

Chapter 2

Elements, Compounds, and the Periodic Table

Multiple Choice Questions

Section 2.1

Difficulty Level: easy

1. All of the following are alkali metals *except*

- a. Sr
- b. Na
- c. Fr
- d. Cs
- e. Rb

Answer: a

Section 2.1

Difficulty Level: easy

2. Which element is a halogen?

- a. Te
- b. O
- c. Se
- d. Uuh
- e. I

Answer: e

Section 2.1

Difficulty Level: easy

3. Each statement accurately describes the noble gases *except* for which one?

- a. They were once known as the inert gases.
- b. He, Ne, Ar, Kr, Xe, Rn, and Uuo are part of the group.
- c. Their heavier elements do react with other elements.
- d. They belong to group VIIIA (or 18).
- e. They contain at least one metalloid.

Answer: e

Section 2.1

Difficulty Level: easy

4. The transition metals take up ____ periods of the periodic table.

- a. 2
- b. 3
- c. 4
- d. 1
- e. 5

Answer: c

Section 2.1

Difficulty Level: easy

5. In which family of elements does Ca belong?

- a. alkali metals
- b. alkaline earth metals
- c. halogens
- d. noble gases
- e. transition metals

Answer: b

Section 2.1

Difficulty Level: easy

6. The elements in a column of the periodic table are known as

- a. metalloids.
- b. a period.
- c. noble gases.
- d. a group.
- e. nonmetals.

Answer: d

Section 2.1

Difficulty Level: easy

7. The elements in a row of the periodic table are known as

- a. metalloids.
- b. a period.
- c. noble gases.
- d. a group.
- e. nonmetals.

Answer: b

Section 2.1

Difficulty Level: easy

8. Which of these elements have the most chemical properties that are similar to sulfur?

- a. calcium
- b. oxygen
- c. phosphorus
- d. bromine
- e. nitrogen

Answer: b

Section 2.1

Difficulty Level: easy

9. Which of these elements have the most chemical properties that are similar to magnesium?

- a. calcium
- b. sodium
- c. aluminum
- d. iron
- e. cesium

Answer: a

Section 2.1

Difficulty Level: easy

10. Which of these elements have the most chemical properties that are similar to silicon?

- a. aluminum
- b. phosphorus
- c. nitrogen
- d. silver
- e. germanium

Answer: e

Section 2.2

Difficulty Level: easy

11. Some elements have properties that lie between true metals and true nonmetals. These elements are known as:

- a. metals
- b. nonmetals
- c. halogens
- d. alkaline earth metals
- e. metalloids

Answer: e

Section 2.2

Difficulty Level: easy

12. Which metal is a liquid at room temperature (about 25°C)?

- a. hydrogen
- b. bromine
- c. tungsten
- d. mercury
- e. chromium

Answer: d

Section 2.2

Difficulty Level: easy

13. Which compound is a gas at room temperature (about 25°C)?

- a. hydrogen
- b. bromine
- c. tungsten
- d. mercury
- e. chromium

Answer: a

Section 2.2

Difficulty Level: easy

14. Diamond and graphite are different forms of which element?

- a. sodium
- b. carbon
- c. mercury
- d. gold
- e. calcium

Answer: b

Section 2.2

Difficulty Level: medium

15. Which of the following is not a property of metals?

- a. They have a shine called a metallic luster.
- b. They are good conductors of electricity.
- c. They are generally poor conductors of heat.
- d. They can be rolled into thin sheets.
- e. Some metals are quite hard, while some are soft.

Answer: c

Section 2.2

Difficulty Level: medium

16. Classify the following three elements as a metal, metalloid, or nonmetal: P, Si, Al.

- a. P, metal; Si, metalloid; Al, nonmetal
- b. P, metal; Al, metalloid; Si, nonmetal
- c. Al, metal; P, metalloid; Si, nonmetal
- d. Si, metal; Al, metalloid; P, nonmetal
- e. Al, metal; Si, metalloid; P, nonmetal

Answer: e

Section 2.2

Difficulty Level: medium

17. Classify the following three elements as a metal, metalloid, or nonmetal: Ti, S, Sb.

- a. Ti, metal; S, metalloid; Sb, nonmetal
- b. Sb, metal; S, metalloid; Ti, nonmetal
- c. S, metal; Sb, metalloid; Ti, nonmetal
- d. Sb, metal; Ti, metalloid; S, nonmetal
- e. Ti, metal; Sb, metalloid; S, nonmetal

Answer: e

Section 2.2

Difficulty Level: easy

18. Which of these element types are usually tend to be poor conductors of heat and electricity?

- a. metals
- b. metalloids
- c. nonmetals
- d. alkaline earth metals
- e. alkali metals

Answer: c

Section 2.3

Difficulty Level: easy

19. Which of the following is used to represent elemental bromine?

- a. Be
- b. B
- c. 2Br
- d. Br₂
- e. Br

Answer: d

Section 2.3

Difficulty Level: medium

20. Which combination is used to represent molecular hydrogen, and atomic hydrogen, respectively?

- a. H₂, H
- b. He, H⁻
- c. H, H
- d. 2H, H⁺
- e. Hy, H

Answer: a

Section 2.3

Difficulty Level: medium

21. Which compound exists as a diatomic molecule in the free state?

- a. magnesium
- b. managanese
- c. silicon
- d. arsenic
- e. chlorine

Answer: e

Section 2.3

Difficulty Level: medium

22. Which compound exists as a diatomic molecule in the free state?

- a. C
- b. N
- c. Ga
- d. Ge
- e. P

Answer: b

Section 2.3

Difficulty Level: medium

23. Which compound exists as a diatomic molecule in the free state?

- a. helium
- b. fluorine
- c. neon
- d. argon
- e. xenon

Answer: b

Section 2.3

Difficulty Level: medium

24. Which compound is correctly represented as a hydrate?

- a. $\text{C}_2\text{H}_5\text{OH}_2^+$
- b. $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
- c. $\text{FeH}_2(\text{CO})_4$
- d. $\text{O}_2\text{S}(\text{OH})_2$
- e. $[\text{CrCl}(\text{H}_2\text{O})_5]\text{Cl}$

Answer: b

Section 2.3

Difficulty Level: medium

25. Which compound is correctly represented as a hydrate?

- a. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- b. $\text{HC}_2\text{H}_3\text{O}_2$
- c. $\text{O}_2\text{S}(\text{OH})_2$
- d. $\text{H}_2\text{S}_2\text{O}_7$
- e. $\text{C}_6(\text{H}_2\text{O})_6$

Answer: a

Section 2.4

Difficulty Level: medium

26. How many oxygen atoms are in one molecule of $\text{Mg}(\text{NO}_3)_2$?

- a. 1
- b. 2
- c. 3
- d. 5
- e. 6

Answer: e

Section 2.4

Difficulty Level: medium

27. How many oxygen atoms are in one formula unit of $\text{Mg}(\text{NO}_3)_2$?

- a. 1
- b. 2
- c. 3
- d. 5
- e. 6

Answer: e

Section 2.4

Difficulty Level: easy

28. How many hydrogen atoms are in one molecule of $\text{HC}_2\text{H}_3\text{O}_2$?

- a. 1
- b. 2
- c. 3
- d. 4
- e. 5

Answer: d

Section 2.4

Difficulty Level: easy

29. How many carbon atoms are in one molecule of C_6H_6 ?

- a. 1
- b. 2
- c. 4
- d. 6
- e. 12

Answer: d

Section 2.4

Difficulty Level: medium

30. The number of atoms in one formula unit of the substance, $\text{CO}(\text{NH}_2)_2$, is

- a. 4
- b. 5
- c. 6
- d. 7
- e. 8

Answer: e

Section 2.4

Difficulty Level: medium

31. The number of atoms in one formula unit of $\text{C}_2\text{H}_4(\text{COOH})_2$ is

- a. 10
- b. 11
- c. 12
- d. 14
- e. 16

Answer: d

Section 2.4

Difficulty Level: medium

32. The number of atoms in one formula unit of the substance $\text{Cs}_2\text{SO}_4 \cdot 5\text{H}_2\text{O}$ is

- a. 4
- b. 17
- c. 22
- d. 25
- e. 33

Answer: c

Section 2.4

Difficulty Level: hard

33. How many oxygen atoms are in one formula unit of $\text{Cu}(\text{NO}_3)_2 \cdot 5\text{H}_2\text{O}$?

- a. 2
- b. 3
- c. 5
- d. 6
- e. 11

Answer: e

Section 2.4

Difficulty Level: medium

34. The number of atoms in one formula unit of the substance $(\text{NH}_4)_3\text{Co}(\text{CN})_6$ is

- a. 21
- b. 26
- c. 28
- d. 31
- e. 33

Answer: c

Section 2.4

Difficulty Level: medium

35. How many atoms are there in one formula unit of $(\text{NH}_4)_4\text{Fe}(\text{CN})_6$?

- a. 15
- b. 25
- c. 28
- d. 33
- e. 35

Answer: d

Section 2.4

Difficulty Level: medium

36. How many atoms are there in one formula unit of $\text{NiSO}_4 \cdot 7\text{H}_2\text{O}$?

- a. 9
- b. 14
- c. 27
- d. 28
- e. 33

Answer: c

Section 2.4

Difficulty Level: medium

37. How many atoms of each element are in the formula, $\text{H}_2\text{S}_2\text{O}_7$?

- a. 2H, 2S, 7O
- b. 1H, 2S, 4O
- c. 2H, 1S, 1O
- d. 2H, 4S, 4O
- e. 1H, 1S, 1O

Answer: a

Section 2.4

Difficulty Level: medium

38. How many atoms of each element are in the formula, $\text{Ni}(\text{ClO}_4)_2$?

- a. 2Ni, 1Cl, 4O
- b. 1Ni, 2 Cl, 8O
- c. 2Ni, 1 Cl, 1O
- d. 2Ni, 4 Cl, 4O
- e. 1Ni, 1 Cl, 8O

Answer: b

Section 2.4

Difficulty Level: medium

39. How many hydrogen atoms appear on the right side of the equation, $4\text{NH}_3 + 3\text{O}_2 \rightarrow 2\text{N}_2 + 6\text{H}_2\text{O}$?

- a. 2
- b. 4
- c. 6
- d. 10
- e. 12

Answer: e

Section 2.4

Difficulty Level: hard

40. How many atoms are in one molecule of $\text{Mo}_2(\text{O}_2\text{CC}(\text{CH}_3)_3)_4$?

- a. 17
- b. 30
- c. 60
- d. 66
- e. 64

Answer: d

Section 2.4

Difficulty Level: hard

41. How many atoms of each element appear on each side of the arrow in the following chemical equation? $2\text{Fe}(\text{NO}_3)_3 + 3\text{Na}_2\text{CO}_3 \rightarrow \text{Fe}_2(\text{CO}_3)_3 + 6\text{NaNO}_3$

- a. 2Fe, 6N, 18O, 6Na, 3C
- b. 2Fe, 6N, 27O, 6Na, 9C
- c. 2Fe, 6N, 27O, 6Na, 3C
- d. 2Fe, 6N, 27O, 9Na, 3C
- e. 2Fe, 6N, 21O, 18Na, 3C

Answer: c

Section 2.4

Difficulty Level: hard

42. How many atoms of each element appear on each side of the arrow in the following chemical equation? $3\text{Cl}_3\text{BNH}_2\text{CH}_3 + 6(\text{CH}_3)_3\text{N} \rightarrow 6(\text{CH}_3)_3\text{NHCl} + \text{B}_3\text{N}_3\text{Cl}_3(\text{CH}_3)_3$

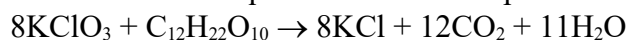
- a. 9Cl, 3B, 9N, 54H, 6C
- b. 9Cl, 3B, 9N, 69H, 21C
- c. 3Cl, 3B, 9N, 15H, 21C
- d. 9Cl, 1B, 9N, 54H, 9C
- e. 3Cl, 3B, 9N, 69H, 18C

Answer: b

Section 2.4

Difficulty Level: hard

43. A student attempts to balance a chemical equation and comes up with the following result:



Turns out he wrote the initial equation wrong so he could not balance the equation. Which element(s) are not balanced in this result?

- a. Cl
- b. O
- c. H
- d. O and H
- e. C

Answer: b

Section 2.5

Difficulty Level: easy

44. Which of these pairs of elements would be most likely to form an ionic compound?

- a. P and Br
- b. Cu and K
- c. C and O
- d. O and Zn
- e. Al and Rb

Answer: d

Difficulty Level: easy

45. Which of these pairs of elements would be most likely to form a molecular compound?

- a. P and Br
- b. Cu and K
- c. K and O
- d. O and Zn
- e. Al and Rb

Answer: a

Section 2.5

Difficulty Level: easy

46. The formula for the phosphate ion is

- a. PO_4^{2-}
- b. PO_4^{3-}
- c. PO_4^-
- d. P_2O_4^-
- e. $\text{P}_2\text{O}_4^{2-}$

Answer: b

Section 2.5

Difficulty Level: easy

47. The correct formula for the carbonate ion is

- a. $\text{C}_2\text{H}_3\text{O}_2^-$
- b. $\text{C}_2\text{O}_4^{2-}$
- c. CO_2^-
- d. CO_3^-
- e. CO_3^{2-}

Answer: e

Section 2.5

Difficulty Level: medium

48. When barium metal reacts with chlorine gas, it forms an ionic compound, BaCl_2 . In the course of the reaction, each Ba atom

- a. loses two protons
- b. loses two electrons
- c. gains two protons
- d. gains two electrons
- e. loses two neutrons

Answer: b

Section 2.5

Difficulty Level: medium

49. When barium metal reacts with chlorine gas, it forms an ionic compound, BaCl_2 . In the course of the reaction, each Cl atom

- a. loses one proton
- b. loses one electron
- c. gains one proton
- d. gains one electron
- e. loses one neutron

Answer: d

Section 2.5

Difficulty Level: medium

50. Write the formula for the ionic compound formed from magnesium and sulfur.

- a. MgS_2
- b. MgS
- c. Mg_2S
- d. Mg_3S_2
- e. MgS_3

Answer: b

Section 2.5

Difficulty Level: medium

51. Write the most likely formula for the ionic compound formed from magnesium and phosphorus.

- a. MgP_2
- b. Mg_3P
- c. Mg_2P
- d. Mg_3P_2
- e. MgP_3

Answer: d

Section 2.5

Difficulty Level: medium

52. Write the most likely formula for the ionic compound formed from calcium and selenium?

- a. CaSe
- b. Ca_2Se
- c. CaSe_2
- d. Ca_3Se
- e. CaSe_3

Answer: a

Difficulty Level: medium

53. Write the most likely formula for the ionic compound formed from magnesium and iodine?

- a. MgI
- b. Mg_2I
- c. MgI_2
- d. MgI_3
- e. Mg_3I

Answer: c

Section 2.5

Difficulty Level: medium

54. An alkaline earth metal, which we will represent by the symbol X, reacts with a halogen, which we will represent by the symbol Q. What would be the formula of the resulting compound?

- a. XQ
- b. XQ_2
- c. XQ_4
- d. X_2Q
- e. X_4Q

Answer: b

Section 2.5

Difficulty Level: medium

55. Aluminum reacts with a second element, which we will represent by the symbol E, to form a compound whose formula is AlE_3 . Element E is most probably

- a. an actinide element.
- b. an alkali metal.
- c. a chalcogen.
- d. a halogen.
- e. a transition metal.

Answer: d

Section 32.5

Difficulty Level: medium

56. Aluminum reacts with another element, which we will represent by the symbol Gr, to form a compound whose formula is $AlGr$. Element Gr is most probably

- a. an actinide element.
- b. group 2A element.
- c. a chalcogen.
- d. group 5A element.
- e. a transition metal.

Answer: d

Section 2.5

Difficulty Level: medium

57. Bromine reacts with a metal, which we will represent by the symbol M, to form a compound whose formula is M_2Br . Element M is most probably

- a. a metalloid.
- b. group 2A element.
- c. a chalcogen.
- d. group 5A element.
- e. a metallic element not currently known.

Answer: e

Section 2.5

Difficulty Level: medium

58. Oxygen reacts with a metal, which we will represent by the symbol Wp, to form a compound whose formula is Wp_2O . Element Wp is most probably

- a. a metalloid.
- b. group 2A element.
- c. a chalcogen.
- d. group 1A element.
- e. a metallic element not currently known.

Answer: d

Section 2.5

Difficulty Level: medium

59. Which formula is correct because it represents a known ionic compound?

- a. Li_2Br
- b. Pb_2I_2
- c. KBr_2
- d. Rb_2Se_4
- e. Al_2S_3

Answer: e

Section 2.5

Difficulty Level: medium

60. Which formula is correct because it represents a known ionic compound?

- a. Be_2Br_4
- b. Ca_2I_2
- c. K_2S
- d. Rb_2Br
- e. Ca_2S_3

Answer: c

Section 2.5

Difficulty Level: medium

61. Which formula is incorrect because it does not represent a known ionic compound?

- a. BeCl_2
- b. CaI_2
- c. K_2S
- d. RbBr
- e. Ca_2O_3

Answer: e

Section 2.5

Difficulty Level: medium

62. Which formula is incorrect because it does not represent an ionic compound written correctly?

- a. BaCl_2
- b. Al_2F_3
- c. Na_2O
- d. RbBr
- e. CaO

Answer: b

Section 2.6

Difficulty Level: hard

63. Select the examples in which the formulas for the ionic compound are not written correctly (Or cannot exist as written).

- I. $(\text{NH}_4)_2\text{As}$
- II. CuO
- III. $\text{Mg}(\text{C}_2\text{H}_3\text{O})_2$
- IV. $\text{Na}_3(\text{HCO}_3)_2$

- a. I only
- b. II and III
- c. III and IV
- d. I and IV
- e. I, II and IV

Answer: d

Section 2.5

Difficulty Level: medium

64. What is the formula for the oxalate ion?

- a. CO_3^{2-}
- b. $\text{C}_4\text{O}_2^{2-}$
- c. $\text{C}_4\text{O}_4^{2-}$
- d. $\text{C}_2\text{O}_4^{2-}$
- e. $\text{C}_2\text{H}_3\text{O}_2^-$

Answer: d

Section 2.5

Difficulty Level: medium

65. The formula of the compound formed from the calcium ion and acetate ion is

- a. $\text{CaC}_2\text{H}_3\text{O}_2$
- b. $\text{Ca}_2\text{C}_2\text{H}_3\text{O}_2$
- c. $\text{Ca}_2(\text{C}_2\text{H}_3\text{O}_2)_4$
- d. $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2$
- e. $\text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_3$

Answer: d

Section 2.5

Difficulty Level: medium

66. Write the most likely formula for the ionic compound formed from calcium ions and nitrate ions?

- a. Ca_3N_2
- b. $\text{Ca}(\text{NO}_3)_2$
- c. Ca_2NO_3
- d. Ca_2NO_2
- e. $\text{Ca}(\text{NO}_2)_2$

Answer: b

Section 2.5

Difficulty Level: medium

67. The formula of the compound formed from the strontium ion and chromate ion is

- a. SrCrO_3
- b. SrCrO_4
- c. Sr_2CrO_4
- d. $\text{Sr}(\text{CrO}_4)_2$
- e. $\text{Sr}_2(\text{CrO}_4)_3$

Answer: b

Section 2.5

Difficulty Level: medium

68. Which compound below has its formula written incorrectly?

- a. $\text{Al}(\text{H}_2\text{PO}_4)_3$
- b. $\text{Al}(\text{HCO}_3)_3$
- c. $\text{Ca}(\text{HCO}_3)_2$
- d. KHPO_4
- e. $\text{Ca}(\text{NO}_3)_2$

Answer: d

Section 2.5

Difficulty Level: medium

69. Which compound below has its formula written incorrectly?

- a. $\text{Al}(\text{H}_2\text{CO}_3)_3$
- b. $\text{Al}(\text{H}_2\text{PO}_4)_3$
- c. $\text{Ba}(\text{HCO}_3)_2$
- d. KH_2PO_4
- e. $\text{Ca}(\text{NO}_2)_2$

Answer: a

Section 2.5

Difficulty Level: hard

70. How many protons, neutrons, and electrons are in the ion, $^{57}\text{Fe}^{3+}$?

- a. 27 protons, 30 neutrons, and 30 electrons
- b. 26 protons, 31 neutrons, and 23 electrons
- c. 29 protons, 28 neutrons, and 26 electrons
- d. 26 protons, 31 neutrons, and 29 electrons
- e. 25 protons, 32 neutrons, and 22 electrons

Answer: b

Section 2.5

Difficulty Level: hard

71. How many protons, neutrons, and electrons are in the ion, $^{129}\text{Te}^{2-}$?

- a. 52 protons, 77 neutrons, and 50 electrons
- b. 53 protons, 76 neutrons, and 55 electrons
- c. 52 protons, 77 neutrons, and 54 electrons
- d. 50 protons, 79 neutrons, and 52 electrons
- e. 51 protons, 78 neutrons, and 53 electrons

Answer: c

Section 2.5

Difficulty Level: hard

72. How many protons, neutrons, and electrons are in the ion, $^{37}\text{Cl}^-$?

- a. 37 protons, 18 neutrons, and 37 electrons
- b. 18 protons, 37 neutrons, and 17 electrons
- c. 17 protons, 20 neutrons, and 18 electrons
- d. 37 protons, 20 neutrons, and 18 electrons
- e. 17 protons, 17 neutrons, and 37 electrons

Answer: c

Section 2.5

Difficulty Level: hard

73. How many protons, neutrons, and electrons are in the cation of the compound, ^{55}MnP ?

- a. 25 protons, 30 neutrons, and 25 electrons
- b. 23 protons, 33 neutrons, and 28 electrons
- c. 28 protons, 27 neutrons, and 25 electrons
- d. 23 protons, 32 neutrons, and 26 electrons
- e. 25 protons, 30 neutrons, and 22 electrons

Answer: e

Section 2.5

Difficulty Level: hard

74. How many protons, neutrons, and electrons are in the anion of the compound, CrCl_3^{37} ?

- a. 17 protons, 20 neutrons, and 18 electrons
- b. 18 protons, 23 neutrons, and 21 electrons
- c. 21 protons, 21 neutrons, and 16 electrons
- d. 14 protons, 23 neutrons, and 17 electrons
- e. 17 protons, 17 neutrons, and 20 electrons

Answer: a

Section 2.5

Difficulty Level: hard

75. List the ions, including the number of each type present in the compound, $(\text{NH}_4)_3\text{PO}_4$.

- a. 4N^{3-} , 12H^+ , PO_4^{2-}
- b. 3NH^{4+} , 4PO_4^{3-}
- c. N^{3-} , 12H^+ , P^{3-} ; 4O^{2-}
- d. 3NH_4^+ , PO_4^{3-}
- e. 4NH^+ , 3PO_4^{3-}

Answer: d

Section 2.5

Difficulty Level: hard

76. List the ions, including the number of each type present in the compound, $\text{Fe}_2(\text{C}_2\text{O}_4)_3 \cdot 2\text{H}_2\text{O}$.

- a. 2Fe^{3+} , 6C^{4+} , 12O^{2-}
- b. 3Fe^{4+} , 2CO_4^{3-} ; 2OH^-
- c. 3Fe^{2+} , $3\text{C}_2\text{O}_4^{2-}$
- d. 3Fe^{4+} , 2CO_4^{3-} ; $2\text{H}_2\text{O}^{2-}$
- e. 2Fe^{3+} , 3CO_2^{2-} ; $2\text{H}_2\text{O}$

Answer: c

Section 2.6

Difficulty Level: easy

77. Which compound below is correctly indicated as magnesium sulfate heptahydrate?

- a. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- b. $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
- c. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- d. $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$
- e. $\text{MnSO}_4 \cdot 2\text{H}_2\text{O}$

Answer: b

Section 2.6

Difficulty Level: medium

78. The name of the compound $\text{Al}(\text{SO}_4)_3$ is

- a. there is no compound with that formula - it must be written incorrectly.
- b. aluminum sulfate
- c. aluminum trisulfate
- d. aluminum(III) sulfate
- e. aluminum sulfite

Answer: a

Section 2.6

Difficulty Level: medium

79. What is the name of the compound, $\text{V}(\text{NO}_3)_3$?

- a. vanadium trinitrate
- b. vanadium nitrite
- c. vanadium(III) nitrite
- d. vanadium nitrate
- e. vanadium(III) nitrate

Answer: e

Section 2.6

Difficulty Level: medium

80. What is the name for the compound, $\text{Ba}(\text{NO}_3)_2$?

- a. barium dinitrate
- b. barium dinitrite
- c. barium nitrate
- d. barium(II) nitrite
- e. barium(II) nitrate

Answer: c

Section 2.6

Difficulty Level: medium

81. Which compound is correctly written as a hydride?

- a. $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$
- b. $\text{HC}_2\text{H}_3\text{O}_2$
- c. NaOH
- d. CaH_2
- e. $\text{C}_6\text{H}_{12}\text{O}_6$

Answer: d

Section 2.6

Difficulty Level: medium

82. What is the name for the compound V_2O_5 ?

- a. divanadium pentoxide
- b. vanadic oxide
- c. vanadium(V) oxide
- d. vanadium(V) pentoxide
- e. vanadous oxide

Answer: c

Section 2.6

Difficulty Level: medium

83. What is the name for the compound NaCl_3 ?

- a. sodium chlorate
- b. sodium chlorite
- c. sodium perchloride
- d. sodium trichloride
- e. There is no such compound.

Answer: e

Section 2.6

Difficulty Level: medium

84. What is the name for the compound CuBr_2 ?

- a. copper(I) bromide(II)
- b. copper(II) bromide
- c. copper(II) bromite
- d. copper dibromide
- e. cuprous bromide

Answer: b

Section 2.6

Difficulty Level: medium

85. What is the correct name for the compound Na_2O ?

- a. disodium oxide
- b. sodium oxide
- c. sodium(I) oxide
- d. sodium peroxide
- e. sodium superoxide

Answer: b

Section 2.6

Difficulty Level: medium

86. Which is the correct name for the compound FeBr_3 ?

- a. ferrous bromide
- b. iron(III) bromide
- c. iron bromite
- d. iron tribromide
- e. iron tribromine

Answer: b

Section 2.6

Difficulty Level: medium

87. What is the formula for the compound iron(II) sulfate?

- a. FeSO_4
- b. $\text{Fe}(\text{SO}_4)_2$
- c. Fe_2SO_4
- d. $\text{Fe}_2(\text{SO}_4)_3$
- e. $\text{Fe}_3(\text{SO}_4)_2$

Answer: a

Section 2.6

Difficulty Level: medium

88. Which is a correct name for the compound Hg_2Cl_2 ?

- a. dimercury dichloride
- b. mercuric chloride
- c. mercury(I) chloride
- d. mercury(II) dichloride
- e. there is no correct name, the formula should be HgCl

Answer: c

Section 2.6

Difficulty Level: medium

89. Which is a correct name for the compound CoF_3 ?

- a. cobalt fluoride
- b. cobalt trifluoride
- c. cobalt(III) fluoride
- d. cobaltic trifluoride
- e. cobaltous fluoride

Answer: c

Section 2.6

Difficulty Level: medium

90. A correct name for SnF_4 is

- a. stannic tetrafluoride
- b. stannous fluoride
- c. stannous(IV) fluoride
- d. tin(IV) fluoride
- e. tin tetrafluoride

Answer: d

Section 2.6

Difficulty Level: medium

91. The correct formula for tin(II) nitrate is

- a. $\text{Sn}(\text{NO}_2)_2$
- b. $\text{Sn}(\text{NO}_3)_2$
- c. $\text{Sn}(\text{NO}_3)_3$
- d. $\text{Sn}(\text{NO}_3)_4$
- e. Sn_2NO_3

Answer: b

Section 2.6

Difficulty Level: medium

92. What is the formula for magnesic perchlorate?

- a. MgClO_3
- b. $\text{Mg}(\text{ClO}_3)_2$
- c. Mg_2ClO_3
- d. $\text{MgO}(\text{ClO}_3)_2$
- e. There is no such compound.

Answer: e

Section 2.6

Difficulty Level: medium

93. What is the name for $\text{Na}_2\text{Cr}_2\text{O}_7$?

- a. sodium chromium(VII)-ate
- b. sodium dichromate
- c. sodium dichromium heptaoxide
- d. sodium heptaoxochromate
- e. sodium perchromate

Answer: b

Section 2.6

Difficulty Level: medium

94. The compound $\text{Na}_2\text{S}_2\text{O}_3$ is used extensively in photographic film processing. What is its chemical name?

- a. sodium bisulfite
- b. sodium disulfur trioxide
- c. sodium oxosulfate(IV)
- d. sodium thiosulfate
- e. sodium trioxosulfite

Answer: d

Section 2.6

Difficulty Level: medium

95. If the NtO_4^{2-} ion is called nortonate, what is the correct name for the compound K_2NtO_4 ?

- a. dipotassium nortonium tetraoxide
- b. dipotassium nortonate
- c. potassium nortonate
- d. potassium(I) nortonate
- e. potassium(II) nortonate

Answer: c

Section 2.6

Difficulty Level: medium

96. What is the name for Cu_2SO_3 ?

- a. copper(I) sulfite
- b. copper(II) sulfite
- c. copper thiosulfate
- d. cuprous sulfate
- e. dicopper sulfur trioxide

Answer: a

Section 2.6

Difficulty Level: medium

97. What is a correct name for the FeCrO_4 ?

- a. iron(II) chromate
- b. iron dichromate
- c. iron(III) chromium tetraoxide
- d. iron monochromate
- e. ferrous chrome

Answer: a

Section 2.6

Difficulty Level: medium

98. What is the name for $\text{CuC}_2\text{H}_3\text{O}_2$?

- a. copper(I) acetate
- b. carbon hydrocarbonate
- c. copper monocarbonate
- d. copper(I) oxalate
- e. dicarbon acetate

Answer: a

Section 2.6

Difficulty Level: medium

99. What is a correct name for KHCr_2O_7 ?

- a. potassium bichromite
- b. potassium bichromate
- c. potassium dichromic acid
- d. potassium monohydrogen chromite
- e. potassium monohydrogen dichromate

Answer: e

Section 2.6

Difficulty Level: medium

100. What is the name for LiHPO_4 ?

- a. lithium monohydrogen phosphate
- b. lithium hydrogen phosphoric acid
- c. lithium hydrogen phosphorus tetraoxide
- d. lithium monohydrogen phosphite
- e. There is no known ionic compound with that formula.

Answer: e

Section 2.6

Difficulty Level: medium

101. What is the name for Li_2HPO_4 ?

- a. lithium monohydrogen phosphate
- b. There is no compound with that formula.
- c. dilithium monohydrogen phosphate
- d. lithium hydrogen phosphorus tetraoxide
- e. lithium phosphoric acid

Answer: a

Section 2.6

Difficulty Level: medium

102. What is the name for CuHSO_4 ?

- a. copper(I) hydrogen sulfate
- b. copper(II) bisulfate acid
- c. copper hydrogen sulfur tetraoxide
- d. copper hydrogen sulfate
- e. copper sulfuric acid

Answer: a

Section 2.6

Difficulty Level: medium

103. Which compound is correctly indicated as cobalt(II) chloride hexahydrate?

- a. $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$
- b. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- c. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$
- d. $\text{NiSO}_4 \cdot 6\text{H}_2\text{O}$
- e. $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

Answer: a

Section 2.6

Difficulty Level: hard

104. Which is a correct formula for mercury(I) phosphate?

- a. HgPO_3
- b. HgPO_4
- c. Hg_3PO_4
- d. Hg_2PO_3
- e. $(\text{Hg}_2)_3(\text{PO}_4)_2$

Answer: e

Section 2.6

Difficulty Level: hard

105. Select the examples in which the formulas do not correctly match the names of the compounds indicated.

- | | |
|-----------------------------------|---|
| I. Sodium thiosulfate | Na_2SO_3 |
| II. Barium oxalate | BaC_2O_4 |
| III. Iron(II) sulfate hexahydrate | $\text{FeSO}_4 \cdot 6\text{H}_2\text{O}$ |
| IV. Calcium phosphate | Ca_3PO_4 |

- a. II only
- b. II and III
- c. I, II and IV
- d. I and IV
- e. II, III and IV

Answer: d

Section 2.6

Difficulty Level: hard

106. Select the examples in which the names do not correctly match the formulas of the compounds indicated.

I. $\text{Fe}_2(\text{CO}_3)_3$	iron(III) carbonate
II. $\text{Cr}_2(\text{C}_2\text{O}_4)_3$	chromium(III) oxalate
III. $\text{Mg}(\text{C}_2\text{H}_3\text{O}_2)_2$	magnesium hydrogencarbonate
IV. PbSO_4	lead sulfate

- a. II only
- b. II and III
- c. III and IV
- d. I and IV
- e. I, II and IV

Answer: c

Section 2.6

Difficulty Level: hard

107. Select the examples in which the names do not correctly match the formulas of the compounds indicated.

I. NaClO_3	Sodium chlorate
II. $(\text{NH}_4)_2\text{CO}_3$	Ammonium(I) carbonate
III. $\text{Cd}(\text{H}_2\text{PO}_4)_2$	Cadmium dihydrogen phosphate
IV. KMnO_4	Potassium-manganese(VII) oxide

- a. II only
- b. II and IV
- c. III and IV
- d. I and IV
- e. I, II and IV

Answer: b

Section 2.7

Difficulty Level: easy

108. Which compound is correctly classified as a hydrocarbon?

- a. $\text{C}_6\text{H}_{12}\text{O}_6$
- b. C_8H_{16}
- c. $\text{HC}_2\text{H}_3\text{O}_2$
- d. NaHCl
- e. $\text{C}_2\text{H}_5\text{OH}$

Answer: b

Section 2.7

Difficulty Level: medium

109. One of the components of kerosene is an alkane with 16 carbon atoms. Which formula is an alkane?

- a. $\text{C}_{16}\text{H}_{12}$
- b. $\text{C}_{16}\text{H}_{22}$
- c. $\text{C}_{16}\text{H}_{32}$
- d. $\text{C}_{16}\text{H}_{34}$
- e. $\text{C}_{16}\text{H}_{40}$

Answer: d

Section 2.7

Difficulty Level: medium

110. The common name for the compound, CH_4 , is

- a. carbon(IV) hydride
- b. carbon tetrahydride
- c. hydrocarbonate
- d. methane
- e. carbonic acid

Answer: d

Section 2.7

Difficulty Level: medium

111. The common name for the compound, C_2H_6 , is

- a. carbon hydride
- b. carbon hexahydride
- c. ethane
- d. methane
- e. propane

Answer: c

Section 2.7

Difficulty Level: medium

112. Which of the following is the correct formula for the hydrocarbon hexane?

- a. CH_4
- b. C_2H_4
- c. CH_6
- d. C_6H_{14}
- e. C_2H_5OH

Answer: d

Section 2.7

Difficulty Level: medium

113. Which compound is not a hydrocarbon?

- a. C_6H_{12}
- b. C_8H_{16}
- c. C_2H_6
- d. C_5H_5N
- e. C_3H_6

Answer: d

Section 2.7

Difficulty Level: medium

114. The formula for the compound formed between arsenic (As) and hydrogen is

- a. AsH
- b. As₂H
- c. AsH₂
- d. As₃H
- e. AsH₃

Answer: e

Section 2.7

Difficulty Level: medium

115. The most likely formula for the compound formed between antimony and chlorine is

- a. SbCl
- b. SbCl₂
- c. SbCl₃
- d. SbCl₄
- e. SbCl₆

Answer: c

Section 2.8

Difficulty Level: easy

116. What is the name of the compound, HI(g)?

- a. hydriodic acid
- b. hydrogen moniodide
- c. hydrogen iodide
- d. iodic acid
- e. monohydrogen moniodide

Answer: c

Section 2.8

Difficulty Level: medium

117. What is the name of the compound, IBr_3 ?

- a. bromic iodide
- b. iodine bromate
- c. iodine tribromide
- d. iodine tribromine
- e. moniodine tribromite

Answer: c

Section 2.8

Difficulty Level: medium

118. What is the name of the compound, S_2Cl_2 ?

- a. disulfur chlorate
- b. disulfur dichloride
- c. disulfur dichlorine
- d. sulfur(I) chloride
- e. sulfur(II) chlorine(II)

Answer: b

Section 2.8

Difficulty Level: medium

119. What is the name of the compound, HCN(g) ?

- a. hydrocarbonitride
- b. hydrocyanic acid
- c. hydrogen carbonitride
- d. hydrogen cyanate
- e. hydrogen cyanide

Answer: e

Section 2.8

Difficulty Level: medium

120. A typographical error on an exam produced the formula, P_4Se_7 , in one of the questions. How would you name this compound?

- a. tetraphosphorus hexaselenide
- b. tetraphosphorus heptaselenide
- c. phosphorus heptaselenite
- d. phosphorus(IV) selenide
- e. phosphorus(VII) selenide

Answer: b

Section 2.8

Difficulty Level: hard

121. Select the examples in which the formulas do not correctly match the names of the compounds indicated.

I. dichlorine heptoxide	Cl_2O_6
II. iodine heptafluoride	I_2F_7
III. dinitrogen difluoride	N_2F_2
IV. tetraarsenic hexoxide	As_4O_8

- a. II only
- b. II and III
- c. I, II and IV
- d. I and IV
- e. II, III and IV

Answer: c

Section 2.8

Difficulty Level: hard

122. Select the examples in which the names do not correctly match the formulas of the compounds indicated.

- | | |
|-----------------------------|-------------------------|
| I. PF_5 | potassium pentafluoride |
| II. N_2O_4 | dinitrogen(IV) oxide |
| III. XeO_4 | xenon tetroxide |
| IV. Cl_2O_5 | dichlorine pentoxide |

- a. II only
- b. II and III
- c. III and IV
- d. I and II
- e. I, II and IV

Answer: d

Section 2.8

Difficulty Level: medium

123. What is the name of the compound, $\text{N}_2\text{O}_5(g)$?

- a. nitrogen oxide
- b. dinitrogen tetroxide
- c. nitrogen pentoxide
- d. dinitrogen pentoxide
- e. trinitrogen pentoxide

Answer: d

Fill-in-the-Blank Questions

Section 2.1

Difficulty Level: easy

124. The vertical columns in the periodic table are numbered sequentially, 1 through _____ using Arabic numerals.

Answer: 18

Section 2.1

Difficulty Level: easy

125. Selenium is found in which group of the periodic table? _____

Answer: group VIA

Section 2.1

Difficulty Level: medium

126. The group 1 elements form compounds with oxygen that dissolve in water to give solutions that are strongly _____.

Answer: alkaline

Section 2.2

Difficulty Level: easy

127. Which group of nonmetallic elements is called “inert” ? _____

Answer: noble gases

Section 2.2

Difficulty Level: medium

128. Metalloids’ electrical conductivity tends to be lower than metals, but they can have higher conductivity than many metals when they are used in materials called _____.

Answer: semiconductors

Section 2.2

Difficulty Level: medium

129. The symbol Te belongs to a metalloid in group _____.

Answer: VIA, 16

Section 2.2

Difficulty Level: medium

130. An element is found to have a high conductivity in its pure form, is malleable, and is ductile. Based on these properties this element would be best classified as _____.

Answer: metal

Section 2.2

Difficulty Level: medium

131. An element is found to be a solid with low electrical conductivity but does conduct electricity. It also has a high density, is shiny, and also brittle, shattering when hit with a hammer. Based on these properties this element would be best classified as _____.

Answer: metalloid

Section 2.3

Difficulty Level: medium

132. Two atoms of nitrogen combine with one atom of oxygen to form one compound, whereas two atoms of nitrogen combine with five atoms of oxygen to form another compound. The ratio of the masses of oxygen in the two compounds must be _____.

Answer: 1/5

Section 2.3

Difficulty Level: medium

133. What formula is used to represent molecular chlorine? _____

Answer: Cl_2

Section 2.3

Difficulty Level: easy

134. List the seven molecules that are the most stable form of their given element.

Answer: H_2 , N_2 , O_2 , F_2 , Cl_2 , Br_2 , I_2

Section 2.3

Difficulty Level: medium

135. To show how atoms are connected in certain compounds, the chemical symbols are used to represent the atoms, and dashes are used to indicate the chemical bonds. The resulting formula is therefore referred to as _____.

Answer: a structural formula

Section 2.3

Difficulty Level: hard

136. Write the formula for the compound that has the atoms and, or groups in the order given: 3 Fe, and two groups made up of 1 As and 4 O. _____

Answer: $\text{Fe}_3(\text{AsO}_4)_2$

Section 2.3

Difficulty Level: hard

137. Write the formula for the hydrated compound that has the atoms and, or groups in the order given: 1 K, 1 Al, two groups of 1 S and 4 O, and twelve groups made up of 2 H and 1 O. _____

Answer: $\text{KAl}(\text{SO}_4)_2 \cdot 12 \text{H}_2\text{O}$

Section 2.4

Difficulty Level: easy

138. List how many of each type of element are present in one molecule of sucrose, $C_{12}H_{22}O_{11}$.

Answer: 12 carbon, 22 hydrogen, 11 oxygen

Section 2.4

Difficulty Level: easy

139. List how many oxygen atoms are present in one molecule of H_3PO_4 . _____

Answer: 4

Section 2.4

Difficulty Level: hard

140. List how many oxygen atoms are present in one formula unit of $CoSO_4 \cdot 6H_2O$. _____

Answer: 10

Section 2.4

Difficulty Level: medium

141. How many hydrogen atoms are present in the formula, $(NH_4)_3PO_4$? _____

Answer: 12

Section 2.4

Difficulty Level: medium

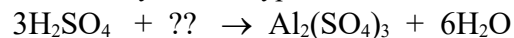
142. How many hydrogen atoms appear on the reactant side of the equation, $4NH_3 + 3O_2 \rightarrow 2N_2 + 6H_2O$?

Answer: 12

Section 2.4

Difficulty Level: hard

143. How many of each type of atoms are needed on the left to balance the equation? ____



Answer: 2Al, 6H, 6O

Section 2.4

Difficulty Level: hard

144. How many additional hydrogen atoms and oxygen atoms are required on the right side to balance the given equation? $\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O} + 2\text{NH}_4\text{NO}_3 \rightarrow 2\text{NH}_3 + \text{H}_2\text{O} + \text{Ba}(\text{NO}_3)_2$ _____

Answer: 18H, 9O

Section 2.4

Difficulty Level: hard

145. What molecule is missing that would balance the given equation? $2\text{AgBr} + 2\text{NaOH} + \text{C}_6\text{H}_6\text{O}_2 \rightarrow 2\text{Ag} + ?? + 2\text{NaBr} + \text{C}_6\text{H}_4\text{O}_2$. Balance the equation by entering the correct coefficient and formula for the missing molecule. _____

Answer: $2\text{H}_2\text{O}$

Section 2.4

Difficulty Level: hard

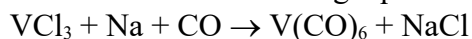
146. What molecule is missing that would balance the given equation? $4\text{Au} + 8\text{NaCN} + ?? + 2\text{H}_2\text{O} \rightarrow 4\text{NaAu}(\text{CN})_2 + 4\text{NaOH}$. If a coefficient other than one is needed provide the coefficient. _____

Answer: O_2

Section 2.4

Difficulty Level: medium

147. Balance the following equation:

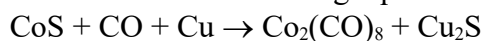


Answer: $\text{VCl}_3 + 3\text{Na} + 6\text{CO} \rightarrow \text{V}(\text{CO})_6 + 3\text{NaCl}$

Section 2.4

Difficulty Level: medium

148. Balance the following equation:



Answer: $2\text{CoS} + 8\text{CO} + 4\text{Cu} \rightarrow \text{Co}_2(\text{CO})_8 + 2\text{Cu}_2\text{S}$

Section 2.5

Difficulty Level: easy

149. What is the charge on all the ions of metals of Group IIA? _____

Answer: $2+$

Section 2.5

Difficulty Level: easy

150. What is the charge on all the ions of non-metals of Group VIIA? _____

Answer: -1

Section 2.5

Difficulty Level: easy

151. What is the formula for the sulfide ion? _____

Answer: S^{2-}

Section 2.5

Difficulty Level: medium

152. How many protons and electrons are in the N^{3-} ion? _____

Answer: 7 protons; 10 electrons

Section 2.5

Difficulty Level: medium

153. How many protons and electrons are in the S^{2-} ion? _____

Answer: 16 protons; 18 electrons

Section 2.5

Difficulty Level: medium

154. How many protons and electrons are in the Ca^{2+} ion? _____

Answer: 20 protons; 18 electrons

Section 2.5

Difficulty Level: medium

155. How many electrons are lost when aluminum forms a cation? _____

Answer: 3

Section 2.5

Difficulty Level: medium

156. How many electrons are lost when zinc forms a cation? _____

Answer: 2

Section 2.5

Difficulty Level: medium

157. How many electrons are gained when sulfur forms an anion? _____

Answer: 2

Section 2.5

Difficulty Level: medium

158. The correct formula for the compound formed from the lithium ion and PO_4^{3-} is _____ .

Answer: Li_3PO_4

Section 2.5

Difficulty Level: medium

159. The formula for the compound formed from the barium ion and SO_3^{2-} is _____ .

Answer: BaSO_3

Section 2.5

Difficulty Level: medium

160. The formula formed from the calcium ion and ClO_2^- is _____ .

Answer: $\text{Ca}(\text{ClO}_2)_2$

Section 2.5

Difficulty Level: medium

161. What is the formula of the compound formed from Cr^{3+} and H_2PO_4^- ? _____

Answer: $\text{Cr}(\text{H}_2\text{PO}_4)_3$

Section 2.5

Difficulty Level: medium

162. What is the formula of the compound formed from the calcium ion and HCO_3^- ? _____

Answer: $\text{Ca}(\text{HCO}_3)_2$

Section 2.5

Difficulty Level: medium

163. What is the name of the following compound: $(\text{NH}_4)_2\text{SO}_4$? _____

Answer: ammonium sulfate

Section 2.6

Difficulty Level: medium

164. What is the name of the following compound: $\text{Cr}_2(\text{SO}_4)_3$? ____

Answer: chromium(III) sulfate

Section 2.6

Difficulty Level: medium

165. What is the name of the following compound: $\text{V}_3(\text{PO}_4)_4$? ____

Answer: vanadium(IV) phosphate

Section 2.6

Difficulty Level: medium

166. What is the name of the following compound: Mn_2O_7 ? ____

Answer: manganese(VII) oxide

Section 2.6

Difficulty Level: medium

167. What is the name of the following compound: NH_4NO_3 ? ____

Answer: ammonium nitrate

Section 2.6

Difficulty Level: medium

168. What is the name of the following compound: $\text{Ba}(\text{OH})_2$? ____

Answer: barium hydroxide

Section 2.6

Difficulty Level: medium

169. What is the name of the following compound: KHCO_3 ? ____

Answer: potassium hydrogen carbonate or potassium bicarbonate

Section 2.6

Difficulty Level: medium

170. What is the correct formula for lead(IV) chloride? ____

Answer: PbCl_4

Section 2.6

Difficulty Level: medium

171. What is the correct formula for calcium phosphate? _____

Answer: $\text{Ca}_3(\text{PO}_4)_2$

Section 2.6

Difficulty Level: medium

172. What is the correct formula for magnesium sulfate? _____

Answer: MgSO_4

Section 2.6

Difficulty Level: medium

173. What is the correct formula for sodium sulfide? _____

Answer: Na_2S

Section 2.6

Difficulty Level: medium

174. What is the correct formula for chromium(VI) oxide? _____

Answer: CrO_3

Section 2.7

Difficulty Level: medium

175. Predict the formula of the compound formed between sulfur and hydrogen _____.

Answer: H_2S

Section 2.7

Difficulty Level: medium

176. Predict the formula of the compound formed between sulfur and hydrogen _____.

Answer: H_2S

Section 2.7

Difficulty Level: medium

177. Hydrocarbons are organic compounds which have general formula _____.

Answer: $\text{C}_n\text{H}_{2n+2}$

Section 2.7

Difficulty Level: medium

178. Write the formula of the alkane hydrocarbon with seven carbon atoms_____ .

Answer: C_7H_{16}

Section 2.8

Difficulty Level: easy

179. What is the name for the compound PBr_3 ? _____

Answer: phosphorus tribromide

Section 2.8

Difficulty Level: easy

180. What is the name for the compound Si_3N_4 ? _____

Answer: trisilicon tetranitride

Section 2.8

Difficulty Level: medium

181. The name for As_4S_{10} is _____.

Answer: tetraarsenic decasulfide

Section 2.8

Difficulty Level: medium

182. What is the formula for dichlorine heptoxide?

Answer: Cl_2O_7

True and False Questions

Section 2.1

Difficulty Level: medium

183. The alkali metals like sodium and potassium are soft metals, so they are unreactive towards water.

Answer: False

Section 2.1

Difficulty Level: medium

184. The number of protons in the nucleus of an atom, determines the order of elements in the periodic table. ____

Answer: True

Section 2.1

Difficulty Level: medium

185. Due to their properties, and where they exist in nature, the group 2A metals are called the lanthanides. ____

Answer: False

Section 2.1

Difficulty Level: medium

186. Elements that are part of the actinides are all composed of radioactive gases. ____

Answer: False

Section 2.2

Difficulty Level: easy

187. Some of the nonmetals are solids at room temperature. ____

Answer: True

Section 2.2

Difficulty Level: easy

188. Metalloids are capable of conducting an electric current. ____

Answer: True

Section 2.2

Difficulty Level: easy

189. From left to right, across a row on the periodic table, there is a gradual change in properties from nonmetallic to metallic properties. ____

Answer: False

Section 2.2

Difficulty Level: easy

190. Metalloids tend to be malleable and ductile in nature. _____

Answer: False

Section 2.3

Difficulty Level: easy

191. The formula, N₂, is used to represent elemental nitrogen. _____

Answer: True

Section 2.3

Difficulty Level: easy

192. When interpreting the formula, CO(NH₂)₂, it should be noted that the group of atoms within the parentheses, occurs twice. _____

Answer: True

Section 2.3

Difficulty Level: medium

193. An important characteristic of a compound's formula is it specifies the atomic composition of the compound. _____

Answer: True

Section 2.4

Difficulty Level: easy

194. When iron and sulfur combine chemically, the properties of the resulting compound are similar to that of each of the elements.

Answer: False

Section 2.4

Difficulty Level: medium

195. Four molecules of the only product formed in the incomplete equation below are needed to ensure that the equation is balanced. $\text{P}_4\text{O}_{10} + 6\text{H}_2\text{O} \rightarrow ??$ _____

Answer: True

Section 2.5

Difficulty Level: easy

196. Ionic compounds are generally formed when metals react with nonmetals. _____

Answer: True

Section 2.5

Difficulty Level: medium

197. The phosphide ion has 18 electrons and 18 protons. _____

Answer: False

Section 2.5

Difficulty Level: medium

198. The subscripts in the formulas do not normally produce an electrically neutral formula unit in ionic compounds. _____

Answer: False

Section 2.6

Difficulty Level: easy

199. The name of MnCl_3 is magnesium(III) chloride. _____

Answer: False

Section 2.6

Difficulty Level: medium

200. It is important to specify how many cations and anions are present in ionic compounds. _____

Answer: False

Section 2.6

Difficulty Level: medium

201. The formula for magnesium phosphide is Mg_3P_2 . _____

Answer: True

Section 2.7

Difficulty Level: easy

202. As a general rule, molecular compounds are formed when nonmetallic elements combine. _____

Answer: True

Section 2.7

Difficulty Level: easy

203. The elements, carbon and oxygen, can combine to form only one compound. _____

Answer: False

Section 2.7

Difficulty Level: easy

204. Phosphorus can combine with hydrogen to form the compound, PH_3 . ____

Answer: True

Section 2.8

Difficulty Level: easy

205. The compound N_2O_4 , is named nitrate tetraoxide. ____

Answer: False

Section 2.8

Difficulty Level: easy

206. The name for ZnBr_2 , is zirconium bromide. ____

Answer: False

Section 2.8

Difficulty Level: medium

207. A name for the compound P_4Se_{10} is phosphorus(IV) selenium. ____

Answer: False

Section 2.8

Difficulty Level: medium

208. A name for CrBr_2 , is chromic bromide. ____

Answer: False

Section 2.8

Difficulty Level: medium

209. The name for RbClO_4 , is rubidium(I) perchlorate. ____

Answer: False

Section 2.8

Difficulty Level: medium

210. A name for $\text{Ni}(\text{OCl})_2$ is nickel(II) hypochlorite. ____

Answer: True

Section 2.8

Difficulty Level: medium

211. A name for the compound $\text{Mn}(\text{ClO}_4)_2$, is magnesium chlorate. ____

Answer: False

Section 2.8

Difficulty Level: medium

212. The name for $\text{K}_2\text{Cr}_2\text{O}_7$, is potassium dichromium heptaoxide. ____

Answer: False

Critical Thinking Questions

Section 2.3

Difficulty Level: medium

213. A compound is known to contain one C atom for each water molecule (H_2O). If the compound has six carbon atoms, what is the general formula representing the compound?

Answer: $\text{C}_6\text{H}_{12}\text{O}_6$

Section 2.3

Difficulty Level: hard

214. How many silicon and oxygen atoms are in the formula, $\text{Ca}_3\text{Mg}_5(\text{Si}_4\text{O}_{11})_2(\text{OH})_2$?

- a. 3 Si, 5 O
- b. 8 Si, 24 O
- c. 4 Si, 11 O
- d. 2 Si, 2 O
- e. 5 Si, 3 O

Answer: b

Section 2.3

Difficulty Level: hard

215. What is the total number of atoms represented by the following formula? $\text{Mg}_5\text{Al}(\text{OH})_8\text{AlSi}_3\text{O}_{10}$

- a. 36
- b. 28
- c. 8
- d. 24
- e. 42

Answer: a

Section 2.3

Difficulty Level: hard

216. What is the total number of atoms represented by the following? $3\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$

- a. 35
- b. 28
- c. 8
- d. 81
- e. 42

Answer: d

Section 2.3

Difficulty Level: hard

217. Through analysis it was found that an unknown molecule contains 19.8 g of nitrogen for every 65.0 g of the molecule. How many grams of nitrogen would 1.35 grams of the molecule contain?

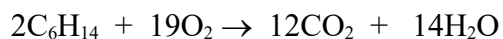
- a. 0.305 g
- b. 3.28 g
- c. 0.411 g
- d. 0.0681 g
- e. 0.226 g

Answer: c

Section 2.4

Difficulty Level: medium

218. What is the total number of atoms reacting in the chemical reaction below?



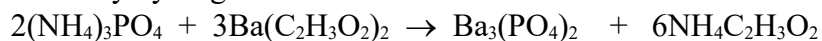
- a. 35
- b. 82
- c. 41
- d. 78
- e. 21

Answer: d

Section 2.4

Difficulty Level: hard

219. How many hydrogen atoms are on the reactant side of the chemical equation below?



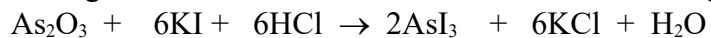
- a. 35
- b. 28
- c. 8
- d. 24
- e. 42

Answer: e

Section 2.4

Difficulty Level: hard

220. What single coefficient is needed to balance the following chemical equation?



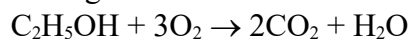
- a. 2
- b. 3
- c. 4
- d. 5
- e. 6

Answer: b

Section 2.4

Difficulty Level: hard

221. What single coefficient is needed to balance the following chemical equation?



- a. 2
- b. 3
- c. 4
- d. 5
- e. 6

Answer: b

Section 2.4

Difficulty Level: hard

222. Write the formula of the single product in the reaction below, if its coefficient is 5.



- a. $\text{P}_6\text{O}_6\text{S}_5$
- b. $\text{P}_4\text{O}_6\text{S}_4$
- c. $\text{P}_4\text{O}_{16}\text{S}_6$
- d. $\text{P}_8\text{O}_3\text{S}_8$
- e. $\text{P}_{12}\text{O}_3\text{S}_{10}$

Answer: b

Section 2.5

Difficulty Level: hard

223. Two elements, Qr and E, combine to form an ionic compound whose formula is QrE_2 . Qr also combines with element Z to form an ionic compound, Qr_3Z_2 . Based on this information, what is a reasonable value for the charge on E? (Assume that Qr has the same charge in both compounds.)

- a. 1+
- b. 1-
- c. 2+
- d. 2-
- e. 3-

Answer: b

Section 2.5

Difficulty Level: hard

224. Two elements, Qr and Z, combine to form an ionic compound containing simple ions whose formula is Qr_2Z_3 . Calcium also combines with element Z to form an ionic compound containing simple ions whose formula is CaZ . Qr combines with a third element, E, to form an ionic compound containing simple ions whose formula is QrE_3 . Based on this information, what is a reasonable formula for the compound formed when magnesium combines with element E to form a simple ionic compound? (Assume that Qr has the same charge in both compounds.)

- a. MgE
- b. Mg_2E
- c. MgE_2
- d. Mg_2E_3
- e. Mg_3E_2

Answer: c

Section 2.5

Difficulty Level: hard

225. Vitellium phosphate has the formula, $\text{Vi}_3(\text{PO}_4)_2$, while sodium nortonate has the formula, Na_2NtO_4 . Which of the following would be the expected formula for vitellium nortonate? (Imaginary elements are used in this question.)

- a. ViNtO_4
- b. Vi_2NtO_4
- c. $\text{Vi}(\text{NtO}_4)_2$
- d. $\text{Vi}_2(\text{NtO}_4)_3$
- e. $\text{Vi}_3(\text{NtO}_4)_2$

Answer: a

Section 2.5

Difficulty Level: hard

226. Engrium sulfate has the formula, $\text{En}_2(\text{SO}_4)_3$, while sodium nortonite has the formula Na_2NtO_3 . Based on these names and formulas, what would you expect for the formula of engrium nortonate? (Imaginary elements are used in this question.)

- a. EnNtO_4
- b. En_2NtO_4
- c. $\text{En}(\text{NtO}_4)_2$
- d. $\text{En}_2(\text{NtO}_4)_3$
- e. $\text{En}_3(\text{NtO}_4)_2$

Answer: d

Section 2.6

Difficulty Level: medium

227. What is the name for the ionic compound CuH_2CrO_4 ?

- a. copper(I) hydrogen chromate
- b. copper(II) bichromic acid
- c. copper hydrogen chromate tetraoxide
- d. copper hydrogen sulfate
- e. There is no known ionic compound with this formula.

Answer: e

Section 2.6

Difficulty Level: medium

228. What is the formula for manganese(III) monohydrogen phosphate?

- a. MnHO_4
- b. MnHPO_4
- c. MnHPO_3
- d. $\text{Mn}_2(\text{HPO}_4)_3$
- e. Mn_3HPO_4

Answer: d

Section 2.6

Difficulty Level: medium

229. What is the formula for cobalt(III) dihydrogen phosphate?

- a. Co_3HPO_4
- b. $\text{Co}_2\text{H}(\text{PO}_4)_3$
- c. $\text{Co}(\text{H}_2\text{PO}_4)_3$
- d. $\text{Co}(\text{H}_2\text{PO}_4)_3$
- e. CoH_3PO_4

Answer: d

Section 2.7

Difficulty Level: hard

230. What are the likely formulas of three different hydrocarbons each with 12 hydrogen atoms?

- a. $\text{C}_{12}\text{H}_{12}$; COH_{12} ; C_5H_{12}
- b. $\text{C}_{12}\text{H}_{12}$; C_7H_{12} ; CH_{12}
- c. C_5H_{12} ; C_6H_{12} ; C_7H_{12}
- d. $\text{C}_{12}\text{H}_{12}$; C_9H_{12} ; CH_{12}
- e. CH_{12} ; $\text{C}_{12}\text{H}_{12}$; C_8H_{12}

Answer: c

Section 2.7

Difficulty Level: hard

231. What are the likely formulas of three different hydrocarbons each with 5 carbon atoms?

- a. C_5H_2 ; C_5H_{12} ; C_5H_{14}
- b. C_5H_{12} ; C_5H_{10} ; C_5H_8
- c. C_5H_{12} ; C_5H_{19} ; C_5H_{11}
- d. C_5H_{12} ; C_5H_{19} ; C_5H_{30}
- e. C_5HO_3 ; C_5H_{12} ; C_5H_{22}

c.

Answer: b

Section 2.7

Difficulty Level: hard

232. Starting with the hydrocarbon, C_6H_{14} , what is the most likely formula of the alcohol formed from this hydrocarbon?

- a. $C_6H_{15}(OH)_2$
- b. C_6HOH
- c. $C_5H_{14}OH$
- d. $C_6H_{13}OH$
- e. $C_5H_{12}OH$

Answer: d

Section 2.8

Difficulty Level: medium

233. What is the most likely name for BrF ?

- a. bromine monofluoride
- b. bromine fluorine
- c. monobromide fluoride
- d. bromine difluorine
- e. bromide fluorine

Answer: a

Section 2.8

Difficulty Level: medium

234. What is the best name for the I_2O_5 molecule?

- a. diiodine pentoxide
- b. iodine pentoxygen
- c. pentoxygen iodide
- d. iodine dioxide
- e. diiodide oxide

Answer: a

Section 2.8

Difficulty Level: medium

235. What is the most likely name for IF_7 ?

- a. diiodine pentafluoride
- b. iodine heptafluoride
- c. pentafluorine iodide
- d. iodine fluoride
- e. diiodide hexafluoride

Answer: b

Section 2.8

Difficulty Level: medium

236. What is the formula for the compound named hydrogen sulfide? _____

Answer: H_2S