

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Which one of the following is a pure substance? 1) _____
 A) elemental copper
 B) concrete
 C) milk
 D) wood
 E) salt water
- 2) What decimal power does the abbreviation Milli represent? 2) _____
 A) 1×10^6 B) 1×10^3 C) 1×10^{-6} D) 1×10^{-3} E) 1×10^9
- 3) The number 0.00430 has _____ significant figures. 3) _____
 A) 6 B) 2 C) 4 D) 3 E) 5
- 4) The density of silver is 10.5 g/cm^3 . A piece of silver that occupies a volume of 23.6 cm^3 would have a mass of _____ g. 4) _____
 A) 248 B) 23.6 C) 112 D) 0.445 E) 2.25
- 5) $3.337 \text{ g/cm}^3 =$ _____ kg/m^3 5) _____
 A) 333.7
 B) 3.337×10^{-5}
 C) 0.3337
 D) 3.337×10^{-9}
 E) 3337
- 6) The correct result (indicating the proper number of significant figures) of the following addition is 6) _____
 _____.
 12
 1.2
 0.12
 + 0.012
- A) 13
 B) 13.3
 C) 13.33
 D) 13.332
 E) none of the above
- 7) An element cannot _____. 7) _____
 A) interact with other elements to form compounds
 B) be part of a homogeneous mixture
 C) be a pure substance
 D) be part of a heterogeneous mixture
 E) be separated into other substances by chemical means

- 8) Of the following, _____ is the smallest mass. 8) _____
A) 2.5×10^9 ng
B) 2.5×10^{-2} mg
C) 2.5×10^{10} μ g
D) 25 kg
E) 2.5×10^{15} g
- 9) Which of the following has the same number of significant figures as the number 1.00310? 9) _____
A) 1×10^6 B) 199.791 C) 5.119 D) 100 E) 8.66
- 10) Which of the following are chemical processes? 10) _____
1. rusting of a nail
2. freezing of water
3. decomposition of water into hydrogen and oxygen gases
4. compression of oxygen gas
A) 1, 3 B) 1, 4 C) 1, 3, 4 D) 2, 3, 4 E) 1, 2
- 11) One angstrom, symbolized \AA , is 10^{-10} m. $1 \text{ cm}^3 =$ _____ \AA^3 . 11) _____
A) 10^{-24} B) 10^{24} C) 10^{30} D) 10^{-30} E) 10^{-9}
- 12) The atomic number indicates _____. 12) _____
A) the number of neutrons in a nucleus
B) the number of atoms in 1 g of an element
C) the total number of neutrons and protons in a nucleus
D) the number of different isotopes of an element
E) the number of protons or electrons in a neutral atom
- 13) Elements in Group 2A are known as the _____. 13) _____
A) alkali metals
B) alkaline earth metals
C) chalcogens
D) halogens
E) noble gases
- 14) Potassium is a _____ and chlorine is a _____. 14) _____
A) nonmetal, metal
B) metal, metal
C) metal, metalloid
D) metalloid, nonmetal
E) metal, nonmetal
- 15) The correct name for SO is _____. 15) _____
A) sulfate
B) sulfur monoxide
C) sulfur oxide
D) sulfoxide
E) sulfite

- 16) The correct name for HClO_3 is _____. 16) _____
A) hydrochlorous acid
B) hydrochloric acid
C) chlorous acid
D) perchloric acid
E) chloric acid
- 17) The formula of the carbonate ion is _____. 17) _____
A) CO^- B) CO_2^{2-} C) CO_3^{3-} D) CO_3^{2-} E) CO_2^-
- 18) The charge on an electron was determined in the _____. 18) _____
A) atomic theory of matter
B) Dalton atomic theory
C) Rutherford gold foil experiment
D) Millikan oil drop experiment
E) cathode ray tube, by J. J. Thompson
- 19) All atoms of a given element have the same _____. 19) _____
A) number of electrons and neutrons
B) mass
C) number of protons
D) number of neutrons
E) density
- 20) Which one of the following is a nonmetal? 20) _____
A) W B) Sr C) Br D) Os E) Ir
- 21) A molecular formula always indicates _____. 21) _____
A) which atoms are attached to which in a molecule
B) how many of each atom are in a molecule
C) the geometry of a molecule
D) the isotope of each element in a compound
E) the simplest whole-number ratio of different atoms in a compound
- 22) Which species below is the sulfite ion? 22) _____
A) S^{2-} B) H_2S C) H_2SO_4 D) SO_3^{-2} E) SO_2^{-2}
- 23) Predict the charge of the most stable ion of potassium. 23) _____
A) -2 B) -1 C) +3 D) +1 E) +2
- 24) How many protons does the Br^- ion possess? 24) _____
A) 36 B) 8 C) 6 D) 34 E) 35

- 25) Which statement below correctly describes the responses of alpha, beta, and gamma radiation to an electric field? 25) _____
- A) Both beta and gamma are deflected in the same direction, while alpha shows no response.
 - B) Both alpha and beta are deflected in the same direction, while gamma shows no response.
 - C) Both alpha and gamma are deflected in the same direction, while beta shows no response.
 - D) Only alpha is deflected, while beta and gamma show no response.
 - E) Alpha and beta are deflected in opposite directions, while gamma shows no response.
- 26) _____ typically form ions with a 2+ charge. 26) _____
- A) Transition metals
 - B) Alkaline earth metals
 - C) Alkali metals
 - D) Chalcogens
 - E) Halogens
- 27) The formula of a salt is XCl_2 . The X-ion in this salt has 28 electrons. The metal X is _____. 27) _____
- A) Fe
 - B) Zn
 - C) Ni
 - D) Pd
 - E) V
- 28) A molecule of water contains hydrogen and oxygen in a 1:8 ratio by mass. This is a statement of _____. 28) _____
- A) the law of conservation of mass
 - B) the law of multiple proportions
 - C) the law of conservation of energy
 - D) the law of constant composition
 - E) none of the above
- 29) There are _____ electrons, _____ protons, and _____ neutrons in an atom of $^{132}_{54}\text{Xe}$. 29) _____
- A) 78, 78, 132
 - B) 54, 54, 132
 - C) 132, 132, 54
 - D) 54, 54, 78
 - E) 78, 78, 54
- 30) 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? 30) _____
- A) K
 - B) Cl
 - C) Ca
 - D) Ar
 - E) None of the above could be the unknown element.
- 31) Which formula/name pair is incorrect? 31) _____
- A) $Mn(NO_2)_2$ manganese(II) nitrite
 - B) $Mg(MnO_4)_2$ magnesium permanganate
 - C) $Mg(NO_3)_2$ magnesium nitrate
 - D) $Mn(NO_3)_2$ manganese(II) nitrate
 - E) Mg_3N_2 magnesium nitrite

- 32) The element _____ is the most similar to strontium in chemical and physical properties. 32) _____
A) Cs B) Li C) Rb D) Ba E) At
- 33) When the following equation is balanced, the coefficients are _____. 33) _____
$$\text{NH}_3 (\text{g}) + \text{O}_2 (\text{g}) \rightarrow \text{NO}_2 (\text{g}) + \text{H}_2\text{O} (\text{g})$$

A) 2, 3, 2, 3 B) 1, 3, 1, 2 C) 4, 7, 4, 6 D) 4, 3, 4, 3 E) 1, 1, 1, 1
- 34) When the following equation is balanced, the coefficient of sulfur dioxide is _____. 34) _____
$$\text{PbS} (\text{s}) + \text{O}_2 (\text{g}) \rightarrow \text{PbO} (\text{s}) + \text{SO}_2 (\text{g})$$

A) 2 B) 5 C) 3 D) 4 E) 1
- 35) The formula weight of a substance is _____. 35) _____
A) the same as the percent by mass weight
B) determined by combustion analysis
C) identical to the molar mass
D) the weight of a sample of the substance
E) the sum of the atomic weights of each atom in its chemical formula
- 36) There are _____ molecules of methane in 0.123 mol of methane (CH_4). 36) _____
A) 0.615
B) 5
C) 2.46×10^{-2}
D) 7.40×10^{22}
E) 2.04×10^{-25}
- 37) The combustion of propane (C_3H_8) produces CO_2 and H_2O : 37) _____
$$\text{C}_3\text{H}_8 (\text{g}) + 5\text{O}_2 (\text{g}) \rightarrow 3\text{CO}_2 (\text{g}) + 4\text{H}_2\text{O} (\text{g})$$

The reaction of 2.5 mol of O_2 will produce _____ mol of H_2O .
A) 4.0 B) 3.0 C) 2.5 D) 2.0 E) 1.0
- 38) When a hydrocarbon burns in air, what component of air reacts? 38) _____
A) water
B) nitrogen
C) argon
D) oxygen
E) carbon dioxide
- 39) The formula of nitrobenzene is $\text{C}_6\text{H}_5\text{NO}_2$. The molecular weight of this compound is _____ 39) _____
amu.
A) 43.03 B) 3.06 C) 109.10 D) 123.11 E) 107.11

- 40) One million argon atoms is _____ mol of argon atoms. 40) _____
 A) 1.7×10^{-18}
 B) $1.0 \times 10^{+6}$
 C) 6.0×10^{23}
 D) 3
 E) 1.0×10^{-6}

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

41) The temperature of 25°C is _____ in Kelvins. 41) _____

42) Sn is the symbol for the element _____. 42) _____

43) 1.035×10^{-4} L = _____ mL 43) _____

44) 1 nanometer = _____ picometers 44) _____

45) The quantity _____ m is the same as 3 km. 45) _____

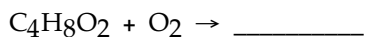
46) If matter is uniform throughout, cannot be separated into other substances by physical processes, but can be decomposed into other substances by chemical processes, it is called a (an) _____ 46) _____

47) The correct answer (reported to the proper number of significant figures) to the following is _____ 47) _____

$$(1815-1806) \times (9.11 \times 7.92) = \underline{\hspace{2cm}}$$

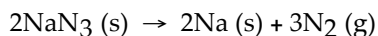
48) There are _____ sulfur atoms in 25 molecules of $C_4H_4S_2$. 48) _____

49) What is the coefficient of O_2 when the following equation is completed and balanced? 49) _____



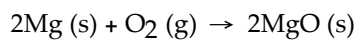
50) The molecular weight of urea ($(NH_2)_2CO$), a compound used as a nitrogen fertilizer, is _____ amu. 50) _____

51) Automotive air bags inflate when sodium azide decomposes explosively to its constituent elements: 51) _____



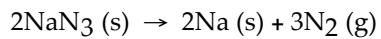
How many moles of N_2 are produced by the decomposition of 2.88 mol of sodium azide?

52) Magnesium burns in air with a dazzling brilliance to produce magnesium oxide: 52) _____



How many moles of O_2 are consumed when 0.770 mol of magnesium burns?

53) Automotive air bags inflate when sodium azide decomposes explosively to its constituent elements: 53) _____



How many grams of sodium azide are required to produce 18.0 g of nitrogen?

Answer Key

Testname: PRACTICE TEST 1A

- 1) A
- 2) D
- 3) D
- 4) A
- 5) E
- 6) A
- 7) E
- 8) B
- 9) B
- 10) A
- 11) B
- 12) E
- 13) B
- 14) E
- 15) B
- 16) E
- 17) D
- 18) D
- 19) C
- 20) C
- 21) B
- 22) D
- 23) D
- 24) E
- 25) E
- 26) B
- 27) B
- 28) D
- 29) D
- 30) D
- 31) E
- 32) D
- 33) C
- 34) A
- 35) E
- 36) D
- 37) D
- 38) D
- 39) D
- 40) A
- 41) 298
- 42) Tin
- 43) 0.1035
- 44) 1000
- 45) 3000
- 46) compound
- 47) 600
- 48) 50
- 49) 5
- 50) 60.1

Answer Key

Testname: PRACTICE TEST 1A

51) 4.32

52) 0.385

53) 27.9