnBr}_2 (\text{aq})$
 - Ⓑ $\text{Zn (s)} + 2\text{HBr (aq)} \rightarrow \text{ZnBr}_2 (\text{aq}) + 2\text{H}^+ (\text{aq})$
 - Ⓒ $\text{Zn (s)} + 2\text{HBr (aq)} \rightarrow \text{ZnBr}_2 (\text{s}) + 2\text{H}^+ (\text{aq})$
 - Ⓓ $\text{Zn (s)} + 2\text{H}^+ (\text{aq}) \rightarrow \text{Zn}^{2+} (\text{aq}) + \text{H}_2 (\text{g})$
 - Ⓔ $2\text{Zn (s)} + \text{H}^+ (\text{aq}) \rightarrow 2\text{Zn}^{2+} (\text{aq}) + \text{H}_2 (\text{g})$
- 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 ($\text{HC}_2\text{H}_3\text{O}_2$) 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:
- $$\text{Pb}^{2+}(\text{aq}) + 2\text{I}^{-}(\text{aq}) \rightarrow \text{PbI}_2(\text{s})$$
- 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 $\text{Pb}(\text{NO}_3)_2$ (aq) to completely precipitate the lead?
- Ⓐ 2.54×10^{-3}
 - Ⓑ 394
 - Ⓒ 197
 - Ⓓ 0.197
 - Ⓔ 0.394