Chemistry: Molecular Nature of Matter, 8e **(Jespersen)**
Chapter 2 Elements, Compounds, and the Periodic Table

1) All of the following are alkali metals *except*
A) Sr.
B) Na.
C) Fr.
D) Cs.
E) Rb.
Answer: A
Diff: 1
Section: 2.1

2) Which element is a halogen?
A) Te
B) O
C) Se
D) Uuh
E) I
Answer: E
Diff: 1
Section: 2.1

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
Diff: 1
Section: 2.1

4) The transition metals begin in period _____ of the periodic table.
A) 2
B) 3
C) 4
D) 1
E) 5
Answer: B
Diff: 1
Section: 2.1

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
Diff: 1
Section: 2.1

6) The elements in a specific column of the periodic table are known as
A) a row.
B) a period.
C) transition elements.
D) a group or family.
E) transitive elements.
Answer: D
Diff: 1
Section: 2.1

7) The elements in a row of the periodic table are known as
A) a column.
B) a period.
C) transition elements.
D) a group or family.
E) transitive elements.
Answer: B
Diff: 1
Section: 2.1

8) Which of these elements has the most similar chemical properties to sulfur?
A) calcium
B) oxygen
C) phosphorus
D) bromine
E) nitrogen
Answer: B
Diff: 1
Section: 2.1

9) Which of these elements has the most similar chemical properties to magnesium?
A) calcium
B) sodium
C) aluminum
D) iron
E) cesium
Answer: A
Diff: 1
Section: 2.1

10) Which of these elements has the most similar chemical properties silicon?
A) aluminum
B) phosphorus
C) nitrogen
D) silver
E) germanium
Answer: E
Diff: 1
Section: 2.1

11) Some elements have properties that fit between metals and nonmetals. These elements are known most specifically as the
A) metals.
B) nonmetals.
C) halogens.
D) alkaline earth metals.
E) metalloids.
Answer: E
Diff: 1
Section: 2.2

12) Which metal is a liquid at room temperature (about 25°C)?
A) hydrogen
B) bromine
C) tungsten
D) mercury
E) chromium
Answer: D
Diff: 1
Section: 2.2

13) Which element is a gas at room temperature (about 25°C)?
A) neon
B) bromine
C) tungsten
D) mercury
E) chromium
Answer: A
Diff: 1
Section: 2.2

14) Diamond and graphite are different forms of which element?
A) sodium
B) carbon
C) mercury
D) gold
E) calcium
Answer: B
Diff: 1
Section: 2.2

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
Diff: 2
Section: 2.2

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
Diff: 2
Section: 2.2

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
Diff: 2
Section: 2.2

18) Which of these element types tend to be poor conductors of heat and electricity?
A) metals
B) metalloids
C) nonmetals
D) alkaline earth metals
E) alkali metals
Answer: C
Diff: 1
Section: 2.2

19) Which of the following is used to represent molecular bromine?
A) Be
B) B
C) 2Br
D) Br_2
E) Br
Answer: D
Diff: 1
Section: 2.3

20) Which combination is used to represent molecular hydrogen and atomic hydrogen, respectively?
A) H_2, H
B) He, H^-
C) H, H
D) 2H, H^+
E) Hy, H
Answer: A
Diff: 2
Section: 2.3

21) Which compound exists as a diatomic molecule in its free state?
A) magnesium
B) manganese
C) silicon
D) arsenic
E) chlorine
Answer: E
Diff: 1
Section: 2.3

22) Which compound exists as a diatomic molecule in its free state?
A) C
B) N
C) Ga
D) Ge
E) P
Answer: B
Diff: 1
Section: 2.3

23) Which compound exists as a diatomic molecule in its free state?
A) helium
B) fluorine
C) neon
D) argon
E) xenon
Answer: B
Diff: 1
Section: 2.3

24) Which compound is correctly represented as a hydrate?
A) $C_2H_5OH_2^+$
B) $MgSO_4 \cdot 7H_2O$
C) $FeH_2(CO)_4$
D) $O_2S(OH)_2$
E) $[CrCl(H_2O)_5]Cl$
Answer: B
Diff: 2
Section: 2.3

25) Which compound is correctly represented as a hydrate?
A) $CuSO_4 \cdot 5H_2O$
B) $HC_2H_3O_2$
C) $O_2S(OH)_2$
D) $H_2S_2O_7$
E) $C_6(H_2O)_6$
Answer: A
Diff: 2
Section: 2.3

26) How many oxygen atoms are in one molecule of $Mg(NO_3)_2$?
A) 1
B) 2
C) 3
D) 5
E) 6
Answer: E
Diff: 2
Section: 2.4

27) How many oxygen atoms are in one formula unit of $Mg(NO_3)_2$?
A) 1
B) 2
C) 3
D) 5
E) 6
Answer: E
Diff: 2
Section: 2.4

28) How many hydrogen atoms are in one molecule of $HC_2H_3O_2$?
A) 1
B) 2
C) 3
D) 4
E) 5
Answer: D
Diff: 1
Section: 2.4

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
Diff: 1
Section: 2.4

30) The number of atoms in one formula unit of the substance, $CO(NH_2)_2$, is
A) 4
B) 5
C) 7
D) 8
E) 10
Answer: D
Diff: 2
Section: 2.4

31) The number of atoms in one formula unit of $C_2H_4(COOH)_2$ is
A) 10
B) 11
C) 12
D) 14
E) 16
Answer: D
Diff: 2
Section: 2.4

32) The number of atoms in one formula unit of the substance $Cs_2SO_4 \cdot 5H_2O$ is
A) 4
B) 17
C) 22
D) 25
E) 33
Answer: C
Diff: 2
Section: 2.4

33) How many oxygen atoms are in one formula unit of $Cu(NO_3)_2 \cdot 5H_2O$?
A) 2
B) 3
C) 5
D) 6
E) 11
Answer: E
Diff: 2
Section: 2.4

34) The number of atoms in one formula unit of the substance $(NH_4)_3Co(CN)_6$ is
A) 21
B) 26
C) 28
D) 31
E) 33
Answer: C
Diff: 2
Section: 2.4

35) How many atoms are there in one formula unit of $(NH_4)_4Fe(CN)_6$?
A) 15
B) 25
C) 28
D) 33
E) 35
Answer: D
Diff: 2
Section: 2.4

36) How many atoms are there in one formula unit of $NiSO_4 \cdot 7H_2O$?
A) 9
B) 14
C) 27
D) 28
E) 33
Answer: C
Diff: 2
Section: 2.4

37) How many atoms of each element are shown in the formula $H_2S_2O_7$?
A) 2H, 2S, 7O
B) 1H, 2S, 4O
C) 2H, 1S, 1O
D) 2H, 4S, 4O
E) 1H, 1S, 1O
Answer: A
Diff: 2
Section: 2.4

38) How many atoms of each element shown are in the formula $Ni(ClO_4)_2$?
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
Diff: 2
Section: 2.4

39) How many hydrogen atoms appear on the right side of the equation following equation:
$4NH_3 + 3O_2 \rightarrow 2N_2 + 6H_2O$?
A) 2
B) 4
C) 6
D) 10
E) 12
Answer: E
Diff: 2
Section: 2.4

40) How many atoms are in one molecule of $Mo_2(O_2CC(CH_3)_3)_4$?

Hint: Remember to distribute the subscripts to all elements inside the parenthesis. Start on the inside and work your way out.
A) 17
B) 30
C) 60
D) 66
E) 64
Answer: D
Diff: 3
Section: 2.4

41) How many atoms of each element appear on each side of the arrow in the following chemical equation? $2Fe(NO_3)_3 + 3Na_2CO_3 \rightarrow Fe_2(CO_3)_3 + 6NaNO_3$

Hint: Distribute coefficients across the entire compound for each reactant and product. Be sure to account for parenthesis.
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
Diff: 3
Section: 2.4

42) How many atoms of each element appear on each side of the arrow in the following chemical equation? $3Cl_3BNH_2CH_3 + 6(CH_3)_3N \rightarrow 6(CH_3)_3NHCl + B_3N_3Cl_3(CH_3)_3$

Hint: Distribute coefficients across the entire compound for each reactant and product. Be sure to account for parenthesis.
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
Diff: 3
Section: 2.4

43) A student attempts to balance a chemical equation and comes up with the following result:
$8KClO_3 + C_{12}H_{22}O_{10} \rightarrow 8KCl + 12CO_2 + 11H_2O$
However, he wrote the initial equation wrong and therefore could not balance the equation. Which element(s) are not balanced in this result?

Hint: Make a chart and identify how many elements you have on each side of the arrow.
A) Cl
B) O
C) H
D) O and H
E) C
Answer: B
Diff: 3
Section: 2.4

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
Diff: 1
Section: 2.5

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
Diff: 1
Section: 2.5

46) The formula for the phosphate ion is
A) PO_4^{2-}.
B) PO_4^{3-}.
C) PO_4^{-}.
D) $P_2O_4^{-}$.
E) $P_2O_4^{2-}$.
Answer: B
Diff: 1
Section: 2.5

47) The correct formula for the carbonate ion is
A) $C_2H_3O_2^{-}$.
B) $C_2O_4^{2-}$.
C) CO_2^{-}.
D) CO_3^{-}.
E) CO_3^{2-}.
Answer: E
Diff: 1
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 32.5

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) a group 2A element.
C) a chalcogen.
D) a group 5A element.
E) There are no elements that can react with bromine to give the formula M_2Br.
Answer: E
Diff: 2
Section: 2.5

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) a group 2A element.
C) a chalcogen.
D) a group 1A element.
E) there are no elements that can react with oxygen to give the formula Wp_2O.
Answer: D
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

62) Which formula is incorrect because it does not represent a correctly written ionic compound?
A) $BaCl_2$
B) Al_2F_3
C) Na_2O
D) RbBr
E) CaO
Answer: B
Diff: 2
Section: 2.5

63) Select the examples in which the formula for the ionic compound is not written correctly or cannot exist as written.

I. $(NH_4)_2As$
II. CuO
III. $Mg(C_2H_3O)_2$
IV. $Na_3(HCO_3)_2$
A) I only
B) II and III
C) III and IV
D) I and IV
E) I, II and IV
Answer: D
Diff: 2
Section: 2.6

64) What is the formula for the oxalate ion?
A) CO_3^{2}
B) $C_4O_2^{2}$
C) $C_4O_4^{2}$
D) $C_2O_4^{2}$
E) $C_2H_3O_2$
Answer: D
Diff: 2
Section: 2.5

65) The formula of the compound formed from the calcium ion and acetate ion is
A) $CaC_2H_3O_2$.
B) $Ca_2C_2H_3O_2$.
C) $Ca_2(C_2H_3O_2)_4$.
D) $Ca(C_2H_3O_2)_2$.
E) $Ca(C_2H_3O_2)_3$.
Answer: D
Diff: 2
Section: 2.5

66) Write the formula for the ionic compound formed from calcium ions and nitrate ions?
A) Ca_3N_2
B) $Ca(NO_3)_2$
C) Ca_2NO_3
D) Ca_2NO_2
E) $Ca(NO_2)_2$
Answer: B
Diff: 2
Section: 2.5

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) $Sr(CrO_4)_2$.
E) $Sr_2(CrO_4)_3$.
Answer: B
Diff: 2
Section: 2.5

68) Which compound below has its formula written incorrectly?
A) $Al(H_2PO_4)_3$
B) $Al(HCO_3)_3$
C) $Ca(HCO_3)_2$
D) $KHPO_4$
E) $Ca(NO_3)_2$
Answer: D
Diff: 2
Section: 2.5

69) Which compound below has its formula written incorrectly?
A) $Al(H_2CO_3)_3$
B) $Al(H_2PO_4)_3$
C) $Ba(HCO_3)_2$
D) KH_2PO_4
E) $Ca(NO_2)_2$
Answer: A
Diff: 2
Section: 2.5

70) How many protons, neutrons, and electrons are in the ion, $^{57}Fe^{3+}$?
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
Diff: 2
Section: 2.5

71) How many protons, neutrons, and electrons are in the ion, $^{129}Te^{2-}$?
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
Diff: 2
Section: 2.5

72) How many protons, neutrons, and electrons are in the ion, $^{37}Cl^{-}$?
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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

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
Diff: 2
Section: 2.5

75) List the polyatomic ions, including the number of each type, present in the compound, $(NH_4)_3PO_4$.

Hint: Think about the requirements for forming ionic compounds and how this affects the number of each ion present in the formula.
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
Diff: 3
Section: 2.5

76) List the ions, including the number of each type, present in the compound, $Fe_2(C_2O_4)_3 \cdot 2H_2O$.

Hint: Think about the requirements for forming ionic compounds and how this affects the number of each ion present in the formula.

A) $2Fe^{3+}$, $6C^{4+}$, $12O^{2-}$

B) $3Fe^{4+}$, $2CO_4^{3-}$; $2OH^-$

C) $3Fe^{2+}$, $3C_2O_4^{2-}$

D) $3Fe^{4+}$, $2CO_4^{3-}$; $2H_2O^{2-}$

E) $2Fe^{3+}$, $3CO_2^{2-}$; $2\ H_2O$

Answer: C
Diff: 3
Section: 2.5

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

A) $CaSO_4 \cdot 2H_2O$

B) $MgSO_4 \cdot 7H_2O$

C) $CuSO_4 \cdot 5H_2O$

D) $CoCl_2 \cdot 6H_2O$

E) $7MnSO_4 \cdot 2H_2O$

Answer: B
Diff: 1
Section: 2.6

78) The name of the compound $Al(SO_4)_3$ is

A) aluminum sulfide.
B) aluminum sulfate.
C) aluminum trisulfate.
D) aluminum(III) sulfate.
E) aluminum sulfite.

Answer: B
Diff: 2
Section: 2.6

79) What is the name of the compound, $V(NO_3)_3$?

A) vanadium trinitrate
B) vanadium nitrite
C) vanadium(III) nitrite
D) vanadium nitrate
E) vanadium(III) nitrate

Answer: E
Diff: 2
Section: 2.6

80) What is the name for the compound, $Ba(NO_3)_2$?
A) barium dinitrate
B) barium dinitrite
C) barium nitrate
D) barium(II) nitrite
E) barium(II) nitrate
Answer: C
Diff: 2
Section: 2.6

81) Which compound is correctly written as a hydride?
A) $CoCl_2 \cdot 6H_2O$
B) $HC_2H_3O_2$
C) NaOH
D) CaH_2
E) $C_6H_{12}O_6$
Answer: D
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

87) What is the formula for the compound iron(II) sulfate?
A) $FeSO_4$
B) $Fe(SO_4)_2$
C) Fe_2SO_4
D) $Fe_2(SO_4)_3$
E) $Fe_3(SO_4)_2$
Answer: A
Diff: 2
Section: 2.6

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

Hint: Consider the charge on the mercury ion.
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
Diff: 3
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

91) The correct formula for tin(II) nitrate is
A) $Sn(NO_2)_2$.
B) $Sn(NO_3)_2$.
C) $Sn(NO_3)_3$.
D) $Sn(NO_3)_4$.
E) Sn_2NO_3.
Answer: B
Diff: 2
Section: 2.6

92) What is the formula for magnesic perchlorate?
A) $MgClO_3$
B) $Mg(ClO_3)_2$
C) Mg_2ClO_3
D) $MgO(ClO_3)_2$
E) There is no such compound.
Answer: E
Diff: 2
Section: 2.6

93) What is the name for $Na_2Cr_2O_7$?
A) sodium chromium(VII)ate
B) sodium dichromate
C) sodium dichromium heptaoxide
D) sodium heptaoxochromate
E) sodium perchromate
Answer: B
Diff: 2
Section: 2.6

94) The compound $Na_2S_2O_3$ 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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

98) What is the name for $CuC_2H_3O_2$?
A) copper(I) acetate
B) carbon hydrocarbonate
C) copper monocarbonate
D) copper(I) oxalate
E) dicarbon acetate
Answer: A
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

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
Diff: 2
Section: 2.6

103) Which compound is correctly indicated as cobalt(II) chloride hexahydrate?
A) $CoCl_2 \cdot 6H_2O$
B) $CaSO_4 \cdot 2H_2O$
C) $CuSO_4 \cdot 5H_2O$
D) $NiSO_4 \cdot 6H_2O$
E) $Na_2CO_3 \cdot 10H_2O$
Answer: A
Diff: 2
Section: 2.6

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

Hint: Remember that mercury (I) is not a single atom.
A) $HgPO_3$
B) $HgPO_4$
C) Hg_3PO_4
D) Hg_2PO_3
E) $(Hg_2)_3(PO_4)_2$
Answer: E
Diff: 3
Section: 2.6

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	$FeSO_4 \cdot 6H_2O$
IV.	Calcium phosphate	Ca_3PO_4

Hint: Write the correct name of each formula without looking at the names and then compare it to the choices.
A) II only
B) II and III
C) I, II and IV
D) I and IV
E) II, III and IV
Answer: D
Diff: 3
Section: 2.6

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

I.	$Fe_2(CO_3)_3$	iron(III) carbonate
II.	$Cr_2(C_2O_4)_3$	chromium(III) oxalate
III.	$Mg\ (C_2H_3O)_2$	magnesium hydrogen carbonate
IV.	$PbSO_3$	lead sulfate

Hint: Write the correct name of each formula without looking at the names and then compare it to the choices.
A) II only
B) II and III
C) III and IV
D) I and IV
E) I, II and IV
Answer: C
Diff: 3
Section: 2.6

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

I.	$NaClO_3$	Sodium chlorate
II.	II. $(NH_4)_2CO_3$	Ammonium(I) carbonate
III.	$Cd(H_2PO_4)_2$	Cadmium dihydrogen phosphate
IV.	$KMnO_4$	Potassium-manganese(VII) oxide

Hint: Write the correct name of each formula without looking at the names and then compare it to the choices.
A) II only
B) II and IV
C) III and IV
D) I and IV
E) I, II and IV
Answer: B
Diff: 3
Section: 2.6

108) Which compound is correctly classified as a hydrocarbon?
A) $C_6H_{12}O_6$
B) C_8H_{16}
C) $HC_2H_3O_2$
D) NaHCl
E) C_2H_5OH
Answer: B
Diff: 1
Section: 2.7

109) One of the components of kerosene is an alkane with 16 carbon atoms. Which formula is an alkane?
A) $C_{16}H_{12}$
B) $C_{16}H_{22}$
C) $C_{16}H_{32}$
D) $C_{16}H_{34}$
E) $C_{16}H_{40}$
Answer: D
Diff: 2
Section: 2.7

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
Diff: 2
Section: 2.7

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
Diff: 2
Section: 2.7

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
Diff: 2
Section: 2.7

113) Which compound is not a simple hydrocarbon?
A) C_6H_{12}
B) C_8H_{16}
C) C_2H_6
D) C_5H_5N
E) C_3H_6
Answer: D
Diff: 2
Section: 2.7

114) The formula for the compound formed between arsenic (As) and hydrogen is
A) AsH.
B) As_2H.
C) AsH_2.
D) As_3H.
E) AsH_3.
Answer: E
Diff: 2
Section: 2.7

115) The most likely formula for the compound formed between antimony and chlorine is
A) SbCl.
B) $SbCl_2$.
C) $SbCl_3$.
D) $SbCl_4$.
E) $SbCl_6$.
Answer: C
Diff: 2
Section: 2.7

116) What is the name of the compound, HI(*g*)?
A) hydriodic acid
B) hydrogen monoiodide
C) hydrogen iodide
D) iodic acid
E) monohydrogen monoiodide
Answer: C
Diff: 1
Section: 2.8

117) What is the name of the compound, IBr_3?
A) bromic iodide
B) iodine bromate
C) iodine tribromide
D) iodine tribromine
E) monoiodine tribromite
Answer: C
Diff: 2
Section: 2.8

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
Diff: 2
Section: 2.8

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
Diff: 2
Section: 2.8

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
Diff: 2
Section: 2.8

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

Hint: Write the correct name of each formula without looking at the names and then compare it to the choices.
A) II only
B) II and III
C) I, II and IV
D) I and IV
E) II, III and IV
Answer: C
Diff: 3
Section: 2.8

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

Hint: Write the correct name of each formula without looking at the names and then compare it to the choices.
A) II only
B) II and III
C) III and IV
D) I and II
E) I, II and IV
Answer: D
Diff: 3
Section: 2.8

123) What is the name of the compound, $N_2O_5(g)$?
A) nitrogen oxide
B) dinitrogen tetroxide
C) nitrogen pentoxide
D) dinitrogen pentoxide
E) trinitrogen pentoxide
Answer: D
Diff: 2
Section: 2.8

124) The vertical columns in the periodic table are numbered sequentially, 1 through _____ using Arabic numerals.
Answer: 18
Diff: 1
Section: 2.1

125) Selenium is found in which group of the periodic table?
Answer: group VIA
Diff: 1
Section: 2.1

126) The group 1 elements form compounds with oxygen that dissolve in water to give solutions that
are strongly _____.
Answer: alkaline
Diff: 2
Section: 2.1

127) Which group of nonmetallic elements is called "inert"?
Answer: noble gases
Diff: 1
Section: 2.2

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
Diff: 2
Section: 2.2

129) The symbol Te belongs to a metalloid in group _____.
Answer: VIA, 16
Diff: 2
Section: 2.2

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
Diff: 2
Section: 2.2

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 is also brittle, shattering when hit with a hammer. Based on these properties, this element would be best classified as _____.
Answer: metalloid
Diff: 2
Section: 2.2

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
Diff: 2
Section: 2.3

133) What formula is used to represent molecular chlorine?
Answer: Cl_2
Diff: 2
Section: 2.3

134) List the seven diatomic 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
Diff: 1
Section: 2.3

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
Diff: 2
Section: 2.3

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.

Hint: The groups of atoms are polyatomic ions.
Answer: $Fe_3(AsO_4)_2$
Diff: 3
Section: 2.3

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.

Hint: The groups of atoms are clusters such as polyatomic ions or water.
Answer: $KAl(SO_4)_2 \cdot 12\ H_2O$
Diff: 3
Section: 2.3

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
Diff: 1
Section: 2.4

139) List how many oxygen atoms are present in one molecule of H_3PO_4
Answer: 4
Diff: 1
Section: 2.4

140) List how many oxygen atoms are present in one formula unit of $CoSO_4 \cdot 6H_2O$.
Answer: 10
Diff: 2
Section: 2.4

141) How many hydrogen atoms are present in the formula, $(NH_4)_3PO_4$?
Answer: 12
Diff: 2
Section: 2.4

142) How many hydrogen atoms appear on the reactant side of the equation,
$4NH_3 + 3O_2 \rightarrow 2N_2 + 6H_2O$?
Answer: 12
Diff: 2
Section: 2.4

143) How many of each type of atoms are needed on the left to balance the equation?
$3H_2SO_4 + ?? \rightarrow Al_2(SO_4)_3 + 6H_2O$

Hint: Distribute coefficients across the entire compound and remember how subscripts apply to everything inside the parentheses.
Answer: 2Al, 6H, 6O
Diff: 3
Section: 2.4

144) How many additional hydrogen atoms and oxygen atoms are required on the right side to balance the given equation?
$Ba(OH)_2 \cdot 8H_2O + 2NH_4NO_3 \rightarrow 2NH_3 + H_2O + Ba(NO_3)_2$

Hint: Distribute coefficients across the entire compound and remember how subscripts apply to everything inside the parentheses.
Answer: 18H, 9O
Diff: 3
Section: 2.4

145) What molecule is missing that would balance the given equation?
$2AgBr + 2NaOH + C_6H_6O_2 \rightarrow 2Ag + ?? + 2NaBr + C_6H_4O_2$.
Balance the equation by entering the correct coefficient and formula for the missing molecule.

Hint: Figure out which elements are missing and consider the ratio of those elements.
Answer: $2H_2O$
Diff: 3
Section: 2.4

146) What molecule is missing that would balance the given equation?
$4Au + 8NaCN + ?? + 2H_2O \rightarrow 4NaAu(CN)_2 + 4NaOH.$
If a coefficient other than one is needed provide the coefficient.

Hint: Figure out which elements are missing and consider the ratio of those elements.
Answer: O_2
Diff: 3
Section: 2.4

147) Balance the following equation:
$VCl_3 + Na + CO \rightarrow V(CO)_6 + NaCl$
Answer: $VCl_3 + 3Na + 6CO \rightarrow V(CO)_6 + 3NaCl$
Diff: 2
Section: 2.4

148) Balance the following equation:
$CoS + CO + Cu \rightarrow Co_2(CO)_8 + Cu_2S$
Answer: $2CoS + 8CO + 4Cu \rightarrow Co_2(CO)_8 + 2Cu_2S$
Diff: 2
Section: 2.4

149) What is the charge on all the ions of metals of Group IIA?
Answer: 2+
Diff: 1
Section: 2.5

150) What is the charge on all the ions of non-metals of Group VIIA?
Answer: -1
Diff: 1
Section: 2.5

151) What is the formula for the sulfide ion?
Answer: S_2
Diff: 1
Section: 2.5

152) How many protons and electrons are in the N^{3-} ion?
Answer: 7 protons; 10 electrons
Diff: 2
Section: 2.5

153) How many protons and electrons are in the S^{2-} ion?
Answer: 16 protons; 18 electrons
Diff: 2
Section: 2.5

154) How many protons and electrons are in the Ca^{2+} ion?
Answer: 20 protons; 18 electrons
Diff: 2
Section: 2.5

155) How many electrons are lost when aluminum forms a cation?
Answer: 3
Diff: 2
Section: 2.5

156) How many electrons are lost when zinc forms a cation?
Answer: 2
Diff: 2
Section: 2.5

157) How many electrons are gained when sulfur forms an anion?
Answer: 2
Diff: 2
Section: 2.5

158) The correct formula for the compound formed from the lithium ion and PO_4^{3-} is _____.
Answer: Li_3PO_4
Diff: 2
Section: 2.5

159) The formula for the compound formed from the barium ion and SO_3^{2-} is _____.
Answer: $BaSO_3$
Diff: 2
Section: 2.5

160) The formula formed from the calcium ion and ClO_2^- is _____.
Answer: $Ca(ClO_2)_2$
Diff: 2
Section: 2.5

161) What is the formula of the compound formed from Cr^{3+} and $H_2PO_4^-$?
Answer: $Cr(H_2PO_4)_3$
Diff: 2
Section: 2.5

162) What is the formula of the compound formed from the calcium ion and HCO_3^-?
Answer: $Ca(HCO_3)_2$
Diff: 2
Section: 2.5

163) What is the name of the following compound: $(NH_4)_2SO_4$?
Answer: ammonium sulfate
Diff: 2
Section: 2.5

164) What is the name of the following compound: $Cr_2(SO_4)_3$?
Answer: chromium(III) sulfate
Diff: 2
Section: 2.6

165) What is the name of the following compound: $V_3(PO_4)_4$?
Answer: vanadium(IV) phosphate
Diff: 2
Section: 2.6

166) What is the name of the following compound: Mn_2O_7?
Answer: manganese(VII) oxide
Diff: 2
Section: 2.6

167) What is the name of the following compound: NH_4NO_3?
Answer: ammonium nitrate
Diff: 2
Section: 2.6

168) What is the name of the following compound: $Ba(OH)_2$?
Answer: barium hydroxide
Diff: 2
Section: 2.6

169) What is the name of the following compound: $KHCO_3$?
Answer: potassium hydrogen carbonate or potassium bicarbonate
Diff: 2
Section: 2.6

170) What is the correct formula for lead(IV) chloride?
Answer: $PbCl_4$
Diff: 2
Section: 2.6

171) What is the correct formula for calcium phosphate?
Answer: $Ca_3(PO_4)_2$
Diff: 2
Section: 2.6

172) What is the correct formula for magnesium sulfate?
Answer: $MgSO_4$
Diff: 2
Section: 2.6

173) What is the correct formula for sodium sulfide?
Answer: Na_2S
Diff: 2
Section: 2.6

174) What is the correct formula for chromium(VI) oxide?
Answer: CrO_3
Diff: 2
Section: 2.6

175) Predict the formula of the compound formed between chlorine and hydrogen.
Answer: HCl
Diff: 1
Section: 2.7

176) Predict the formula of the compound formed between sulfur and hydrogen.
Answer: H_2S
Diff: 2
Section: 2.7

177) Hydrocarbons are organic compounds which have general formula _____.
Answer: C_nH_{2n+2}
Diff: 2
Section: 2.7

178) Write the formula of the alkane hydrocarbon with seven carbon atoms.
Answer: C_7H_{16}
Diff: 2
Section: 2.7

179) What is the name for the compound PBr_3?
Answer: phosphorus tribromide
Diff: 1
Section: 2.8

180) What is the name for the compound Si_3N_4?
Answer: trisilicon tetranitride
Diff: 1
Section: 2.8

181) The name for As_4S_{10} is _____.
Answer: tetraarsenic decasulfide
Diff: 2
Section: 2.8

182) What is the formula for dichlorine heptoxide?
Answer: Cl_2O_7
Diff: 2
Section: 2.8

183) The alkali metals like sodium and potassium are soft metals, so they are unreactive towards water.
Answer: FALSE
Diff: 2
Section: 2.1

184) The number of protons in the nucleus of an atom, determines the order of elements in the periodic table.
Answer: TRUE
Diff: 2
Section: 2.1

185) Due to their properties, and where they exist in nature, the group 2A metals are called the lanthanides.
Answer: FALSE
Diff: 2
Section: 2.1

186) Elements that are part of the actinides are all composed of radioactive gases.
Answer: FALSE
Diff: 2
Section: 2.1

187) Some of the nonmetals are solids at room temperature.
Answer: TRUE
Diff: 1
Section: 2.2

188) Metalloids are capable of conducting an electric current.
Answer: TRUE
Diff: 1
Section: 2.2

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
Diff: 1
Section: 2.2

190) Metalloids tend to be malleable and ductile in nature.
Answer: FALSE
Diff: 1
Section: 2.2

191) The formula, N_2, is used to represent elemental nitrogen.
Answer: TRUE
Diff: 1
Section: 2.3

192) When interpreting the formula, $CO(NH_2)_2$, it should be noted that the group of atoms within the parentheses occurs twice.
Answer: TRUE
Diff: 1
Section: 2.3

193) An important characteristic of a compound's formula is it specifies the atomic composition of the compound.
Answer: TRUE
Diff: 2
Section: 2.3

194) When iron and sulfur combine chemically, the properties of the resulting compound are similar to that of each of the elements.
Answer: FALSE
Diff: 1
Section: 2.4

195) Four molecules of the only product formed in the incomplete equation below are needed to ensure that the equation is balanced. $P_4O_{10} + 6H_2O \rightarrow$??
Answer: TRUE
Diff: 2
Section: 2.4

196) Ionic compounds are generally formed when metals react with nonmetals.
Answer: TRUE
Diff: 1
Section: 2.5

197) The phosphide ion has 18 electrons and 18 protons.
Answer: FALSE
Diff: 2
Section: 2.5

198) The subscripts in the formulas do not normally produce an electrically neutral formula unit in ionic compounds.
Answer: FALSE
Diff: 2
Section: 2.5

199) The name of $MnCl_3$ is magnesium(III) chloride.
Answer: FALSE
Diff: 1
Section: 2.6

200) It is important to specify how many cations and anions are present in ionic compounds.
Answer: FALSE
Diff: 2
Section: 2.6

201) The formula for magnesium phosphide is Mg_3P_2.
Answer: TRUE
Diff: 2
Section: 2.6

202) As a general rule, molecular compounds are formed when nonmetallic elements combine.
Answer: TRUE
Diff: 1
Section: 2.7

203) The elements, carbon and oxygen, can combine to form only one compound.
Answer: FALSE
Diff: 1
Section: 2.7

204) Phosphorus can combine with hydrogen to form the compound, PH_3.
Answer: TRUE
Diff: 1
Section: 2.7

205) The compound N_2O_4 is named nitrate tetraoxide.
Answer: FALSE
Diff: 1
Section: 2.8

206) The name for $ZnBr_2$, is zirconium bromide.
Answer: FALSE
Diff: 1
Section: 2.8

207) A name for the compound P_4Se_{10} is phosphorus(IV) selenium.
Answer: FALSE
Diff: 2
Section: 2.8

208) A name for $CrBr_2$, is chromic bromide.
Answer: FALSE
Diff: 2
Section: 2.8

209) The name for $RbClO_4$, is rubidium(I) perchlorate.
Answer: FALSE
Diff: 2
Section: 2.8

210) A name for $Ni(OCl)_2$ is nickel(II) hypochlorite.
Answer: TRUE
Diff: 2
Section: 2.8

211) A name for the compound $Mn(ClO_4)_2$, is magnesium chlorate.
Answer: FALSE
Diff: 2
Section: 2.8

212) The name for $K_2Cr_2O_7$, is potassium dichromium heptaoxide.
Answer: FALSE
Diff: 2
Section: 2.8

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: $C_6H_{12}O_6$
Diff: 2
Section: 2.3

214) How many silicon and oxygen atoms are in the formula, $Ca_3Mg_5(Si_4O_{11})_2(OH)_2$?
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
Diff: 2
Section: 2.3

215) What is the total number of atoms represented by the following formula?
$Mg_5Al(OH)_8AlSi_3O_{10}$
A) 36
B) 28
C) 8
D) 24
E) 42
Answer: A
Diff: 2
Section: 2.3

216) What is the total number of atoms represented by the following?
$3Co(NO_3)_2 \cdot 6H_2O$
A) 35
B) 28
C) 8
D) 81
E) 42
Answer: D
Diff: 2
Section: 2.3

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?

Hint: Use the masses of the elements to find the ratio of the elements.
A) 0.305 g
B) 3.28 g
C) 0.411 g
D) 0.0681 g
E) 0.226 g
Answer: C
Diff: 3
Section: 2.3

218) What is the total number of atoms reacting in the chemical reaction below?
$2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O$
A) 35
B) 82
C) 41
D) 78
E) 21
Answer: D
Diff: 2
Section: 2.4

219) How many hydrogen atoms are on the reactant side of the chemical equation below?
$2(NH_4)_3PO_4 + 3Ba(C_2H_3O_2)_2 \rightarrow Ba_3(PO_4)_2 + 6NH_4C_2H_3O_2$
A) 35
B) 28
C) 8
D) 24
E) 42
Answer: E
Diff: 2
Section: 2.4

220) What single coefficient is needed on the water formula to balance the following chemical equation?
$As_2O_3 + 6KI + 6HCl \rightarrow 2AsI_3 + 6KCl + H_2O$
A) 2
B) 3
C) 4
D) 5
E) 6
Answer: B
Diff: 2
Section: 2.4

221) What single coefficient is needed on the water formula to balance the following chemical equation?
$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + H_2O$
A) 2
B) 3
C) 4
D) 5
E) 6
Answer: B
Diff: 2
Section: 2.4

222) Write the formula of the single product in the reaction below if its coefficient is 5.
$3P_4O_{10} + 2P_4S_{10} \rightarrow 5$???

Hint: Determine the necessary ratio of elements on the reactant side.
A) $P_6O_6S_5$
B) $P_4O_6S_4$
C) $P_4O_{16}S_6$
D) $P_8O_3S_8$
E) $P_{12}O_3S_{10}$
Answer: B
Diff: 3
Section: 2.4

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.)

Hint: Consider the rules for forming ionic compounds to figure out what the possible charge is. Remember ionic compounds are neutral.
A) 1+
B) 1
C) 2+
D) 2
E) 3
Answer: B
Diff: 3
Section: 2.5

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.)

Hint: Consider the rules for forming ionic compounds to figure out what the possible charge is. Remember ionic compounds are neutral.
A) MgE
B) Mg_2E
C) MgE_2
D) Mg_2E_3
E) Mg_3E_2
Answer: C
Diff: 3
Section: 2.5

225) Vitellium phosphate has the formula, $Vi_3(PO_4)_2$, 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.)

Hint: Consider the rules for forming ionic compounds to figure out what the possible charge is. Remember ionic compounds are neutral.

A) $ViNtO_4$
B) Vi_2NtO_4
C) $Vi(NtO_4)_2$
D) $Vi_2(NtO_4)_3$
E) $Vi_3(NtO_4)_2$
Answer: A
Diff: 3
Section: 2.5

226) Engrium sulfate has the formula, $En_2(SO_4)_3$, 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.)

Hint: Consider the rules for forming ionic compounds to figure out what the possible charge is. Remember ionic compounds are neutral.

A) $EnNtO_4$
B) En_2NtO_4
C) $En(NtO_4)_2$
D) $En_2(NtO_4)_3$
E) $En_3(NtO_4)_2$
Answer: D
Diff: 3
Section: 2.5

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
Diff: 2
Section: 2.6

228) What is the formula for manganese(III) monohydrogen phosphate?
A) $MnHO_4$
B) $MnHPO_4$
C) $MnHPO_3$
D) $Mn_2(HPO_4)_3$
E) Mn_3HPO_4
Answer: D
Diff: 2
Section: 2.6

229) What is the formula for cobalt(III) dihydrogen phosphate?
A) Co_3HPO_4
B) $Co_2H(PO_4)_3$
C) $Co(H_2PO_4)$
D) $Co(H_2PO_4)_3$
E) CoH_3PO_4
Answer: D
Diff: 2
Section: 2.6

230) What are the likely formulas of three different hydrocarbons each with 12 hydrogen atoms?
A) $C_{12}H_{12}$; COH_{12} ; C_5H_{12}
B) $C_{12}H_{12}$; C_7H_{12} ; CH_{12}
C) C_5H_{12}; C_6H_{12}; C_7H_{12}
D) $C_{12}H_{12}$; C_9H_{12} ; CH_{12}
E) CH_{12}; $C_{12}H_{12}$; C_8H_{12}
Answer: C
Diff: 2
Section: 2.7

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_5H_3; C_5H_{12} ; C_5H_{22}
Answer: B
Diff: 2
Section: 2.7

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
Diff: 2
Section: 2.7

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
Diff: 2
Section: 2.8

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
Diff: 2
Section: 2.8

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
Diff: 2
Section: 2.8

236) What is the formula for the compound named hydrogen sulfide?
Answer: H_2S
Diff: 2
Section: 2.8