Chemistry The Study of Matter and Its Changes

**Elements, Compounds, and Chemical Reactions**

1. How many atoms are there in one formula unit of NiSO4⋅7H2O?

a. 9

b. 14

\* c. 27

d. 28

e. 33

Section 2.1

2. Which one of the statements below is true?

a. When two atoms combine, they do so in definite proportions by weight

b. When two different compounds combine to form an element, they do so in definite

proportions by weight

\* c. When two different elements combine to form a compound, they do so in definite

proportions by weight

d. When two molecules combine, they do so in definite proportions by weight

e. When two different elements combine to form a mixture, they do so in definite

proportions by weight

Section 2.1

3. The relative number of atoms of each element in a particular compound

a. is always l:l

b. is the same as the density ratio

c. is the same as the weight ratio

\* d. is definite and constant

e. cannot be determined experimentally

Section 2.2

4. A naturally occurring element consists of **three** isotopes. The data on the isotopes:

isotope #1: 46.972 **u**, 69.472%

isotope #2: 48.961 **u**, 21.667%

isotope #3: 49.954 **u**, 8.8610%

What is the average atomic weight of this naturally occurring element?

\* a. 47.667 **u**

b. 47.699 **u**

c. 48.629 **u**

d. 48.667 **u**

e. 48.961 **u**

Section 2.2

5. A naturally occurring element consists of **three** isotopes. The data on the isotopes:

isotope #1: 146.9672 **u**, 64.792%

isotope #2: 148.9638 **u**, 26.117%

isotope #3: 149.9592 **u**, 9.0910%

What is the average atomic weight of this naturally occurring element?

a. 49.254 **u**

\* b. 147.76 **u**

c. 148.63 **u**

d. 148.67 **u**

e. 147.80 **u**

Section 2.2

6. A naturally occurring element consists of **three** isotopes. The data on the isotopes:

isotope #1: 187.9122 **u**., 10.861%

isotope #2: 190.9047 **u**, 12.428%

isotope #3: 192.8938 **u**, 76.711%

What is the average atomic weight of this naturally occurring element?

a. 64.035 **u**

b. 190.57 **u**

c. 190.67 **u**

d. 192.08 **u**

\* e. 192.11 **u**

Section 2.2

7. A naturally occurring element consists of **three** isotopes. The data on the isotopes:

isotope #1: 147.9554 **u**, 10.563%

isotope #2: 150.9496 **u**, 70.811%

isotope #3: 152.9461 **u**, 18.626%

What is the average atomic weight of this naturally occurring element?

a. 50.335 **u**

b. 150.62 **u**

c. 150.67 **u**

\* d. 151.01 **u**

e. 151.08 **u**

Section 2.2

8. A naturally occurring element consists of **two** isotopes. The data on the isotopes:

isotope #1 68.5257 **u** 60.226 %

isotope #2 70.9429 **u** ?????? %

## Calculate the average atomic mass of this element

\* a. 69.728 **u**

b. 69.743 **u**

c. 69.934 **u**

d. 69.972 **u**

e. 70.141 **u**

Section 2.2

9. The atomic mass of naturally occurring iron, which is a mixture of isotopes, is listed as 55.847 **u**. This means that the average mass for the individual iron atoms is

a. 55.847 times as great as that of a 12C atom

b. 55.847 times as great as that of a 1H atom

c. 55.847/1.0079 times as great as that of a 1H atom

\* d. 55.847/12.000 times as great as that of a 12C atom

e. 55.847/12.011 times as great as that of a 12C atom

Section 2.2

10. The atomic mass of naturally occurring nickel, which is a mixture of isotopes, is listed as 58.6934 **u**. This means that the average mass for the individual nickel atoms is

a. 58.6934 times as great as that of a 12C atom

b. 58.6934 times as great as that of a 1H atom

c. 58.6934/1.0079 times as great as that of a 1H atom

\* d. 58.6934/12.000 times as great as that of a 12C atom

e. 58.6934/12.011 times as great as that of a 12C atom

Section 2.2

11. The atomic mass of naturally occurring silver, which is a mixture of two isotopes, is listed as 107.868 **u**. This means that

a. all silver atoms found in nature have a mass which is 107.868/12.000 times as great as that

of a 12C atom

b. all silver atoms found in nature have a mass which is 107.868/1.0079 times as great as that

of a 1H atom

c. some silver atoms found in nature have a mass which is 107.868/12.000 times as great as

that of a 12C atom

d. some silver atoms found in nature have a mass which is 107.868/1.0079 times as great as

that of a 1H atom

\* e. no silver atoms found in nature have a mass which is 107.868/12.000 times as great as that

of a 12C atom

Section 2.2

12. The atomic mass of naturally occurring copper, which is a mixture of two isotopes, is listed as 63.546 **u**. This means that

a. all copper atoms found in nature have a mass which is 63.546/12.000 times as great as that

of a 12C atom

b. all copper atoms found in nature have a mass which is 63.546/1.0079 times as great as that

of a 1H atom

c. some copper atoms found in nature have a mass which is 63.546/12.000 times as great as

that of a 12C atom

d. some copper atoms found in nature have a mass which is 63.546/1.0079 times as great as

that of a 1H atom

\* e. no copper atoms found in nature have a mass which is 63.546/12.000 times as great as that

of a 12C atom

Section 2.2

13. The atomic mass of naturally occurring gallium, which is a mixture of two isotopes, is listed as 69.723 **u**. This means that

a. all gallium atoms found in nature have a mass which is 69.723/12.000 times as great as that

of a 12C atom

b. all gallium atoms found in nature have a mass which is 69.723/1.0079 times as great as that

of a 1H atom

c. some gallium atoms found in nature have a mass which is 69.723/12.000 times as great as

that of a 12C atom

d. some gallium atoms found in nature have a mass which is 69.723/1.0079 times as great as

that of a 1H atom

\* e. no gallium atoms found in nature have a mass which is 69.723/12.000 times as great as that

of a 12C atom

Section 2.2

14. The atomic mass of naturally occurring fluorine, which exists in nature as a single isotope, is listed as 18.9984 **u**. This means that

\* a. all fluorine atoms found in nature have a mass which is 18.9984/12.000 times as great as

that of a 12C atom

b. all fluorine atoms found in nature have a mass which is 18.9984/1.0079 times as great as

that of a 1H atom

c. some fluorine atoms found in nature have a mass which is 18.9984/12.000 times as great as

that of a 12C atom

d. some fluorine atoms found in nature have a mass which is 18.9984/1.0079 times as great as

that of a 1H atom

e. no fluorine atom found in nature has a mass which is 18.9984/12.000 times as great as that

of a 12C atom

Section 2.2

15. The atomic mass of naturally occurring cobalt, which exists in nature as a single isotope, is listed as 58.9332 **u**. This means that

\* a. all cobalt atoms found in nature have a mass which is 58.9332/12.000 times as great as

that of a 12C atom

b. all cobalt atoms found in nature have a mass which is 58.9332/1.0079 times as great as

that of a 1H atom

c. some cobalt atoms found in nature have a mass which is 58.9332/12.000 times as great as

that of a 12C atom

d. some cobalt atoms found in nature have a mass which is 58.9332/1.0079 times as great as

that of a 1H atom

e. no cobalt atom found in nature has a mass which is 58.9332 12.000 times as great as that

of a 12C atom

Section 2.2

16. Which one of the following contributes to the charge but does NOT contribute significantly to the mass of an atom?

\* a. electrons

b. nuclei

c. photons

d. neutrons

e. protons

Section 2.2

17. Uranium exists in nature in the form of several isotopes; the different isotopes have different

a. atomic numbers

b. charges

c. numbers of electrons

\* d. numbers of neutrons

1. numbers of protons

Section 2.2

18. Which answer below best describes all atoms of a given isotope of a particular element?

a. they possess the same mass, only

b. they possess the same chemical properties and the same mass, but nothing else in

common

c. they possess the same atomic number and the same mass, but have nothing else in

common

d. they possess the same number of electrons, the same atomic number, the same

mass, but nothing else in common

\* e. they possess the same number of electrons, the same atomic number, the same

mass, and the same chemical properties

Section 2.2

19. Which answer below best describes all atoms of a particular element?

a. they possess the same number of electrons, the same atomic number, the same

mass, but nothing else in common

b. they possess the same mass and the same chemical properties, but nothing else in

common

\* c. they possess the same number of electrons, the same atomic number, the same

chemical properties, but not necessarily the same mass

d. they possess the same chemical properties and the same mass, but nothing else in

common

e. they possess the same atomic number and the same mass, but have nothing else in

common

Section 2.2

20. The species shown below which has 24 neutrons is

a. 

b. 

c. 

\* d. 

e. 

Section 2.2

21. The species shown below which has 24 protons is

\* a. 

b. 

c. 

d. 

e. 

Section 2.2

22. The species, , has the same number of neutrons as

a. 

b. 

c. 

\* d. 

e. 

Section 2.2

23. Consider the atoms of  and . Both of these species have the same

a. number of electrons

b. mass

\* c. number of neutrons

d. atomic mass number

e. number of protons

Section 2.2

24. Consider the atoms of 59Co and 60Co. Both of these atoms have the same

a. number of electrons

b. number of neutrons

c. atomic mass number

d. number of photons

\* e. number of protons

Section 2.2

25. Consider the atoms of 65Cu and 65Zn. Both of these atoms have the same

a. number of electrons

b. mass

c. number of neutrons

\* d. atomic mass number

e. number of protons

Section 2.2

26. Compare and . In what respect do these species differ?

a. number of electrons **and** number of protons

b. number of neutrons **and** number of protons

\* c. atomic mass number **and** number of protons

d. number of neutrons **and** number of electrons

e. atomic mass number **and** number of electrons

Section 2.2

27. A neutral iodine atom has an atomic mass number = 131. Which description below fits this atom?

a. 39 protons, 78 neutrons, 39 electrons

\* b. 53 protons, 78 neutrons, 53 electrons

c. 53 protons, 78 neutrons, 54 electrons

d. 53 protons, 131 neutrons, 53 electrons

e. 53 protons, 131 neutrons, 54 electrons

Section 2.2

28. Which description below fits the atom?

a. 29 protons, 65 neutrons, 29 electrons

b. 29 protons, 36 neutrons, 34 electrons

c. 29 protons, 36 neutrons, 31 electrons

\* d. 29 protons, 36 neutrons, 27 electrons

e. 31 protons, 34 neutrons, 29 electrons

Section 2.2

29. Which description below fits the atom?

a. 48 protons, 64 neutrons, 48 electrons

b. 48 protons, 62 neutrons, 48 electrons

\* c. 48 protons, 64 neutrons, 46 electrons

d. 48 protons, 62 neutrons, 46 electrons

e. 50 protons, 64 neutrons, 48 electrons

Section 2.3

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

\* a. Mg

b. Na

c. Fr

d. Cs

e. Rb

Section 2.3

31. Which element is a halogen?

a. Te

b. O

c. Se

d. Uuh

\* e. I

Section 2.3

32. 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. La is the heaviest element in the group.

Section 2.3

33. The transition metals take up \_\_\_ periods of the periodic table.

a. 2

b. 3

\* c. 4

d. 1

e. 5

Section 2.5

34. How many atoms are in one molecule of Mo2(O2C(CH3)3)4?

a. 17

b. 30

c. 60

\* d. 62

e. 64

Section 2.5

35. Which element exists as a diatomic molecule in the free state?

\* a. H

b. He

c. Li

d. Be

e. B

Section 2.5

36. Which element exists as a diatomic molecule in the free state?

a. C

b. P

c. S

\* d. Br

e. Ni

Section 2.5

37. Which element exists as a diatomic molecule in the free state?

a. Mg

b. Mn

c. Si

d. As

\* e. Cl

Section 2.5

38. Which element exists as a diatomic molecule in the free state?

a. C

\* b. N

c. Ga

d. Ge

e. P

Section 2.5

39. Which element exists as a diatomic molecule in the free state?

a. He

\* b. F

c. Ne

d. Ar

e. Xe

Section 2.5

40. Which compound is correctly described as a hydrate?

a. CaH2

\* b. MgSO4·7H2O

c. H2O

d. HCl

e. NaOH

Section 2.5

41. Which compound is correctly described as a hydrate?

\* a. CoCl2·6H2O

b. HC2H3O2

c. NaOH

d. CaH2

e. C6H12O6

Section 2.6

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

a. C16H12

b. C16H22

c. C16H32

\* d. C16H34

e. C16H40

Section 2.6

43. Which compound is correctly classified as a hydrocarbon?

a. C6H12O6

\* b. C8H16

c. HC2H3O2

d. NaHCl

e. C2H5OH

Section 2.6

44. The common name for the compound, CH4, is

a. carbon(IV) hydride

b. carbon tetrahydride

c. hydrocarbonate

\* d. methane

e. carbonic acid

Section 2.6

45. Which compound is not a hydrocarbon?

a. C6H12

b. C8H16

c. C2H6

\* d. C5H5N

e. C3H6

Section 2.7

46. The number of atoms in one formula unit of the substance CO(NH)2,is

a. 4

b. 5

c. 6

d. 7

\* e. 8

Section 2.7

47. The number of atoms in one formula unit of C2H4(COOH)2 is

a. 10

b. 11

c. 12

\* d. 14

e. 16

Section 2.7

48. The number of atoms in one formula unit of the substance CsSO4·5H2O is

a. 4

b. 17

\* c. 21

d. 23

e. 33

Section 2.7

49. The number of atoms in one formula unit of the substance (NH4)3Co(CN)6 is

a. 21

b. 26

\* c. 28

d. 31

e. 33

Section 2.7

50. How many atoms are there in one formula unit of (NH4)4Fe(CN)6?

a. 15

b. 25

c. 28

\* d. 33

e. 35

Section 2.7

51. When barium metal reacts with chlorine gas it forms an ionic compound, BaCl2. 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

Section 2.7

52. When barium metal reacts with chlorine gas it forms an ionic compound, BaCl2. 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

Section 2.8

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

a. XQ

\* b. XQ2

c. XQ4

d. X2Q

e. X4Q

Section 2.8

54. Aluminum unites with a second element, which we will represent by the symbol E, to form a compound whose formula is AlE3. Element E is most probably

a. an actinide element.

b. an alkali metal.

c. a chalcogen.

\* d. a halogen.

e. a transition element.

Section 2.8

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

a. AsH

b. As2H

c. AsH2

d. As3H

\* e. AsH3

Section 2.8

56. The formula for the compound formed between antimony(Sb) and hydrogen is

a. SbH

b. SbH2

\* c. SbH3

d. SbH4

e. SbH5

Section 2.8

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

a. BaCl2

\* b. Al2F3

c. Na2O

d. RbBr

e. CaO

Section 2.8

58. What is the formula for oxalate ion?

a. CO32‑

b. C4O22‑

c. C4O42‑

\* d. C2O42‑

e. C2H3O2‑

Section 2.8

59. The formula for the compound formed from calcium ion and acetate ion is

a. CaC2H3O2

b. Ca2C2H3O2

c. Ca2(C2H3O2)4

\* d. Ca(C2H3O2) 2

e. Ca(C2H3O2) 3

Section 2.8

60. The formula for the compound formed from strontium ion and chromate ion is

a. SrCrO3

\* b. SrCrO4

c. Sr2CrO4

d. Sr(CrO4) 2

e. Sr2(CrO4) 3

Section 2.8

61. The formula for phosphate ion is

a. PO42-

\* b. PO43-

c. PO4-

d. P2O4-

e. P2O42-

Section 2.8

62. The correct formula for carbonate ion is

a. C2H3O2-

b. C2O42-

c. CO2-

d. CO3-

\* e. CO32-

Section 2.8

63. One of the compounds below has its formula written incorrectly. Which one?

a. Al(H2PO4)3

b. Al(HCO3)3

c. Ca(HCO3)2

\* d. KHPO4

Section 2.8

64. One of the compounds below has its formula written incorrectly. Which one?

\* a. Al(H2CO3)3

b. Al(H2PO4)3

c. Ba(HCO3)2

d. KH2PO4

Section 2.9

65. What is the name for the compound IBr3?

a. bromic iodide

b. iodine bromate

\* c. iodine tribromide

d. iodine tribromine

e. monoiodine tribromite

Section 2.9

66. What is the name for the compound S2Cl2?

a. disulfur chlorate

\* b. disulfur dichloride

c. disulfur dichlorine

d. sulfur(I) chloride

e. sulfur(II) chlorine(II)

Section 2.9

67. What is the name for the compound HI(*g*)?

a. hydriodic acid

b. hydrogen monoiodide

\* c. hydrogen iodide

d. iodic acid

1. monohydrogen monoiodide

Section 2.9

68. What is the name for the compound HCN(*g*)?

a. hydrocarbonitride

b. hydrocyanic acid

c. hydrogen carbonitride

d. hydrogen cyanate

\* e. hydrogen cyanide

Section 2.9

69. A typographical error on an exam produced the formula, P4Se7, 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

Section 2.9

70. The name for the compound Al(SO4)3 is

\* a. there is no compound with that formula‑‑it must be incorrectly written

b. aluminum sulfate

c. aluminum trisulfate

d. aluminum(III) sulfate

e. aluminum sulfite

Section 2.9

71. Which is the name for the compound, V(NO3)3?

a. vanadium trinitrate

b. vanadium nitrite

c. vanadium(III) nitrite

d. vanadium nitrate

\* e. vanadium(III) nitrate

Section 2.9

72. Which is the name for the compound, Ba(NO3)2?

a. barium dinitrate

b. barium dinitrite

\* c. barium nitrate

d. barium(II) nitrite

e. barium(II) nitrate

Section 2.9

73. Which compound is correctly described as a hydride?

a. CoCl2·6H2O

b. HC2H3O2

c. NaOH

\* d. CaH2

e. C6H12O6

Section 2.9

74. What is the name for the compound V2O5? (Remember, for transition metals, the change on the ion is indicated with a Roman numeral.)

a. divanadium pentoxide

b. vanadic oxide

\* c. vanadium(V) oxide

d. vanadium(V) pentoxide

e. vanadous oxide

Section 2.9

75. What is the name for the compound NaCl3?

a. sodium chlorate

b. sodium chlorite

c. sodium perchloride

d. sodium trichloride

\* e. There is no such compound.

Section 2.9

76. What is the name for the compound CuBr2? (Remember, for transition metals, the change on the ion is indicated with a Roman numeral.)

a. copper(I) bromide(II)

\* b. copper(II) bromide

c. copper(II) bromite

d. copper dibromide

e. cuprous bromide

Section 2.9

77. What is the correct name for the compound Na2O?

a. disodium oxide

\* b. sodium oxide

c. sodium(I) oxide

d. sodium peroxide

e. sodium superoxide

Section 2.9

78. Which is a correct name for the compound FeBr3?

a. ferrous bromide

\* b. iron(III) bromide

c. iron bromite

d. iron tribromide

e. iron tribromine

Facets of Chemistry 2.1 and Section 2.9

79. Which is the formula for the compound ferrous sulfate?

\* a. FeSO4

b. Fe(SO4)2

c. Fe2SO4

d. Fe2(SO4)3

e. Fe3(SO4)2

Section 2.9

80. Which is a correct name for the compound Hg2Cl2?

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

Facets of Chemistry 2.3 and Section 2.9

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

a. HgPO3

b. HgPO4

c. Hg3PO4

d. Hg2PO3

\* e. (Hg2)3(PO4)2

Facets of Chemistry 2.3 and Section 2.9

82. Which is a correct name for the compound CoF3?

a. cobalt fluoride

b. cobalt trifluoride

\* c. cobaltic fluoride

d. cobaltic trifluoride

e. cobaltous fluoride

Section 2.9

83. A correct name for SnF4 is

a. stannic tetrafluoride

b. stannous fluoride

c. stannous(IV) fluoride

\* d. tin(IV) fluoride

e. tin tetrafluoride

Section 2.9

84. The correct formula for stannous nitrate is

a. Sn(NO2)2

\* b. Sn(NO3)2

c. Sn(NO3)3

d. Sn(NO3)4

e. Sn2NO3

Section 2.9

85. What is the formula for magnesic chlorate?

a. MgClO3

b. Mg(ClO3)2

c. Mg2ClO3

d. MgO(ClO3)2

\* e. There is no such compound.

Section 2.9

86. What is the name for Na2Cr2O7?

a. sodium chromium(VII)‑ate

\* b. sodium dichromate

c. sodium dichromium heptaoxide

d. sodium heptaoxochromate

e. sodium perchromate

Section 2.9

87. The compound Na2S2O3 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

Section 2.9

88. If the NtO42‑ ion is called nortonate, what is the correct name for the compound K2NtO4?

a. dipotassium nortonium tetraoxide

b. dipotassium nortonate

\* c. potassium nortonate

d. potassium(I) nortonate

e. potassium(II) nortonate

Section 2.9

89. What is the name for Cu2SO3?

\* a. copper(I) sulfite

b. copper(II) sulfite

c. copper thiosulfate

d. cuprous sulfate

e. dicopper sulfur trioxide

Section 2.9

90. What is the name for the C2H3O2‑ ion?

\* a. acetate ion

b. hydrocarbonate ion

c. monocarbonate ion

d. oxalate ion

e. sucrose ion

Section 2.9

91. What is a correct name for the HCrO4‑ ion?

\* a. hydrogen chromate ion

b. dichromate ion

c. hydrogen chromium tetraoxide ion

d. monochromate ion

e. monochromic acid

Section 2.9

92. What is a correct name for KHCr2O7?

a. potassium bichromite

b. potassium bichromate

c. potassium dichromic acid

d. potassium monohydrogen chromite

\* e. potassium monohydrogen dichromate

Section 2.9

93. What is the name for LiHPO4?

a. lithium monohydrogen phosphate

b. lithium hydrogen phosphoric acid

c. lithium hydrogen phosphorus tetraoxide

d. lithium monohydrogen phosphite

\* e. There is no compound with that formula.

Section 2.9

94. What is the name for Li2HPO4?

\* 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

Section 2.9

95. What is the name for CuHSO4?

\* a. copper(I) hydrogen sulfate

b. copper(II) bisulfate acid

c. copper hydrogen sulfur tetraoxide

d. copper hydrogen sulfate

1. copper sulfuric acid

**Fill in the Blank**

Section 2.3

96. What is the charge on all the ions of metals of Group IIA? \_\_\_\_\_\_ (2+)

Section 2.3

97. What is the charge on all the ions of non-metals of Group VIIA? \_\_\_\_\_\_ (-1)

Section 2.5

98. How many atoms are in one formula unit of [NH4]3[Fe(CN)6]? \_\_\_\_\_\_ (28)

Section 2.5

99. How many atoms are in one formula unit of NH4Al(SO4)2∙24H2O? \_\_\_\_\_\_ (88)

Section 2.5

100. How many atoms are in one formula unit of Al2(SO4)3∙18H2O? \_\_\_\_\_\_ (71)

Section 2.5

101. What is the name for the compound CH4? \_\_\_\_\_\_ (methane)

Section 2.5

102. What is the name for the compound NH3? \_\_\_\_\_\_ (ammonia)

Section 2.8

103. What is the formula for the sulfide ion? \_\_\_\_\_\_ (S2‑)

Section 2.8

104. The correct formula for lithium phosphate is \_\_\_\_\_\_ (Li3PO4)

Section 2.8

105. The formula for barium sulfite is \_\_\_\_\_\_ (BaSO3)

Section 2.8

106. The formula for barium chlorite is \_\_\_\_\_\_ (Ba(ClO2)2)

Section 2.9

107. The name for As4S10 is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (tetraarsenic decasulfide)

Section 2.9

108. What is the formula for chromium(III) dihydrogen phosphate? \_\_\_\_\_\_ (Cr(H2PO4)3)

Section 2.9

109. What is the formula for calcium bicarbonate? \_\_\_\_\_\_ (Ca(HCO3)2)

**True and False**

Section 2.9

110. A name for the compound P4Se10 is phosphorus(IV) selenium. \_\_\_ (F)

# Section 2.9

111. The compound N2O4, is named nitrate tetraoxide. \_\_\_ (F)

Section 2.9

112. A name for CrBr2, is chromic bromide. \_\_\_ (F)

Section 2.9

113. The name for RbClO4, is rubidium(I) perchlorate. \_\_\_ (F)

Section 2.9

114. The name for the CrO42‑ ion is perchromate. \_\_\_ (F)

Section 2.9

115. A name for Ni(OCl)2 is nickel(II) hypochlorite. \_\_\_ (T)

Section 2.9

116. The name for ZnBr2, is zirconium bromide. \_\_\_ (F)

Section 2.9

117. A name for the compound Mn(ClO4)2, is magnesium chlorate. \_\_\_ (F)

Section 2.9

118. The name for K2Cr2O7 is potassium dichromium heptaoxide. \_\_\_ (F)

**Critical Thinking Questions**

Section 2.8

119. Two elements, Qr and E, combine to form an ionic compound whose formula is QrE2. Qr also com­bines with element Z to form an ionic compound, Qr3Z2. 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‑

Section 2.8

120. Two elements, Qr and Z, combine to form an ionic compound containing simple ions whose formula is Qr2Z3. 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 QrE3. 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. Mg2E

\* c. MgE2

d. Mg2E3

e. Mg3E2

Section 2.9

121. Vitellium phosphate has the formula, Vi3(PO4)2, while sodium nortonate has the formula, Na2NtO4. Which of the following would be the expected formula for vitellium nortonate? (Imaginary elements are used in this question.)

\* a. ViNtO4

b. Vi2NtO4

c. Vi(NtO4)2

d. Vi2(NtO4)3

e. Vi3(NtO4)2

Section 2.9

122. Engrium sulfate has the formula, En2(SO4)3, while sodium nortonite has the formula Na2NtO3. Based on these names and formulas, what would you expect for the formula of engrium nortonate? (Imaginary elements are used in this question.)

a. EnNtO4

b. En2NtO4

c. En(NtO4)2

\* d. En2(NtO4)3

e. En3(NtO4)2

**Short Answer**

123. The reaction of nitrogen and hydrogen to give ammonia is called the Haber Process. The balanced chemical equation is given below:

N2(g) + 3H2(g)⭢ 2NH3(g)

Rationalize this reaction in terms of Dalton's Atomic Theory.

(Essentially, elements combine in fixed, numerical ratios. This can be seen in the formula of ammonia, NH3).

124. Describe what the subatomic components of an atom are, and how they interact to form an atom.

(The subatomic components are positively charged protons, negatively charged electrons, and neutral neutrons. The protons and neutrons form the center of the atom, known as the nucleus, while the electrons "orbit" the nucleus.)

125. What are the primary differences between metals and nonmetals? How do metalloids fill the gaps between metals and nonmetals?

(Metals are conductive, malleable, and ductile solids. Nonmetals tend to be brittle and nonconductive, and can also exist as gases in the natural states. Metalloids have properties between those of metals and nonmetals.)

126. What are the characteristics of ionic compounds? What are they composed of?

(Ionic compounds are composed of positively charged cations interacting with negatively charged anions. The positive and negative ions tend to be metals and nonmetals, respectively. The compounds tend to be brittle and poor conductors of electricity as solids, but they can conduct electricity in aqueous solutions or when melted.)

127. What are the characteristics of molecular compounds? What are they composed of?

(Molecular compounds tend to be hard and poor conductors of electricity. They are composed of nonmetals.)

128. Draw a general outline of the periodic table. Label, roughly, where the metals, nonmetals, and metalloids are found.

(See the periodic table in your text.)

129. The major isotopes of tungsten are 182W (26.32%), 183W (14.31%), 184W (30.67%), and 186W (28.62%). What is the atomic weight of W?

((0.2632 x 182) + (0.1431 x 183) + (0.3067 x 184) + (0.2862 x 186) = 184 g/mol.)