

# Sample Questions

## Chapter 2.

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

1) Which statement below correctly describes the responses of alpha, beta, and gamma radiation to an electric field? 1) \_\_\_\_\_

- A) Both alpha and gamma are deflected in the same direction, while beta shows no response.
- B) Only alpha is deflected, while beta and gamma show no response.
- C) Both alpha and beta are deflected in the same direction, while gamma shows no response.
- D) Alpha and beta are deflected in opposite directions, while gamma shows no response.
- E) Both beta and gamma are deflected in the same direction, while alpha shows no response.

2) \_\_\_\_\_ and \_\_\_\_\_ reside in the atomic nucleus. 2) \_\_\_\_\_

- A) Protons, electrons
- B) Protons, neutrons
- C) Electrons, neutrons
- D) none of the above
- E) Neutrons, only neutrons

3) 200 pm is the same as \_\_\_\_\_ Å. 3) \_\_\_\_\_

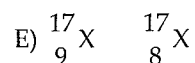
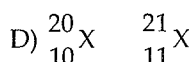
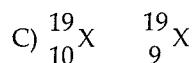
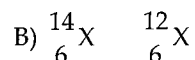
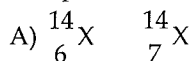
A) 200                      B) 2                      C)  $2 \times 10^{-12}$                       D) 20                      E) 2000

4) The atomic number indicates \_\_\_\_\_. 4) \_\_\_\_\_

- A) the number of neutrons in a nucleus
- B) the number of different isotopes of an element
- C) the number of atoms in 1 g of an element
- D) the total number of neutrons and protons in a nucleus
- E) the number of protons or electrons in a neutral atom

5) Which pair of atoms constitutes a pair of isotopes of the same element?

5) \_\_\_\_\_



6) The nucleus of an atom contains \_\_\_\_\_.

6) \_\_\_\_\_

A) protons, neutrons, and electrons

B) protons and neutrons

C) protons and electrons

D) protons

E) electrons

7) In the periodic table, the rows are called \_\_\_\_\_ and the columns are called \_\_\_\_\_.

7) \_\_\_\_\_

A) octaves, groups

B) rows, groups

C) cogeners, families

D) staffs, families

E) periods, groups

8) Which group in the periodic table contains only nonmetals?

8) \_\_\_\_\_

A) 8A

B) 6A

C) 2A

D) 1A

E) 2B

9) The element \_\_\_\_\_ is the most similar to strontium in chemical and physical properties.

9) \_\_\_\_\_

A) Ba

B) Li

C) Cs

D) At

E) Rb

10) Elements in Group 1A are known as the \_\_\_\_\_.

10) \_\_\_\_\_

A) alkali metals

B) chalcogens

C) noble gases

D) alkaline earth metals

E) halogens

- 11) Lithium is a \_\_\_\_\_ and magnesium is a \_\_\_\_\_. 11) \_\_\_\_\_
- A) metal, metalloid
  - B) nonmetal, metal
  - C) metalloid, metalloid
  - D) nonmetal, nonmetal
  - E) metal, metal
- 12) \_\_\_\_\_ are found uncombined, as monatomic species in nature. 12) \_\_\_\_\_
- A) Alkaline earth metals
  - B) Chalcogens
  - C) Halogens
  - D) Noble gases
  - E) Alkali metals
- 13) When a metal and a nonmetal react, the \_\_\_\_\_ tends to lose electrons and the \_\_\_\_\_ tends to gain electrons. 13) \_\_\_\_\_
- A) metal, nonmetal
  - B) nonmetal, nonmetal
  - C) metal, metal
  - D) nonmetal, metal
  - E) None of the above, these elements share electrons .
- 14) The empirical formula of a compound with molecules containing 12 carbon atoms, 14 hydrogen atoms, and 6 oxygen atoms is \_\_\_\_\_. 14) \_\_\_\_\_
- A) CHO
  - B)  $C_6H_7O_3$
  - C)  $C_2H_4O$
  - D)  $C_{12}H_{14}O_6$
  - E)  $CH_2O$
- 15) \_\_\_\_\_ typically form ions with a 2+ charge. 15) \_\_\_\_\_
- A) Alkaline earth metals
  - B) Halogens
  - C) Alkali metals
  - D) Transition metals
  - E) Chalcogens

- 16) What is the formula of the compound formed between strontium ions and nitrogen ions? 16) \_\_\_\_\_  
A)  $\text{Sr}_2\text{N}_3$       B)  $\text{SrN}_3$       C)  $\text{Sr}_3\text{N}_2$       D)  $\text{SrN}_2$       E)  $\text{SrN}$
- 17) Magnesium reacts with a certain element to form a compound with the general formula  $\text{MgX}$ .  
What would the most likely formula be for the compound formed between potassium and element X? 17) \_\_\_\_\_  
A)  $\text{KX}_2$       B)  $\text{K}_2\text{X}$       C)  $\text{K}_2\text{X}_3$       D)  $\text{K}_2\text{X}_2$       E)  $\text{KX}$
- 18) The charge on the manganese in the salt  $\text{MnF}_3$  is \_\_\_\_\_. 18) \_\_\_\_\_  
A) -1      B) +1      C) +3      D) -2      E) +2
- 19) Aluminum reacts with a certain nonmetallic element to form a compound with the general formula  $\text{AlX}$ . Element X is a diatomic gas at room temperature. Element X must be \_\_\_\_\_. 19) \_\_\_\_\_  
A) oxygen      B) chlorine      C) fluorine      D) sulfur      E) nitrogen
- 20) Sodium forms an ion with a charge of \_\_\_\_\_. 20) \_\_\_\_\_  
A) +1      B) -2      C) -1      D) 0      E) +2
- 21) Sulfur forms an ion with a charge of \_\_\_\_\_. 21) \_\_\_\_\_  
A) +3      B) -6      C) +6      D) +2      E) -2
- 22) Predict the empirical formula of the ionic compound that forms from sodium and fluorine. 22) \_\_\_\_\_  
A)  $\text{Na}_3\text{F}_2$       B)  $\text{NaF}$       C)  $\text{NaF}_2$       D)  $\text{Na}_2\text{F}_3$       E)  $\text{Na}_2\text{F}$
- 23) Predict the empirical formula of the ionic compound that forms from aluminum and oxygen. 23) \_\_\_\_\_  
A)  $\text{Al}_3\text{O}_2$       B)  $\text{AlO}$       C)  $\text{Al}_2\text{O}_3$       D)  $\text{AlO}_2$       E)  $\text{Al}_2\text{O}$
- 24) The correct name for  $\text{K}_2\text{S}$  is \_\_\_\_\_. 24) \_\_\_\_\_  
A) dipotassium sulfate  
B) potassium disulfide  
C) potassium bisulfide  
D) potassium sulfide  
E) potassium sulfate

25) The correct name for SrO is \_\_\_\_\_.

25) \_\_\_\_\_

- A) strontium dioxide
- B) strontium oxide
- C) strontium monoxide
- D) strontium peroxide
- E) strontium hydroxide

26) The correct name for  $Al_2O_3$  is \_\_\_\_\_.

26) \_\_\_\_\_

- A) dialuminum trioxide
- B) dialuminum oxide
- C) aluminum oxide
- D) aluminum trioxide
- E) aluminum hydroxide

27) The correct name for  $CaH_2$  is \_\_\_\_\_.

27) \_\_\_\_\_

- A) calcium dihydroxide
- B) hydrocalcium
- C) calcium dihydride
- D) calcium hydroxide
- E) calcium hydride

28) The correct name for SO is \_\_\_\_\_.

28) \_\_\_\_\_

- A) sulfate
- B) sulfur monoxide
- C) sulfur oxide
- D) sulfoxide
- E) sulfite

29) The correct name for  $CCl_4$  is \_\_\_\_\_.

29) \_\_\_\_\_

- A) carbon chlorate
- B) carbon chloride
- C) carbon tetrachloride
- D) carbon tetrachlorate
- E) carbon perchlorate

30) The correct name for  $\text{H}_2\text{CO}_3$  is \_\_\_\_\_.

30) \_\_\_\_\_

- A) carbohydric acid
- B) carbonous acid
- C) carbonic acid
- D) hydrocarbonate
- E) carbohydrate

31) The correct name for  $\text{H}_2\text{SO}_3$  is \_\_\_\_\_.

31) \_\_\_\_\_

- A) hydrosulfuric acid
- B) sulfuric acid
- C) hydrosulfic acid
- D) sulfur hydroxide
- E) sulfurous acid

32) The correct name for  $\text{HClO}_2$  is \_\_\_\_\_.

32) \_\_\_\_\_

- A) chlorous acid
- B) hypochloric acid
- C) chloric acid
- D) hypochlorous acid
- E) perchloric acid

33) The formula of bromic acid is \_\_\_\_\_.

33) \_\_\_\_\_

- A)  $\text{HBrO}_3$       B)  $\text{HBr}$       C)  $\text{HBrO}_4$       D)  $\text{HBrO}$       E)  $\text{HBrO}_2$

34) The name of  $\text{PCl}_3$  is \_\_\_\_\_.

34) \_\_\_\_\_

- A) trichloro potassium
- B) phosphorus trichloride
- C) potassium chloride
- D) monophosphorous trichloride
- E) phosphorous(III) chloride

- 35) The ions  $\text{Ca}^{2+}$  and  $\text{PO}_4^{3-}$  form a salt with the formula \_\_\_\_\_. 35) \_\_\_\_\_
- A)  $\text{Ca}_2(\text{PO}_4)_3$
  - B)  $\text{Ca}_3(\text{PO}_4)_2$
  - C)  $\text{Ca}_2\text{PO}_4$
  - D)  $\text{Ca}(\text{PO}_4)_2$
  - E)  $\text{CaPO}_4$
- 36) Element M reacts with fluorine to form an ionic compound with the formula  $\text{MF}_3$ . The M-ion has 18 electrons. Element M is \_\_\_\_\_. 36) \_\_\_\_\_
- A) P
  - B) Sc
  - C) Cr
  - D) Ar
  - E) Ca
- 37) The correct name for  $\text{Mg}(\text{ClO}_3)_2$  is \_\_\_\_\_. 37) \_\_\_\_\_
- A) magnesium chloroxide
  - B) magnesium chlorate
  - C) manganese perchlorate
  - D) magnesium perchlorate
  - E) manganese chlorate
- 38) Chromium and chlorine form an ionic compound whose formula is  $\text{CrCl}_3$ . The name of this compound is \_\_\_\_\_. 38) \_\_\_\_\_
- A) chromium chlorine
  - B) chromic trichloride
  - C) monochromium trichloride
  - D) chromium(III) trichloride
  - E) chromium(III) chloride
- 39) The name of the ionic compound  $\text{V}_2\text{O}_3$  is \_\_\_\_\_. 39) \_\_\_\_\_
- A) vanadium(III) oxide
  - B) divanadium trioxide
  - C) vanadium oxide
  - D) vanadium(II) oxide
  - E) vanadium(III) trioxide
- 40) What is the formula for perchloric acid? 40) \_\_\_\_\_
- A)  $\text{HClO}_4$
  - B)  $\text{HCl}$
  - C)  $\text{HClO}_2$
  - D)  $\text{HClO}_3$
  - E)  $\text{HClO}$

- 41) Which one of the following is not one of the postulates of Dalton's atomic theory? 41) \_\_\_\_\_
- A) Compounds are formed when atoms of more than one element combine; a given compound always has the same relative number and kind of atoms.
  - B) All atoms of a given element are identical; the atoms of different elements are different and have different properties.
  - C) Atoms are composed of protons, neutrons, and electrons.
  - D) Each element is composed of extremely small particles called atoms.
  - E) Atoms of an element are not changed into different types of atoms by chemical reactions: atoms are neither created nor destroyed in chemical reactions.
- 42) Which pair of substances could be used to illustrate the law of multiple proportions? 42) \_\_\_\_\_
- A) CO, CO<sub>2</sub>
  - B) CH<sub>4</sub>, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>
  - C) H<sub>2</sub>O, O<sub>2</sub>
  - D) SO<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub>
  - E) NaCl, KCl
- 43) The charge on an electron was determined in the \_\_\_\_\_. 43) \_\_\_\_\_
- A) Millikan oil drop experiment
  - B) Dalton atomic theory
  - C) Rutherford gold foil experiment
  - D) atomic theory of matter
  - E) cathode ray tube, by J. J. Thompson
- 44) \_\_\_\_\_-rays consist of fast-moving electrons. 44) \_\_\_\_\_
- A) X
  - B) alpha
  - C) gamma
  - D) beta
  - E) none of the above
- 45) The gold foil experiment performed in Rutherford's lab \_\_\_\_\_. 45) \_\_\_\_\_
- A) utilized the deflection of beta particles by gold foil
  - B) was the basis for Thompson's model of the atom
  - C) led to the discovery of the atomic nucleus
  - D) confirmed the plum-pudding model of the atom
  - E) proved the law of multiple proportions



- 46) Cathode rays are \_\_\_\_\_. 46) \_\_\_\_\_  
A) x-rays      B) atoms      C) protons      D) neutrons      E) electrons
- 47) Cathode rays are deflected away from a negatively charged plate because \_\_\_\_\_. 47) \_\_\_\_\_  
A) they are emitted by all matter  
B) they are not particles  
C) they are positively charged particles  
D) they are negatively charged particles  
E) they are neutral particles
- 48) Of the following, the smallest and lightest subatomic particle is the \_\_\_\_\_. 48) \_\_\_\_\_  
A) nucleus  
B) proton  
C) alpha particle  
D) neutron  
E) electron
- 49) All atoms of a given element have the same \_\_\_\_\_. 49) \_\_\_\_\_  
A) number of protons  
B) density  
C) number of neutrons  
D) number of electrons and neutrons  
E) mass
- 50) Which atom has the smallest number of neutrons? 50) \_\_\_\_\_  
A) nitrogen-14  
B) oxygen-16  
C) carbon-14  
D) neon-20  
E) fluorine-19

51) There are \_\_\_\_\_ electrons, \_\_\_\_\_ protons, and \_\_\_\_\_ neutrons in an atom of  $^{132}_{54}\text{Xe}$ . 51) \_\_\_\_\_

- A) 54, 54, 132
- B) 78, 78, 132
- C) 78, 78, 54
- D) 132, 132, 54
- E) 54, 54, 78

52) Which combination of protons, neutrons, and electrons is correct for the isotope of copper,  $^{63}_{29}\text{Cu}$ ? 52) \_\_\_\_\_

- A) 29 p<sup>+</sup>, 34 n<sup>0</sup>, 29 e<sup>-</sup>
- B) 29 p<sup>+</sup>, 29 n<sup>0</sup>, 63 e<sup>-</sup>
- C) 34 p<sup>+</sup>, 34 n<sup>0</sup>, 29 e<sup>-</sup>
- D) 34 p<sup>+</sup>, 29 n<sup>0</sup>, 34 e<sup>-</sup>
- E) 63 p<sup>+</sup>, 29 n<sup>0</sup>, 63 e<sup>-</sup>

53) Which isotope has 36 electrons in an atom? 53) \_\_\_\_\_

- A)  $^{78}_{34}\text{Se}$
- B)  $^{34}_{17}\text{Cl}$
- C)  $^{80}_{35}\text{Br}$
- D)  $^{36}_{80}\text{Hg}$
- E)  $^{80}_{36}\text{Kr}$

54) Isotopes are atoms that have the same number of \_\_\_\_\_ but differing number of \_\_\_\_\_. 54) \_\_\_\_\_

- A) neutrons, electrons
- B) neutrons, protons
- C) protons, electrons
- D) protons, neutrons
- E) electrons, protons

55) Different isotopes of a particular element contain the same number of \_\_\_\_\_. 55) \_\_\_\_\_

- A) neutrons
- B) protons
- C) protons and neutrons
- D) subatomic particles
- E) protons, neutrons, and electrons

56) In the symbol shown below, x = \_\_\_\_\_.



- A) 13
- B) 7
- C) 12
- D) 6
- E) not enough information to determine

56) \_\_\_\_\_

57) In the symbol below, X = \_\_\_\_\_.



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

57) \_\_\_\_\_

58) In the symbol below, x is \_\_\_\_\_.



- A) the atomic number
- B) the mass number
- C) the elemental symbol
- D) the number of neutrons
- E) the isotope number

58) \_\_\_\_\_

59) In the periodic table, the elements are arranged in \_\_\_\_\_.

- A) order of increasing atomic number
- B) order of increasing metallic properties
- C) order of increasing neutron content
- D) alphabetical order
- E) reverse alphabetical order

59) \_\_\_\_\_

- 60) Elements \_\_\_\_\_ exhibit similar physical and chemical properties. 60) \_\_\_\_\_
- A) in the same period of the periodic table
  - B) in the same group of the periodic table
  - C) on opposite sides of the periodic table
  - D) with similar atomic masses
  - E) with similar chemical symbols
- 61) Which pair of elements would you expect to exhibit the greatest similarity in their physical and chemical properties? 61) \_\_\_\_\_
- A) Cs, Ba
  - B) Ca, Sr
  - C) C, O
  - D) Ga, Ge
  - E) H, Li
- 62) The elements in groups 1A, 6A, and 7A are called, \_\_\_\_\_, respectively. 62) \_\_\_\_\_
- A) halogens, transition metals, and alkali metals
  - B) alkaline earth metals, halogens, and chalcogens
  - C) alkali metals, halogens, and noble gases
  - D) alkaline earth metals, transition metals, and halogens
  - E) alkali metals, chalcogens, and halogens
- 63) Which pair of elements below should be the most similar in chemical properties? 63) \_\_\_\_\_
- A) Cs and He
  - B) I and Br
  - C) K and Kr
  - D) B and As
  - E) C and O
- 64) An element in the upper right corner of the periodic table \_\_\_\_\_. 64) \_\_\_\_\_
- A) is either a metal or metalloid
  - B) is definitely a non-metal
  - C) is definitely a metal
  - D) is definitely a metalloid
  - E) is either a metalloid or a non-metal
- 65) Which one of the following does not occur as diatomic molecules in elemental form? 65) \_\_\_\_\_
- A) bromine
  - B) oxygen
  - C) nitrogen
  - D) sulfur
  - E) hydrogen
- 66) Which one of the following molecular formulas is also an empirical formula? 66) \_\_\_\_\_
- A)  $\text{H}_2\text{P}_4\text{O}_6$
  - B)  $\text{H}_2\text{O}_2$
  - C)  $\text{C}_2\text{H}_6\text{SO}$
  - D)  $\text{C}_6\text{H}_6$
  - E)  $\text{C}_6\text{H}_6\text{O}_2$
- 67) Of the choices below, which one is not an ionic compound? 67) \_\_\_\_\_
- A)  $\text{RbCl}$
  - B)  $\text{MoCl}_6$
  - C)  $\text{NaCl}$
  - D)  $\text{PbCl}_2$
  - E)  $\text{PCl}_5$

- 68) A molecular formula always indicates \_\_\_\_\_.
- 68) \_\_\_\_\_
- A) the geometry of a molecule  
 B) the simplest whole-number ratio of different atoms in a compound  
 C) the isotope of each element in a compound  
 D) how many of each atom are in a molecule  
 E) which atoms are attached to which in a molecule
- 69) Which species has 16 protons?
- 69) \_\_\_\_\_
- A)  $^{34}_{16}\text{S}^{2-}$       B)  $^{36}_{17}\text{Cl}$       C)  $^{80}_{35}\text{Br}^{-}$       D)  $^{31}_{15}\text{P}$       E)  $^{16}_8\text{O}$
- 70) Which one of the following species has as many electrons as it has neutrons?
- 70) \_\_\_\_\_
- A)  $^1_1\text{H}$       B)  $^{14}_6\text{C}$       C)  $^{40}_{20}\text{Ca}^{2+}$       D)  $^{14}_6\text{C}^{2+}$       E)  $^{19}_9\text{F}^{-}$
- 71) Which species has 48 electrons?
- 71) \_\_\_\_\_
- A)  $^{48}_{22}\text{Ti}$       B)  $^{118}_{50}\text{Sn}^{+2}$       C)  $^{112}_{48}\text{Cd}^{+2}$       D)  $^{68}_{31}\text{Ga}$       E)  $^{116}_{50}\text{Sn}^{+4}$
- 72) Which pair of elements is most apt to form an ionic compound with each other?
- 72) \_\_\_\_\_
- A) barium, bromine  
 B) calcium, sodium  
 C) oxygen, fluorine  
 D) nitrogen, hydrogen  
 E) sulfur, fluorine
- 73) Which species below is the nitride ion?
- 73) \_\_\_\_\_
- A)  $\text{NO}_3^{-}$       B)  $\text{NO}_2^{-}$       C)  $\text{NH}_4^{+}$       D)  $\text{N}^{3-}$       E)  $\text{Na}^{+}$
- 74) Which species below is the sulfite ion?
- 74) \_\_\_\_\_
- A)  $\text{H}_2\text{SO}_4$       B)  $\text{H}_2\text{S}$       C)  $\text{SO}_3^{-}$       D)  $\text{S}^{2-}$       E)  $\text{SO}_2^{-}$
- 75) Which formula/name pair is incorrect?
- 75) \_\_\_\_\_
- A)  $\text{Fe}_2(\text{SO}_4)_3$       iron(III) sulfide  
 B)  $\text{Fe}_2(\text{SO}_3)_3$       iron(III) sulfite  
 C)  $\text{FeSO}_3$       iron(II) sulfite  
 D)  $\text{FeS}$       iron(II) sulfide  
 E)  $\text{FeSO}_4$       iron(II) sulfate

- 76) Which one of the following compounds is copper(I) chloride? 76) \_\_\_\_\_  
A)  $\text{CuCl}_2$       B)  $\text{Cu}_3\text{Cl}_2$       C)  $\text{CuCl}$       D)  $\text{Cu}_2\text{Cl}_3$       E)  $\text{Cu}_2\text{Cl}$
- 77) The charge on the \_\_\_\_\_ ion is -3. 77) \_\_\_\_\_  
A) nitride  
B) sulfate  
C) acetate  
D) permanganate  
E) oxide
- 78) Which metal does not form cations of differing charges? 78) \_\_\_\_\_  
A) Cu      B) Co      C) Na      D) Sn      E) Fe
- 79) The correct name for  $\text{Ni}(\text{CN})_2$  is \_\_\_\_\_. 79) \_\_\_\_\_  
A) nickel (II) cyanide  
B) nickel (I) cyanide  
C) nickel (I) nitride  
D) nickel cyanate  
E) nickel carbonate
- 80) Which metal does not require to have its charge specified in the names of ionic compounds it forms? 80) \_\_\_\_\_  
A) Fe      B) Cu      C) Mn      D) Ca      E) Pb

## Answer Key

Testname: SAMPLE TEST 1B

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

Answer Key

Testname: SAMPLE TEST 1B

- 51) E
- 52) A
- 53) E
- 54) D
- 55) B
- 56) D
- 57) C
- 58) B
- 59) A
- 60) B
- 61) B
- 62) E
- 63) B
- 64) B
- 65) D
- 66) C
- 67) E
- 68) D
- 69) A
- 70) E
- 71) B
- 72) A
- 73) D
- 74) E
- 75) A
- 76) C
- 77) A
- 78) C
- 79) A
- 80) D