

INTERO CHEMISTRY-1305; FINAL REVIEW; SUMMER 2011

- 1) Which of the following terms is a metric unit of length?
 - A) centimeter
 - B) gram
 - C) milliliter
 - D) second
 - E) none of the above
- 2) What is the term for a number that indicates a value is multiplied by itself one or more times?
 - A) exponent
 - B) power of 10
 - C) reciprocal
 - D) scientific notation
 - E) none of the above
- 3) Which of the following terms is a metric unit of mass?
 - A) centimeter
 - B) gram
 - C) milliliter
 - D) second
 - E) none of the above
- 4) What is the term for the amount of substance measured by a laboratory balance?
 - A) length
 - B) mass
 - C) volume
 - D) weight
 - E) none of the above
- 5) What is the term for a numerical value and unit that expresses a mass, length, or volume?
 - A) assessment
 - B) estimation
 - C) measurement
 - D) quantity
 - E) none of the above
- 6) Which of the following is evidence for a chemical reaction?
 - A) A gas is detected.
 - B) A precipitate is formed.
 - C) A flame is observed.
 - D) all of the above
 - E) none of the above

7) What is the coefficient of ammonia gas after balancing the following equation?



- A) 1
- B) 2
- C) 3
- D) 4
- E) none of the above

8) What is the coefficient of chlorine gas after balancing the following equation?



- A) 1
- B) 2
- C) 3
- D) 4
- E) none of the above

9) What is the coefficient of oxygen gas after balancing the following equation?



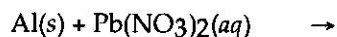
- A) 1
- B) 2
- C) 3
- D) 4
- E) none of the above

10) What type of chemical reaction is illustrated in the following example?



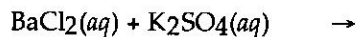
- A) combination reaction
- B) decomposition reaction
- C) single-replacement reaction
- D) double-replacement reaction
- E) neutralization reaction

11) What are the products from the following single-replacement reaction?



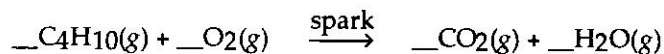
- A) Pb and $\text{Al}(\text{NO}_3)_3$
- B) Pb and $\text{Al}(\text{NO}_2)_3$
- C) PbO and $\text{Al}(\text{NO}_3)_3$
- D) PbO and $\text{Al}(\text{NO}_2)_3$
- E) no reaction

12) What are the products from the following double-replacement reaction?



- A) BaS and KClO_4
- B) BaSO_3 and KCl
- C) BaSO_3 and KClO_4
- D) BaSO_4 and KCl
- E) BaSO_4 and KClO_4

13) Butane, C_4H_{10} , is flammable and used in butane lighters. What is the coefficient of oxygen in the balanced equation for the combustion of butane?



- A) 9
- B) 13
- C) 18
- D) 26
- E) none of the above

14) Which of the following terms is a metric unit of volume?

- A) centimeter
- B) gram
- C) milliliter
- D) second
- E) none of the above

15) What is the term for the digits in a measurement that exceed the certainty of the instrument?

- A) inexact digits
- B) nonsignificant digits
- C) significant digits
- D) uncertain digits
- E) none of the above

- 16) What is the term that expresses the amount of a single quantity compared to an entire sample?
- A) percent
 - B) proportion
 - C) quotient
 - D) reciprocal
 - E) none of the above
- 17) What is the term for ten followed by a positive or negative exponent?
- A) calculator notation
 - B) exponential notation
 - C) power of 10
 - D) scientific notation
 - E) none of the above
- 18) What is the term for eliminating digits that are not significant?
- A) elimination
 - B) exclusion
 - C) rounding off
 - D) simplification
 - E) none of the above
- 19) What is the term for a method of expressing a value by placing a decimal after the first significant digit and indicating the magnitude using a power of 10?
- A) calculator notation
 - B) engineering notation
 - C) fixed decimal notation
 - D) scientific notation
 - E) none of the above
- 20) What is the term for the certain digits in a measurement plus one estimated digit?
- A) certain digits
 - B) instrumental digits
 - C) nonsignificant digits
 - D) significant digits
 - E) none of the above
- 21) Which of the following is a basic unit and symbol in the metric system?
- A) meter (m)
 - B) gram (g)
 - C) liter (L)
 - D) all of the above
 - E) none of the above
- 22) Which of the following is a basic unit and symbol in the metric system?
- A) centimeter (cm)
 - B) kilogram (kg)
 - C) milliliter (mL)
 - D) all of the above
 - E) none of the above

- 23) Which of the following is a basic unit and symbol in the metric system?
- A) decimeter (dm)
 - B) gram (gm)
 - C) liter (L)
 - D) all of the above
 - E) none of the above
- 24) What is the symbol for the metric unit micrometer?
- A) cm
 - B) mm
 - C) Mm
 - D) μm
 - E) none of the above
- 25) What is the name corresponding to the metric symbol dg?
- A) decagram
 - B) decigram
 - C) dekagram
 - D) dekigram
 - E) none of the above
- 26) What is the name corresponding to the metric symbol mL?
- A) megaliter
 - B) metroliter
 - C) microliter
 - D) milliliter
 - E) none of the above
- 27) According to the metric system, 1 _____ = 1,000,000,000,000 m.
- A) Tm
 - B) Gm
 - C) Mm
 - D) pm
 - E) none of the above
- 28) According to the metric system, 1 _____ = 1,000,000 L.
- A) TL
 - B) GL
 - C) ML
 - D) μL
 - E) none of the above
- 29) According to the metric system, 1 g = 100 _____.
- A) cg
 - B) dg
 - C) kg
 - D) mg
 - E) none of the above

- 30) What is the *first step* in the unit analysis method of problem solving?
- Write down the unit asked for in the answer.
 - Write down the given value related to the answer.
 - Apply a unit factor to convert a unit in the given value.
 - Round off the answer in the calculator display.
 - none of the above
- 31) If a 250 mL beaker weighs 95.4 g, what is the mass in kilograms?
- 0.0954 kg
 - 0.954 kg
 - 95.4 kg
 - 95,400 kg
 - none of the above
- 32) If a glass marble weighs 3150 mg, what is the mass in centigrams?
- 3.15 cg
 - 31.5 cg
 - 315 cg
 - 31,050 cg
 - none of the above
- 33) If Earth is 1.50×10^8 km from the Sun, what is the distance in Gm?
- 1.50×10^{-1} Gm
 - 1.50×10^2 Gm
 - 1.50×10^5 Gm
 - 1.50×10^{20} Gm
 - none of the above
- 34) If a rectangular stainless steel block measures 5.05 cm by 1.50 cm by 1.25 cm, what is the volume of the stainless steel solid?
- 0.106 cm^3
 - 2.69 cm^3
 - 4.21 cm^3
 - 6.06 cm^3
 - 9.47 cm^3
- 35) A 10.0 cm^3 volume of alcohol has a mass of 7.05 g. What is the density of the alcohol in grams per cubic centimeter?
- 0.0705 g/cm^3
 - 0.705 g/cm^3
 - 7.05 g/cm^3
 - 10.0 g/cm^3
 - 70.5 g/cm^3
- 36) Osmium is one of the most dense elements (22.5 g/cm^3). What is the mass of 10.0 cm^3 of the metal?
- 0.444 g
 - 2.25 g
 - 22.5 g
 - 225 g
 - 444 g
- 37) The density of ethyl ether is 0.714 g/mL . What is the mass of 10.0 mL of ether?
- 0.0714 g
 - 1.40 g
 - 7.14 g
 - 14.0 g
 - 71.4 g
- 38) Liquid hydrogen boils at $-252 \text{ }^\circ\text{C}$. What is the boiling point on the Kelvin scale?
- 525 K
 - 252 K
 - 21 K
 - 21 K
 - 525 K
- 39) A rare metal alloy is a superconductor at $-225 \text{ }^\circ\text{C}$. What is the temperature on the Kelvin scale?
- 498 K
 - 225 K
 - 48 K
 - 48 K
 - 498 K

- 40) Which of the following are basic units and symbols in the International system?
A) centimeter (cm), gram (g), second (s)
B) meter (m), gram (g), second (s)
C) meter (m), kilogram (kg), second (s)
D) kilometer (km), kilogram (kg), second (s)
E) The International system does not have basic units.
- 41) What is the term for the gravitational force of attraction between an object and Earth?
A) length
B) mass
C) volume
D) weight
E) none of the above
- 42) What is the term for a homogeneous mixture of two or more metals?
A) alloy
B) compound
C) ductile
D) malleable
E) none of the above
- 43) What is the term for the number that identifies a particular element?
A) atomic number
B) element number
C) mass number
D) substance number
E) none of the above
- 44) What is the term for a change that requires altering the composition of a substance?
A) atomic change
B) chemical change
C) molecular change
D) physical change
E) none of the above
- 45) What is the term for a pure substance that can be broken down into two or more substances by chemical reaction?
A) compound
B) element
C) homogeneous
D) matter
E) none of the above
- 46) What is the term for matter having an indefinite composition and variable properties?
A) compound
B) element
C) heterogeneous mixture
D) homogeneous mixture
E) none of the above

- 47) What is the term for matter having a definite composition, but variable properties from sample to sample; for example, alloys and solutions?
- A) compound
 - B) element
 - C) heterogeneous mixture
 - D) homogeneous mixture
 - E) none of the above
- 48) What is the term for matter having a definite composition and constant properties; for example, an element or compound?
- A) heterogeneous mixture
 - B) homogeneous mixture
 - C) matter
 - D) substance
 - E) none of the above
- 49) What is the term for a unit of mass exactly equal to 1/12 the mass of a carbon-12 atom?
- A) atomic mass unit
 - B) hydrogen atom
 - C) neutron
 - D) proton
 - E) none of the above
- 50) What is the term for the region of very high density in the center of the atom?
- A) atomic center
 - B) atomic core
 - C) atomic kernel
 - D) atomic nucleus
 - E) none of the above
- 51) What is the term for the value that indicates the number of protons for an atom of a given element?
- A) atomic notation
 - B) atomic number
 - C) atomic mass
 - D) mass number
 - E) none of the above
- 52) What is the term for the atomic model that describes electrons circling the nucleus in an orbit of specific energy?
- A) Bohr atom
 - B) Rutherford atom
 - C) Thomson atom
 - D) quantum mechanical atom
 - E) none of the above
- 53) What is the term for an orbit that electrons occupy at a fixed distance from the nucleus; designated 1, 2, 3, 4?
- A) energy level
 - B) orbital
 - C) shell
 - D) subshell
 - E) none of the above

- 54) What is the term for an electron energy level that results from splitting a main energy level?
- A) energy sublevel
 - B) orbital
 - C) shell
 - D) subshell
 - E) none of the above
- 55) What is the term for two atoms of the same element that differ by the number of neutrons in the nucleus?
- A) atomic mass units
 - B) isotopes
 - C) nucleons
 - D) photons
 - E) none of the above
- 56) What is the term for the value that indicates the total number of protons and neutrons in an atom of a given element?
- A) atomic notation
 - B) atomic number
 - C) atomic mass
 - D) mass number
 - E) none of the above
- 57) What is the name of the family of elements in Group IA/1?
- A) alkali metals
 - B) alkaline earth metals
 - C) halogens
 - D) noble gases
 - E) none of the above
- 58) What is the term for a method of writing the electron configuration whereby all the inner electrons are represented by a noble gas symbol in brackets followed by the valence electrons?
- A) atomic notation
 - B) core notation
 - C) electron notation
 - D) noble gas notation
 - E) none of the above
- 59) What is the term for a representation of an atom and its valence electrons that shows the chemical symbol surrounded by a dot for each valence electron?
- A) atom dot notation
 - B) core notation
 - C) electron dot formula
 - D) valence formula
 - E) none of the above

- 60) What is the term for the shorthand description of the arrangement of electrons by sublevels according to increasing energy?
- A) atomic notation
 - B) atomic number
 - C) continuous spectrum
 - D) electron configuration
 - E) none of the above
- 61) What is the term for an atom (or group of atoms) that bears a charge as the result of gaining or losing valence electrons?
- A) anion
 - B) cation
 - C) ion
 - D) polyatomic ion
 - E) none of the above
- 62) What is the term for the charge on an atom that has lost or gained electrons?
- A) atomic charge
 - B) electron charge
 - C) ionic charge
 - D) valence charge
 - E) none of the above
- 63) What is the term for two different ions with the same electron configuration?
- A) isoelectronic
 - B) isoenergetic
 - C) isonuclear
 - D) isotopes
 - E) none of the above
- 64) What is the general term for any negatively charged ion?
- A) anion
 - B) cation
 - C) monoatomic ion
 - D) polyatomic ion
 - E) none of the above
- 65) What is the general term for a substance dissolved in water?
- A) acid salt
 - B) aqueous salt
 - C) aqueous solution
 - D) salt solution
 - E) none of the above
- 66) What is the term for a compound that releases hydrogen ions when dissolved in water?
- A) acid
 - B) base
 - C) aqueous acid
 - D) aqueous base
 - E) none of the above

- 67) What is the general term for a substance dissolved in water?
- A) aqueous salt
 - B) aqueous substance
 - C) aqueous solution
 - D) water solution
 - E) none of the above
- 68) What is the term for a compound that releases hydroxide ions when dissolved in water?
- A) acid
 - B) base
 - C) aqueous acid
 - D) aqueous base
 - E) none of the above
- 69) What is the term for a shorthand representation using formulas and symbols to describe a chemical change?
- A) chemical equation
 - B) chemical formula
 - C) chemical reaction
 - D) chemical symbol
 - E) none of the above
- 70) What is the term for a particle composed of two nonmetal atoms?
- A) formula unit
 - B) diatomic molecule
 - C) monoatomic ion
 - D) polyatomic ion
 - E) none of the above
- 71) What is the term for a chemical formula that expresses the simplest whole number ratio of atoms of each element in a molecule?
- A) atomic formula
 - B) elemental formula
 - C) empirical formula
 - D) molecular formula
 - E) none of the above
- 72) What is the term for the amount of substance that contains 6.02×10^{23} particles?
- A) Avogadro's number
 - B) formula mass
 - C) molar mass
 - D) mole
 - E) none of the above
- 73) What is the term for the chemical formula of a compound that expresses the actual number of atoms of each element in a molecule?
- A) atomic formula
 - B) elemental formula
 - C) empirical formula
 - D) molecular formula
 - E) none of the above

- 74) What is the term for a temperature of 0 °C and a pressure of 1 atm?
A) atmospheric temperature and pressure
B) experimental temperature and pressure
C) ideal gas temperature and pressure
D) standard temperature and pressure
E) none of the above
- 75) How many atoms of nickel equal a mass of 58.69 g? (Refer to the Periodic Table.)
A) 1 B) 28 C) 58.69 D) 59 E) 6.02×10^{23}
- 76) Which of the following is equal to 1.00 mole of substance?
A) 6.02×10^{23} sodium atoms, Na
B) 6.02×10^{23} iodine molecules, I₂
C) 6.02×10^{23} sodium iodide formula units, NaI
D) all of the above
E) none of the above
- 77) How many molecules of methane are in 0.500 mol of CH₄ gas?
A) 1.20×10^{23} molecules
B) 1.20×10^{24} molecules
C) 3.01×10^{22} molecules
D) 3.01×10^{23} molecules
E) 3.01×10^{24} molecules
- 78) How many moles of potassium nitrate contain 8.68×10^{20} KNO₃ formula units?
A) 0.00144 mol B) 0.0144 mol C) 1.44 mol D) 6.94 mol E) 694 mol
- 79) What is the molar mass of aspirin, C₉H₈O₄?
A) 29.02 g/mol B) 116.08 g/mol C) 180.17 g/mol D) 244.17 g/mol E) 252.25 g/mol
- 80) What is the mass of 3.30×10^{23} atoms of silver, Ag?
A) 0.549 g B) 25.8 g C) 59.1 g D) 85.7 g E) 197 g
- 81) How many molecules of bromine liquid, Br₂, have a mass equal to 31.8 g?
A) 1.20×10^{23} molecules
B) 1.51×10^{24} molecules
C) 1.91×10^{25} molecules
D) 2.40×10^{23} molecules
E) 3.03×10^{24} molecules
- 82) What is the mass in grams of a single molecule of water, H₂O?
A) 9.23×10^{-26} g
B) 1.66×10^{-24} g
C) 2.99×10^{-23} g
D) 3.34×10^{22} g
E) 1.08×10^{25} g

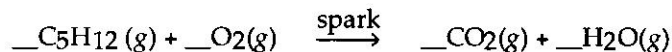
- 83) How many butane molecules are in 22.4 liters of C_4H_{10} gas at STP?
 A) 1.20×10^{24} B) 1.35×10^{25} C) 1.81×10^{24} D) 6.02×10^{23} E) 2.69×10^{22}
- 84) What is the density of ozone gas, O_3 , at STP?
 A) 0.467 g/L B) 0.714 g/L C) 1.40 g/L D) 2.14 g/L E) 22.4 g/L
- 85) What is the density of fluorine gas, F_2 , at STP?
 A) 0.589 g/L B) 0.848 g/L C) 1.18 g/L D) 1.70 g/L E) 22.4 g/L
- 86) If 1.00 L of an unknown gas at STP has a mass of 5.40 g, what is its molar mass?
 A) 4.15 g/mol B) 5.40 g/mol C) 22.4 g/mol D) 54.0 g/mol E) 121 g/mol
- 87) The formula for mustard gas used in chemical warfare is $C_4H_8SCl_2$. What is the percentage of hydrogen in the compound?
 A) 0.635% B) 5.08% C) 20.16% D) 30.20% E) 44.57%
- 88) If 0.300 mol of lead combines with 0.300 mol of sulfur, what is the empirical formula of the lead sulfide product?
 A) PbS
 B) Pb_2S
 C) PbS_2
 D) Pb_3S_3
 E) none of the above
- 89) Acetylene is used in oxyacetylene gas welding. Calculate the empirical formula for acetylene given its percent composition: 92.25% C and 7.75% H.
 A) CH B) CH_2 C) CH_8 D) C_8H_8 E) $C_{12}H$
- 90) Butyric acid is the odor of rancid cheese. Calculate the empirical formula for butyric acid given its percent composition: 54.53% C, 9.15% H, and 36.32% O.
 A) CHO B) C_2H_4O C) C_2H_3O D) $C_5H_9O_2$ E) $C_6H_9O_3$
- 91) Benzene has been used as a solvent for varnishes, waxes, and oils. In 1981 the EPA listed benzene as a carcinogen. What is the molecular formula of benzene if the empirical formula is C_1H_1 , and the approximate molar mass is 78 g/mol?
 A) CH B) CH_6 C) CH_{12} D) C_6H_6 E) $C_{12}H$
- 92) What is the name of the family of elements in Group VIIIA/18?
 A) alkali metals
 B) alkaline earth metals
 C) halogens
 D) noble gases
 E) none of the above

- 93) What term refers to the amount of product experimentally measured in a laboratory procedure?
- A) actual yield
 - B) percent yield
 - C) stoichiometric yield
 - D) theoretical yield
 - E) none of the above
- 94) What is the term for the substance in a chemical reaction that controls the maximum amount of product?
- A) limiting reactant
 - B) limiting product
 - C) maximum reactant
 - D) maximum product
 - E) none of the above

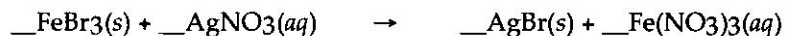
- 95) How many moles of water react with 0.500 mol of calcium metal?



- A) 0.250 mol
 - B) 0.500 mol
 - C) 1.00 mol
 - D) 2.00 mol
 - E) none of the above
- 96) How many moles of oxygen gas react with 0.100 mol of pentane, C₅H₁₂?

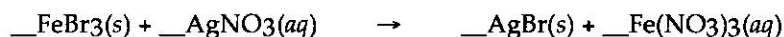


- A) 0.100 mol
 - B) 0.500 mol
 - C) 0.600 mol
 - D) 0.800 mol
 - E) none of the above
- 97) What is the mass of silver bromide (187.77 g/mol) precipitated from 2.96 g of iron(III) bromide (295.55 g/mol)?



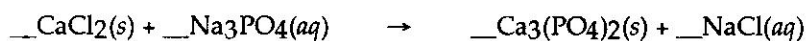
- A) 0.940 g B) 0.627 g C) 1.88 g D) 5.64 g E) 3.76 g

- 98) What is the mass of iron(III) bromide (295.55 g/mol) that yields 0.188 g of silver bromide (187.77 g/mol) precipitate?



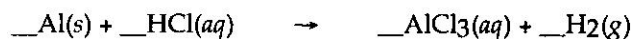
- A) 0.0986 g B) 0.148 g C) 0.296 g D) 0.592 g E) 0.888 g

99) What is the mass of sodium phosphate (163.94 g/mol) that yields 1.00 g of calcium phosphate (310.18 g/mol) precipitate?



- A) 0.264 g B) 0.358 g C) 0.931 g D) 1.06 g E) 8.38 g

100) What is the mass of aluminum metal that reacts to give 1.00 g of hydrogen gas?

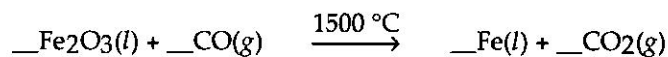


- A) 4.46 g B) 8.90 g C) 13.4 g D) 20.0 g E) 26.7 g

101) Starting with 1.550 g of potassium chlorate, a student releases 0.617 g of oxygen gas. If the calculated mass of oxygen gas is 0.607 g, what is the percent yield?

- A) 39.2% B) 39.8% C) 98.4% D) 102% E) 255%

102) What is the mass of iron produced from 225 g of iron(III) oxide (159.70 g/mol)?



- A) 39.3 g B) 78.7 g C) 157 g D) 322 g E) 1290 g

103) What is the term for the pressure exerted by the gas molecules in air?

- A) atmospheric pressure
- B) gas pressure
- C) partial pressure
- D) vapor pressure
- E) none of the above

104) What principle states that equal volumes of gases, at the same temperature and pressure, contain equal numbers of molecules?

- A) Avogadro's theory
- B) law of combining volumes
- C) law of conservation of mass
- D) law of constant composition
- E) none of the above

105) Which of the following states that the pressure and volume are inversely proportional for a gas at constant temperature?

- A) Boyle's law
- B) Charles's law
- C) Dalton's law
- D) Gay-Lussac's law
- E) none of the above

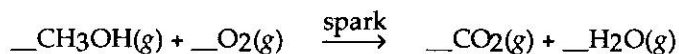
- 106) Which of the following states that the volume and Kelvin temperature are directly proportional for a gas at constant pressure?
- A) Boyle's law
 - B) Charles's law
 - C) Dalton's law
 - D) Gay-Lussac's law
 - E) none of the above
- 107) Which of the following states that the pressure exerted by a gas is inversely proportional to its volume and directly proportional to its Kelvin temperature?
- A) Boyle's law
 - B) Charles's law
 - C) Gay-Lussac's law
 - D) combined gas law
 - E) none of the above
- 108) Which of the following is an observed property of gases?
- A) Gases vary in shape and volume.
 - B) Gases expand infinitely.
 - C) Gases have low density.
 - D) Gases mix completely.
 - E) all of the above
- 109) Which of the following is *not* an observed property of gases?
- A) Gases vary in shape and volume.
 - B) Gases expand infinitely.
 - C) Gases compress infinitely.
 - D) Gases have low density.
 - E) Gases mix completely.
- 110) Which of the following is *not* an observed property of gases?
- A) Gases vary in shape and volume.
 - B) Gases expand and fill the container.
 - C) Gases compress and liquefy.
 - D) Gases diffuse uniformly.
 - E) Gases mix completely.
- 111) A sample of neon gas at 1.20 atm compresses from 0.250 L to 0.125 L. If the temperature remains constant, what is the final pressure?
- A) 0.600 atm
 - B) 1.00 atm
 - C) 1.20 atm
 - D) 2.40 atm
 - E) none of the above
- 112) If the pressure of 125 mL of nitrogen gas at 100 °C decreases from 885 mm Hg to 225 mm Hg, what is the final volume? Assume temperature remains constant.
- A) 0.318 mL
 - B) 4.92 mL
 - C) 31.8 mL
 - D) 492 mL
 - E) 4590 mL

- 113) A 40.0 mL volume of ethane gas is heated from 25.0 °C to 50.0 °C. If the pressure remains constant, what is the final volume?
A) 20.0 mL B) 36.9 mL C) 40.0 mL D) 43.4 mL E) 80.0 mL
- 114) If 7.75 L of radon gas is at 1.55 atm and -19 °C, what is the volume at STP?
A) 4.65 L B) 5.37 L C) 8.33 L D) 11.2 L E) 12.9 L
- 115) A sample of carbon dioxide occupies 1.65 L at -20.0 °C and 20.0 psi. If the volume of the gas is 2.65 L at 35.0 psi, what is the Celsius temperature?
A) 438 °C B) 551 °C C) 711 °C D) 824 °C E) 984 °C
- 116) Predict which of the following is connected by an ionic bond.
A) CaO
B) FeO
C) SnO
D) all of the above
E) none of the above
- 117) Which noble gas is isoelectronic with a bromide ion?
A) helium B) neon C) argon D) krypton E) xenon
- 118) What is the total number of valence electrons in one molecule of H₂O₂?
A) 2
B) 8
C) 14
D) 18
E) none of the above
- 119) What is the total number of valence electrons in one molecule of B₂H₆?
A) 6
B) 8
C) 12
D) 16
E) none of the above
- 120) Draw the electron dot formula for methane, CH₄. How many pairs of nonbonding electrons are in a methane molecule?
A) 0
B) 1
C) 4
D) 6
E) none of the above
- 121) Draw the structural formula for nitrogen, N₂, and state the type of bond in a nitrogen molecule.
A) 1 single bond
B) 1 double bond
C) 1 triple bond
D) 3 single bonds
E) none of the above

- 122) Which of the following describes the attraction between two H₂O molecules?
- A) coordinate covalent bond
 - B) hydrogen bond
 - C) nonpolar covalent bond
 - D) polar covalent bond
 - E) none of the above
- 123) What is the electron pair geometry for a methane molecule, CH₄?
- A) bent
 - B) linear
 - C) tetrahedral
 - D) trigonal pyramidal
 - E) none of the above
- 124) What is the electron pair geometry for a phosphine molecule, PH₃?
- A) bent
 - B) linear
 - C) tetrahedral
 - D) trigonal pyramidal
 - E) none of the above
- 125) What is the term that describes a compound that has lost water of hydration?
- A) anhydrous
 - B) deliquescent
 - C) efflorescent
 - D) hygroscopic
 - E) none of the above
- 126) What is the term for the temperature at which the vapor pressure of a liquid is equal to the atmospheric pressure?
- A) absolute zero
 - B) boiling point
 - C) critical point
 - D) vapor point
 - E) none of the above
- 127) What is the term for the angle formed by two atoms bonded to the central atom in a molecule?
- A) atomic angle
 - B) bond angle
 - C) central angle
 - D) molecular angle
 - E) none of the above
- 128) Which of the following is an observed property of liquids?
- A) Liquids flow readily.
 - B) Liquids do not compress or expand significantly.
 - C) Liquids have a variable shape and fixed volume.
 - D) Liquids are more dense than gases.
 - E) all of the above

- 129) Which of the following is an observed property of liquids?
A) Liquids have a fixed shape and variable volume.
B) Liquids that are soluble mix homogeneously.
C) Liquids compress and expand significantly.
D) Liquids are less dense than gases.
E) none of the above
- 130) What is the strongest intermolecular force in a liquid containing molecules with H-N bonds?
A) covalent bonds
B) dipole forces
C) dispersion forces
D) hydrogen bonds
E) none of the above
- 131) Which of the following illustrates the *like dissolves like* rule for two liquids?
A) A polar solute is miscible with a polar solvent.
B) A nonpolar solute is miscible with a nonpolar solvent.
C) A polar solute is immiscible with a nonpolar solvent.
D) all of the above
E) none of the above
- 132) Which of the following illustrates the *like dissolves like* rule for two liquids?
A) A polar solute is miscible with a nonpolar solvent.
B) A polar solute is immiscible with a polar solvent.
C) A nonpolar solute is miscible with a nonpolar solvent.
D) A nonpolar solvent is miscible with a polar solvent.
E) none of the above
- 133) If 25.0 mL of seawater has a mass of 25.895 g and contains 1.295 g of solute, what is the mass/mass percent concentration of the seawater?
A) 1.30% B) 5.00% C) 5.18% D) 20.0% E) 96.5%
- 134) What is the molarity of a glucose solution that contains 10.0 g of $C_6H_{12}O_6$ (180.18 g/mol) dissolved in 100.0 mL of solution?
A) 0.00555 M B) 0.0555 M C) 0.555 M D) 1.80 M E) 18.0 M
- 135) What is the molarity of a sucrose solution that contains 10.0 g of $C_{12}H_{22}O_{11}$ (342.34 g/mol) dissolved in 100.0 mL of solution?
A) 0.00292 M B) 0.0292 M C) 0.292 M D) 3.42 M E) 34.2 M
- 136) What is the mass of barium hydroxide (171.35 g/mol) dissolved in 0.500 L of 0.100 M $Ba(OH)_2$ solution?
A) 8.57 g B) 17.1 g C) 85.7 g D) 171 g E) 857 g
- 137) What is the mass of zinc acetate (183.49 g/mol) dissolved in 0.200 L of 0.500 M $Zn(C_2H_3O_2)_2$ solution?
A) 1.83 g B) 12.4 g C) 18.3 g D) 36.7 g E) 91.7 g
- 138) What is the molarity of a nitric acid solution prepared by diluting 250.0 mL of 6.00 M HNO_3 to a total volume of 2.50 L?
A) 0.0600 M B) 0.250 M C) 0.600 M D) 2.50 M E) 6.00 M

- 139) What volume of 12 M hydrochloric acid must be diluted with distilled water to prepare 5.0 L of 0.10 M HCl?
 A) 0.042 mL B) 6 mL C) 42 mL D) 60 mL E) 420 mL
- 140) What volume of 16 M nitric acid must be diluted with distilled water to prepare 500.0 mL of 0.50 M HNO₃?
 A) 0.016 mL B) 0.16 mL C) 1.6 mL D) 16 mL E) 160 mL
- 141) Which of the following is true of a hydrogen bond in liquids?
 A) It exists between hydrogen and an electronegative atom.
 B) It is the result of dipole attraction.
 C) Its bond energy is less than a covalent bond.
 D) Its bond length is longer than a covalent bond.
 E) all of the above
- 142) What is the term for water molecules bound to a formula unit in a hydrate?
 A) anhydrous water
 B) deliquescent water
 C) efflorescent water
 D) water of hydration
 E) none of the above
- 143) An atmospheric sample is composed of nitrogen, oxygen, argon, and traces of other gases. If the partial pressure of nitrogen is 587 torr, oxygen is 158 torr, and argon is 7 torr, what is the observed barometric pressure?
 A) 8 torr B) 100 torr C) 422 torr D) 752 torr E) 1512 torr
- 144) What term is an expression for the amount of the actual yield compared to the theoretical yield?
 A) experimental yield
 B) percent yield
 C) ratio yield
 D) stoichiometric yield
 E) none of the above
- 145) Methanol, CH₃OH, is derived from natural gas and can be blended with gasoline to make "gasohol." If the combustion of "gasohol" produces carbon dioxide and water, what is the coefficient of oxygen in the balanced equation?

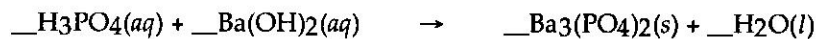


- A) 1
 B) 2
 C) 3
 D) 6
 E) none of the above
- 146) Which of the following is *not* a general guideline for balancing an equation?
 A) write correct formulas for reactants and products
 B) begin balancing with the most complex formula
 C) balance polyatomic ions as a single unit
 D) balance ionic compounds as a single unit
 E) check each reactant and product to verify the coefficients

147) Which of the following elements occurs naturally as diatomic molecules?

- A) carbon
- B) phosphorus
- C) sulfur
- D) all of the above
- E) none of the above

148) What is the coefficient of water after balancing the following equation?

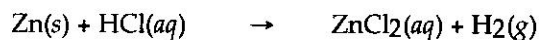


- A) 1
- B) 2
- C) 3
- D) 6
- E) none of the above

149) Which of the following formulas represents an element in its natural state?

- A) B₂
- B) C₂
- C) N₂
- D) P₂
- E) none of the above

150) What type of chemical reaction is illustrated in the following example?



- A) combination reaction
- B) decomposition reaction
- C) single-replacement reaction
- D) double-replacement reaction
- E) neutralization reaction

Answer Key

Testname: INTRO. CHEM-1305; FINAL REVIEW 2010

- 1) A
- 2) A
- 3) B
- 4) B
- 5) C
- 6) D
- 7) B
- 8) C
- 9) C
- 10) B
- 11) A
- 12) D
- 13) B
- 14) C
- 15) B
- 16) A
- 17) C
- 18) C
- 19) D
- 20) D
- 21) D
- 22) E
- 23) C
- 24) D
- 25) B
- 26) D
- 27) A
- 28) C
- 29) A
- 30) A
- 31) A
- 32) C
- 33) B
- 34) E
- 35) B
- 36) D
- 37) C
- 38) D
- 39) D
- 40) C
- 41) D
- 42) A
- 43) A
- 44) B
- 45) A
- 46) C
- 47) D
- 48) D
- 49) A
- 50) D

Answer Key

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- 51) B
- 52) A
- 53) A
- 54) A
- 55) B
- 56) D
- 57) A
- 58) B
- 59) C
- 60) D
- 61) C
- 62) C
- 63) A
- 64) A
- 65) C
- 66) A
- 67) C
- 68) B
- 69) A
- 70) B
- 71) C
- 72) D
- 73) D
- 74) D
- 75) E
- 76) D
- 77) D
- 78) A
- 79) C
- 80) C
- 81) A
- 82) C
- 83) D
- 84) D
- 85) D
- 86) E
- 87) B
- 88) A
- 89) A
- 90) B
- 91) D
- 92) D
- 93) A
- 94) A
- 95) C
- 96) D
- 97) D
- 98) A
- 99) D
- 100) B

Answer Key

Testname: INTRO. CHEM-1305; FINAL REVIEW 2010

- 101) D
- 102) C
- 103) A
- 104) A
- 105) A
- 106) B
- 107) D
- 108) E
- 109) C
- 110) D
- 111) D
- 112) D
- 113) D
- 114) E
- 115) A
- 116) D
- 117) D
- 118) C
- 119) C
- 120) A
- 121) C
- 122) B
- 123) C
- 124) C
- 125) A
- 126) B
- 127) B
- 128) E
- 129) B
- 130) D
- 131) D
- 132) C
- 133) B
- 134) C
- 135) C
- 136) A
- 137) C
- 138) C
- 139) C
- 140) D
- 141) E
- 142) D
- 143) D
- 144) B
- 145) C
- 146) D
- 147) E
- 148) D
- 149) C
- 150) C