Chapter 2: Atoms, Molecules, and Ions

A periodic table is required to work many of the problems in this chapter.

- 1. In a cathode ray tube
 - A) electrons pass from the anode to the cathode.
 - B) electrons pass from the cathode to the anode.
 - C) protons pass from the anode to the cathode.
 - D) protons pass from the cathode to the anode.

Ans: B Category: Medium Section: 2.2

- 2. The scientist who determined the magnitude of the electric charge of the electron was
 - A) John Dalton. D) Henry Moseley.
 - B) Robert Millikan.

E) R. Chang.

its mass. m

its atomic number, Z

- C) J. J. Thomson.
- Ans: B Category: Easy Section: 2.2
- 3. When J. J. Thomson discovered the electron, what physical property of the electron did he measure?

E)

- A) its charge, *e* D)
- B) its charge-to-mass ratio, *e/m*
- C) its temperature, T
- Ans: B Category: Easy Section: 2.2
- 4. Which of the following scientists developed the nuclear model of the atom?
 - A) John Dalton D) Henry Moseley
 - B) Robert Millikan E) Ernest Rutherford
 - C) J. J. Thomson

Ans: E

Category: Easy Section: 2.2

5. Rutherford's experiment with alpha particle scattering by gold foil established that

- A) protons are not evenly distributed throughout an atom.
- B) electrons have a negative charge.
- C) electrons have a positive charge.
- D) atoms are made of protons, neutrons, and electrons.
- E) protons are 1840 times heavier than electrons.
- Ans: A Category: Medium Section: 2.2
- 6. Atoms of the same element with different mass numbers are called
 - A) ions. B) neutrons. C) allotropes. D) chemical families. E) isotopes. Ans: E Category: Easy Section: 2.3

7. An atom of the isotope ¹³⁷ Ba consists of h electrons (e)?	ow mai	ny protons (p), neutrons (n), and
A) 56 p, 137 n, 56 e	D)	56 p, 56 n, 56 e
B) 56 p, 81 n, 56 e	E)	81 p, 56 n, 81 e
C) 137 p, 81 n, 56 e		
Ans: B Category: Medium Section:	2.3	
8. Give the number of protons (p), neutrons (n), and	l electrons (e) in one atom of 238 U.
A) 146 p, 92 n, 92 e	D)	146 p, 28 n, 146 e
B) 92 p, 92 n, 92 e	E)	238 p, 146 n, 238 e
C) 92 p, 146 n, 92e		
Ans: C Category: Medium Section:	2.3	
9. Which of the following are isotopes?		
A) ${}^{14}C$ and ${}^{13}C$	D)	12 C and 12 CO
B) 14 C and 14 N	E)	14 N and 14 N ₂
C) 14 N and 14 N $^{3-}$		
Ans: A Category: Easy Section: 2.3	5	
10. Complete the following chart, in order fro	m left t	o right
Isotope Mass Number Pr	otons	Neutrons Electrons

		Isotope	Mass Number	Protons	Neutrons	Electrons	
		14 N					
A)	14	, 7, 7, 7		D)	7, 14, 7, 7	7	
B)	14	, 7, 14, 7		E)	Some oth	er answer	

B) 14, 7, 14, 7

C) 7, 7, 7, 7

Ans: A Category: Medium Section: 2.3

11. Complete the following chart, in order from left to right

Isotope	Mass Number	Protons	Neutrons	Electrons
	40	19		19

A) ⁴⁰Zr, 21 B) ¹⁹K, 40 C) ²¹K, 19 D) ⁴⁰K, 21 E) ³⁸Sr, 19 Ans: D Category: Medium Section: 2.3

12. Complete the following chart, in order from left to right

Isotope	Mass Number	Protons	Neutrons	Electrons
		40	57	40

A) ⁹⁷Zr, 97 B) ⁴⁰Zr, 57 C) ⁵⁷La, 40 D) ⁹⁷Bk, 80 E) ⁸⁰Hg, 97 Ans: A Category: Medium Section: 2.3

13. Complete the following chart, in order from left to right

1		0 /		U	
	Ion	Mass Number	Protons	Neutrons	Electrons
	$^{40}Ca^{2+}$				
40	, 20, 20, 20		D)	40, 20, 20	, 22
40	, 20, 20, 18		E)	20, 40, 20	, 22

B) 40, 20, 20, 18 C) 20, 20, 40, 20

A)

Ans: B Category: Medium Section: 2.3

14. Complete the following chart, in order from left to right

Ion	Mass Number	Protons	Neutrons	Electrons
	4	2		0

A) 4 He, 2 B) 4 Be, 4 C) 4 Be, 2 D) 4 He, 4 E) 2 H, 2 Ans: A Category: Medium Section: 2.3

- 15. The elements in a column of the periodic table are known asA) metalloids. B) a period. C) noble gases. D) a group. E) nonmetals.Ans: D Category: Easy Section: 2.4
- 16. Which of the following elements is most likely to be a good conductor of electricity?A) N B) S C) He D) Cl E) FeAns: E Category: Easy Section: 2.4
- 17. Which of the following elements is chemically similar to magnesium?A) sulfur B) calcium C) iron D) nickel E) potassiumAns: B Category: Easy Section: 2.4
- 18. Which of the following elements is chemically similar to oxygen?A) sulfur B) calcium C) iron D) nickel E) sodiumAns: A Category: Easy Section: 2.4
- 19. Which of the following elements is chemically similar to potassium?A) calcium B) arsenic C) phosphorus D) cerium E) cesiumAns: E Category: Easy Section: 2.4
- 20. An anion is defined as
 - A) a charged atom or group of atoms with a net negative charge.
 - B) a stable atom.
 - C) a group of stable atoms.
 - D) an atom or group of atoms with a net positive charge.
 - Ans: A Category: Easy Section: 2.5

 21. Which one of the following is an ion? A) B³⁺ B) NaCl C) He D) ¹⁴C E) none of the above Ans: A Category: Easy Section: 2.5
22. Which one of the following elements is most likely to form a 2+ ion?A) calcium B) carbon C) fluorine D) oxygen E) sodiumAns: A Category: Easy Section: 2.5
 23. Which one of the following elements is most likely to form a 2-ion? A) scandium B) selenium C) silicon D) strontium E) iodine Ans: B Category: Easy Section: 2.5
 24. A magnesium ion, Mg²⁺, has A) 12 protons and 13 electrons. B) 24 protons and 26 electrons. C) 12 protons and 10 electrons. Ans: C Category: Medium Section: 2.5 24 protons and 22 electrons. 12 protons and 14 electrons.
 25. An aluminum ion, Al³⁺, has: A) 13 protons and 13 electrons B) 27 protons and 24 electrons C) 16 protons and 13 electrons Ans: D Category: Medium Section: 2.5
26. An oxide ion, O2-, has:A)8 protons and 10 electronsB)10 protons and 8 electronsC)8 protons and 9 electronsAns:A Category: Medium Section: 2.5
 27. A phosphide ion has: A) 10 protons and 13 electrons B) 12 protons and 15 electrons C) 15 protons and 15 electrons Ans: D Category: Medium Section: 2.5
 28. An iron(II) ion has: A) 24 electrons and a charge of 2+ B) 24 electrons and a charge of 2- C) 26 electrons and a charge of 2+ Ans: A Category: Medium Section: 2.5 28 electrons and a charge of 2+ 28 electrons and a charge of 2- 29 electrons and a charge of 2- 20 electrons and a charge of 2- 20 electrons and a charge of 2- 21 electrons and a charge of 2- 22 electrons and a charge of 2- 23 electrons and a charge of 2- 24 electrons and a charge of 2- 25 electrons and a charge of 2- 28 electrons and a charge of 2- 29 electrons and a charge of 2- 20 electrons and a charge of 2- 21 electrons and a charge of 2- 22 electrons and a charge of 2- 23 electrons and a charge of 2- 24 electrons and a charge of 2- 25 electrons and a charge of 2- 26 electrons and a charge of 2- 27 electrons and a charge of 2- 28 electrons and a charge of 2- 29 electrons and a charge of 2- 20 electrons and a charge of 2- 21 electrons and a charge of 2- 22 electrons and a charge of 2- 28 electrons and a charge of 2- 29 electrons and a charge of 2- 20 electrons and a charge of 2- 20 electrons and a charge of 2- 21 electrons and a charge of 2- 22 electrons and a charge of 2- 23 electrons and a charge of 2- 24 electrons and a charge of 2- 25 electrons and a charge of 2- 24 electrons and a charge of 2- 25 electrons and a charge of 2- 24 electrons and a charge of 2- 25 electrons and a charge of 2- 24 electrons and a charge of 2- 25 electrons and a charge of 2- 25 electrons and a ch
 29. How many protons and electrons are present in one Br⁻ ion? A) 35 p, 35 e B) 80 p, 81 e C) 35 p, 34 e D) 35 p, 36 e E) 80 p, 34 e Ans: D Category: Medium Section: 2.5

- 30. What are the two different ions present in the compound CaS ?
 A) Ca⁺, S⁻ B) Ca²⁻, S²⁺ C) Ca⁻, S⁺ D) Ca²⁺, S²⁻ E) Ca, S
 Ans: D Category: Medium Section: 2.6
- 31. What are the two different ions present in the compound Na₂S?
 A) Na₂⁺, S²⁻ B) Na⁺, S²⁻ C) Na²⁺, S²⁻ D) Na⁺, S⁻ E) Na²⁺, S⁻ Ans: B Category: Medium Section: 2.6
- 32. What are the two different ions present in the compound Li_3N ? A) Li^+ , N^{3-} B) Li_3^+ , N^- C) Li_3^{3+} , N^{3-} D) Li^+ , N^- E) Li^{3+} , N^{3-} Ans: A Category: Medium Section: 2.6
- 33. What are the two different ions present in the compound FeCl₃?
 A) Fe²⁺, Cl₃⁻ B) Fe³⁺, Cl³⁻ C) Fe⁺, Cl⁻ D) Fe³⁺, Cl⁻ E) Fe⁺, Cl⁻ Ans: D Category: Medium Section: 2.6
- 34. What are the ions present in the compound CO₂?
 A) C⁴⁺, 2 O²⁻ B) C²⁺, 2 O⁻ C) C²⁺, O²⁻ D) C²⁺, O₂²⁻ E) no ions present Ans: E Category: Medium Section: 2.6
- 35. What are the ions present in the compound CH₄?
 A) C⁴⁺, H⁺ B) C⁴⁻, H⁺ C) C⁻, H⁺ D) C⁴⁻ H⁴⁺ E) no ions present Ans: E Category: Medium Section: 2.6
- 36. Which of the following is an example of an empirical formula? A) C_9H_{12} B) $C_9H_{18}Cl_2$ C) C_6H_6 D) N_2O_4 E) $C_2H_2O_2$ Ans: B Category: Medium Section: 2.6
- 37. What is the empirical formula for $C_{10}H_{22}O_2$? A) $C_{10}H_{22}O_2$ B) $C_5H_{11}O$ C) $C_{20}H_{44}O_4$ D) $C_2H_{11}O$ E) $C_5H_{11}O_2$ Ans: B Category: Medium Section: 2.6
- 38. What is the empirical formula for $C_6H_{14}O$? A) $C_6H_{14}O$ B) C_3H_7O C) C_2H_7O D) $C_{12}H_{28}O_2$ E) CHO Ans: A Category: Medium Section: 2.6
- 39. What is the ion ClO₄⁻ named?
 A) chloride ion
 B) chlorite ion
 C) hypochlorite ion
 Ans: E Category: Medium Section: 2.7
- 40. What is the formula for the ionic compound containing calcium ions and nitrate ions?
 A) Ca₃N₂ B) Ca(NO₃)₂ C) Ca₂NO₃ D) Ca₂NO₂ E) CaNO₃
 Ans: B Category: Medium Section: 2.7

- 41. What is the formula for the ionic compound containing calcium ions and oxide ions?
 A) CaO B) Ca₂O C) CaO₂ D) Ca₃O E) CaO₃
 Ans: A Category: Medium Section: 2.7
- 42. What is the formula for the ionic compound containing iron (III) ions and iodide ions?
 A) FeI B) Fe₂I C) FeI₂ D) FeI₃ E) Fe₃I
 Ans: D Category: Medium Section: 2.7
- 43. What is the formula for the ionic compound containing sodium ions and nitride ions?
 A) NaN B) Na₂N C) NNa₂ D) Na₃N E) NNa₃
 Ans: D Category: Medium Section: 2.7
- 44. What is the formula for the ionic compound containing barium ions and sulfate ions?
 A) BaSO₄ B) Ba₂SO₄ C) BaS D) Ba(SO₄)₂ E) Ba₃S₂
 Ans: A Category: Medium Section: 2.7
- 45. What are the two different ions present in the compound $Al(NO_3)_3$?

A)	Al^{3+} , (NO ₃) ₃ ⁻	D)	Al^{3+}, NO_3^{3-}
B)	Al ⁺ , NO ₃ ⁻	E)	Al^+ , $(NO_3)_3^-$
C)	Al^{3+} , NO_{3}^{-}		

Ans: C Category: Medium Section: 2.7

46. What are the two different ions present in the compound NH₄NO₃?

A)	$\rm NH_{4}^{-}, \rm NO_{3}^{+}$	D)	NH_4^{3+} , NO^{4-}

- B) NH_4^+ , NO_3^- E) NH_4^+ , NO^{3-}
- C) N^{3-}, H^+, O^{2-}
- Ans: B Category: Medium Section: 2.7
- 47. Which is the correct formula for iron(II) phosphate?
 A) Fe₂PO₄ B) Fe₃(PO₄)₂ C) Fe₂PO₃ D) Fe(PO₄)₂ E) Fe(PO₃)₂
 Ans: B Category: Medium Section: 2.7
- 48. Which of the following is the formula for hydroiodic acid?
 A) HIO₄ B) HIO₃ C) HIO₂ D) HIO E) HI
 Ans: E Category: Medium Section: 2.7
- 49. The formula for calcium phosphate is
 A) CaPO₄. B) Ca₃(PO₄)₂. C) Ca₂(PO₄)₃. D) Ca₃P₂. E) Ca₃(PO₃)₂. Ans: B Category: Medium Section: 2.7
- 50. The formula for magnesium sulfate is A) MnS B) MgS C) MnSO₃ D) MgSO₄ E) MgSO₃ Ans: D Category: Medium Section: 2.7

 51. The formula for sodium sulfide is A) NaS. B) K₂S. C) NaS₂. D) Na₂S. Ans: D Category: Medium Section: 2. 	·
, ,	 D) hydrogen nitrogen oxide. E) hydrogen nitrate.
,	D) beryllium hydroxide.E) barium hydroxide.7
,	 D) calcium hydrogen carbon trioxide. E) potassium hydrogen carbonate.
	 D) copper(II) sulfate pentahydrate. E) copper(V) sulfate hydrate.
, ,	D) $Co(ClO_3)_2 \cdot 2H_2O$ E) $Co_2(ClO_3)_3 \cdot 2H_2O$
	D) Cobalt nitriteE) Cobalt (II) nitride
	 D) Copper (II) sulfate E) Copper (IV) sulfate 7

59. Name the compound Al2O3A) Aluminum oxideB) Aluminum (II) oxideC) Dialuminum trioxideAns: A Category: Medium Section: 2.7
 60. Which is the formula for lead(IV) chloride? A) Pb₄Cl B) PbCl₂ C) PbCl₃ D) PbCl₄ E) Pb₂Cl₄ Ans: D Category: Medium Section: 2.7
 61. What type of compound is Mg(NO₃)₂? A) Ionic B) Molecular C) Acid D) Base E) Hydrate Ans: A Category: Medium Section: 2.7
 62. What type of compound is NH₄NO₃ A) Ionic B) Molecular C) Acid D) Base E) Hydrate Ans: A Category: Medium Section: 2.7
63. What type of compound is IF₅?A) Ionic B) Molecular C) Acid D) Base E) Hydrate Ans: B Category: Medium Section: 2.7
64. What type of compound is HBrO₂?A) Ionic B) Binary C) Acid D) Base E) Hydrate Ans: C Category: Medium Section: 2.7
65. What type of compound is NaOH?A) Binary B) Molecular C) Acid D) Base E) Hydrate Ans: D Category: Medium Section: 2.7
66. What type of compound is H₂SO₃?A) Ionic B) Binary C) Acid D) Base E) Hydrate Ans: C Category: Medium Section: 2.7
67. What type of compound is NH₃?A) Ionic B) Ternary C) Acid D) Base E) Hydrate Ans: D Category: Medium Section: 2.7
 68. Name the acid H₃PO₄ (dissolved in water). A) Phosphoric acid D) Hydrophosphate acid B) Phosphorous acid E) Hydrophosphoric acid C) Hydrogen phosphate acid Ans: A Category: Medium Section: 2.7

 69. Name the acid H₂SO₃ (dissolved in water). A) Sulfuric acid B) Sulfurous acid C) Hydrosulfuric acid Ans: B Category: Medium Section: 2.7
 70. The chemical formula for iron(II) nitrate is A) Fe₂(NO₃)₃ B) Ir(NO₂)₂ C) Fe₂N₃ D) Fe(NO₃)₂ E) Fe(NO₂)₂ Ans: D Category: Medium Section: 2.7
71. Name the compound Co2(SO3)3.A) cobalt sulfateD) cobalt(III) sulfiteB) cobalt(II) sulfiteE) cobalt(III) sulfateC) cobalt(II) sulfateAns: D Category: Medium Section: 2.7
72. Name the compound CrO3.A) chromium oxideD) chromium(III) oxideB) chromium(II) oxideE) chromium(VI) oxideC) chromium(III) trioxideEAns: E Category: Medium Section: 2.7
 73. Name the compound Cl₂O₅ A) chlorine pentoxide B) dichlorine pentoxygen C) dichlorine pentoxide Ans: C Category: Medium Section: 2.7
74. Name the compound N2O4A) nitrous oxideD) dinitrogen tetroxideB) dinitrogen pentoxideE) nitrogen tetroxideC) nitrogen oxideAns: D Category: Medium Section: 2.7
 75. Name the compound NO₂ A) mononitrogen dioxygen B) nitrogen dioxide C) dinitrogen monoxide Ans: B Category: Medium Section: 2.7
 76. Name the compounds SO₃ A) sulfur trioxide B) sulfate C) sulfite D) sulfur trioxygen E) sulfur oxide Ans: A Category: Medium Section: 2.7

- 77. The straight chain hydrocarbon that contains six carbon atoms isA) propane B) butane C) pentane D) hexane E) heptaneAns: D Category: Medium Section: 2.8
- 78. What is the law of conservation of mass?Ans: Matter can be neither created nor destroyed.Category: Easy Section: 2.1
- 79. Describe the contributions of Marie Curie.
 Ans: (note that answers will vary) Marie Curie discovered two new elements, and is one of three people to win two Nobel Prizes. She also suggested the term "radioactivity" to describe the spontaneous emission of particles and/or radiation. Category: Easy Section: 2.2
- 80. What are the three types of radiation that can be produced by the decay of radioactive substances like uranium?Ans: Alpha, beta, and gamma radiationCategory: Easy Section: 2.2
- 81. Marie Curie suggested the name "radioactivity" to describe the spontaneous emission of particles and/or radiation.Ans: True Category: Easy Section: 2.2
- 82. Using a cathode ray tube, J. J. Thomson determined the magnitude of the electric charge on the electron.Ans: False Category: Easy Section: 2.2
- 83. When a beam of alpha particles passes between two electrically charged plates, the beam is deflected toward the positive plate.Ans: False Category: Medium Section: 2.2
- 84. The proton is about 1840 times heavier than the electron. Ans: True Category: Easy Section: 2.2
- 85. How many electrons, protons, and neutrons does an iron-55 atom have? Ans: 26 electrons, 26 protons, and 29 neutrons Category: Medium Section: 2.3
- 86. How many protons are there in one atom of nickel? Ans: 28 Category: Easy Section: 2.3
- 87. How many protons are there in one atom of magnesium? Ans: 12 Category: Easy Section: 2.3

- 88. How many protons are there in one atom of xenon? Ans: 54 Category: Easy Section: 2.3
- 89. Almost all the mass of an atom is concentrated in the nucleus. Ans: True Category: Easy Section: 2.3
- 90. The atomic number is equal to the number of protons in the nucleus of each atom of an element.Ans: True Category: Easy Section: 2.3
- 91. The number of neutrons in all atoms of an element is the same. Ans: False Category: Medium Section: 2.3
- 92. How many protons are there in one atom of uranium? Ans: 92 Category: Easy Section: 2.3
- 93. What are *isotopes*?Ans: Atoms of the same element that have the same atomic number but different mass numbers.Category: Easy Section: 2.3
- 94. The table below describes four atoms.

	Atom A	Atom B	Atom C	Atom D
Number of protons	79	80	80	79
Number of neutrons	118	120	118	120
Number of electrons	79	80	80	79

Which atoms represent the same element?

Ans: Atoms A and D represent the same element, and atoms B and C represent the same element.

Category: Medium Section: 2.3

95. Consider a neutral atom of the following isotope of sulfur: ${}^{34}_{16}$ S

How many electrons, protons, and neutrons does the atom contain? Ans: 16 electrons, 16 protons, and 18 neutrons Category: Medium Section: 2.3 96. How many electrons, protons, and neutrons are in a neutral atom of the following isotope of calcium?

 $^{44}_{20}$ Ca Ans: 20 electrons, 20 protons, and 24 neutrons Category: Medium Section: 2.3

97. How many electrons, protons, and neutrons are in a neutral atom of the following isotope of krypton?

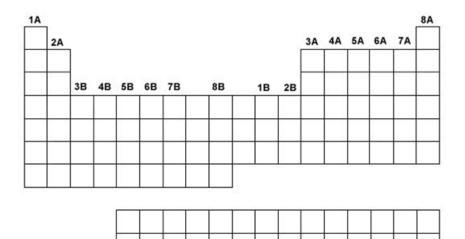
 $^{84}_{36}$ Kr Ans: 36 electrons, 36 protons, and 48 neutrons Category: Medium Section: 2.3

98. How many electrons, protons, and neutrons are in a neutral atom of the following isotope of gadolinium?

 $^{160}_{64}$ Gd

Ans: 64 electrons, 64 protons, and 96 neutrons Category: Medium Section: 2.3

Use the following to answer questions 99-102:



- 99. Use the periodic table above to show where the alkali metals are located.Ans: Group 1A or Group 1Category: Easy Section: 2.4
- 100. Use the periodic table above to show where the alkaline earth metals are located.Ans: Group 2A or Group 2Category: Easy Section: 2.4

- 101. Use the periodic table above to show where the halogen elements are located. Ans: Group 7A or Group 17 Category: Easy Section: 2.4
- 102. Use the periodic table above to show where the noble gases are located.Ans: Group 8A or Group 18Category: Easy Section: 2.4
- 103. The elements known as the halogens are useful as disinfectants. Name two halogens.Ans: (two of these) fluorine, chlorine, bromine, iodineCategory: Easy Section: 2.4
- 104. Define the term *molecule*.
 Ans: A molecule is an aggregate of at least two atoms in a definite arrangement held together by chemical forces.
 Category: Easy Section: 2.5
- 105. What are the seven elements that naturally occur as diatomic molecules? Ans: Hydrogen, nitrogen, oxygen, fluorine, chlorine, bromine, iodine Category: Medium Section: 2.5
- 106. Define *ion*.Ans: An ion is an atom or group of atoms that has a net positive or negative charge.Category: Easy Section: 2.5
- 107. A molecule of antifreeze, ethylene glycol, has the formula C₂H₄(OH)₂. How many atoms are there in one molecule of antifreeze?
 Ans: 10
 Category: Easy Section: 2.5
- 108. How many carbon atoms are in one molecule of CH₃(CH₂)₃CH₃? Ans: 5 Category: Easy Section: 2.5
- 109. How many hydrogen atoms are in one molecule of CH₃(CH₂)₃CH₃ ? Ans: 12 Category: Easy Section: 2.5
- 110. The formula for isopropyl alcohol is sometimes written as (CH₃)₂CHOH to better indicate how the atoms are connected. How many hydrogen atoms would be contained in 3 dozen isopropyl alcohol molecules?
 Ans: 288
 Category: Medium Section: 2.5

111. Define allotrope.

Ans: An allotrope is one of the two or more distinct forms of an element. Category: Easy Section: 2.6

- 112. An empirical formula tell us which elements are present in a compound and gives us the simplest, whole-number ratio of the atoms of these elements in the compound.Ans: True Category: Easy Section: 2.6
- 113. Give the formula for potassium oxide. Ans: K₂O Category: Medium Section: 2.7
- 114. Give the formula for magnesium chloride. Ans: MgCl₂ Category: Medium Section: 2.7
- 115. Give the formula for carbon disulfide. Ans: CS₂ Category: Medium Section: 2.7
- 116. Give the formula for potassium hydroxide. Ans: KOH Category: Medium Section: 2.7
- 117. Give the formula for nickel(II) sulfite.Ans: NiSO₃Category: Medium Section: 2.7
- 118. Name the following binary compound: FeS. Ans: iron(II) sulfide or ferrous sulfide Category: Medium Section: 2.7
- 119. Name the following binary compound: NaH. Ans: sodium hydride Category: Medium Section: 2.7
- 120. Name the following binary compound: MnCl₂. Ans: manganese(II) chloride or manganous chloride Category: Medium Section: 2.7
- 121. Name the following binary compound: Fe₂O₃.Ans: iron(III) oxide (or ferric oxide)Category: Medium Section: 2.7

- 122. Name the following compound: CuCO₃. Ans: copper(II) carbonate or cupric carbonate Category: Medium Section: 2.7
- 123. Name the following compound: K₃PO₄. Ans: potassium phosphate Category: Medium Section: 2.7
- 124. Name the following compound: Al(NO₂)₂. Ans: aluminum nitrite Category: Medium Section: 2.7
- 125. Name the following compound: Cl₂O₇. Ans: dichlorine heptoxide Category: Medium Section: 2.7
- 126. Give the formula of magnesium nitrate. Ans: Mg(NO₃)₂ Category: Medium Section: 2.7
- 127. Give the formula of calcium phosphate. Ans: Ca₃(PO₄)₂ Category: Medium Section: 2.7
- 128. Give the formula of iron(II) phosphate.Ans: Fe₃(PO₄)₂Category: Medium Section: 2.7
- 129. Give the formula of copper(II) bromide. Ans: CuBr₂ Category: Medium Section: 2.7
- 130. Give the formula of ammonium sulfate. Ans: (NH₄)₂SO₄ Category: Medium Section: 2.7
- 131. Give the formula of hydrochloric acid. Ans: HCl Category: Medium Section: 2.7
- 132. Give the formula of carbonic acid.Ans: H₂CO₃Category: Medium Section: 2.7

- 133. Give the formula of nitrous acid.Ans: HNO₂Category: Medium Section: 2.7
- 134. Give the formula of sulfuric acid. Ans: H₂SO₄ Category: Medium Section: 2.7
- 135. Name the following: HF. Ans: hydrofluoric acid Category: Medium Section: 2.7
- 136. Name the following H₃PO₃Ans: phosphorous acidCategory: Medium Section: 2.7
- 137. Write the formula of ammonia. Ans: NH₃ Category: Medium Section: 2.7
- 138. Write the formula of lead(II) chloride. Ans: PbCl₂ Category: Medium Section: 2.7
- 139. Write the formula of calcium carbonate. Ans: CaCO₃Category: Medium Section: 2.7
- 140. Write the formula of an anion that contains a metal. Ans: CrO_4^{2-} or $Cr_2O_7^{2-}$ or MnO_4^{-} Category: Medium Section: 2.7
- 141. Write the formula of a cation that contains a nonmetal. Ans: NH₄⁺ Category: Medium Section: 2.7
- 142. Give an example of an anion that contains a metal and write the name. Ans: chromate or dichromate or permanganate Category: Medium Section: 2.7
- 143. What is the nitride ion, nitrate ion, and nitrite ion, in that order? Ans: N³⁻, NO₃⁻, and NO₂⁻ Category: Medium Section: 2.7

- 144. What is the sulfide ion, sulfate ion, and sulfite ion, in that order? Ans: S²⁻, SO₄²⁻, SO₃²⁻ Category: Medium Section: 2.7
- 145. What is the chloride ion, chlorate ion, and perchlorate ion, in that order? Ans: Cl⁻, ClO₃⁻, and ClO₄⁻ Category: Medium Section: 2.7
- 146. What is chloric acid, chlorous acid, and hypochlorous acid, in that order? Ans: HClO₃, HClO₂, HClO Category: Medium Section: 2.7
- 147. What is ammonia and ammonium ion, in that order? Ans: NH₃, NH₄⁺ Category: Medium Section: 2.7
- 148. What is the formula for dinitrogen monoxide? Ans: N₂O Category: Medium Section: 2.7
- 149. What is the formula for dibromine heptoxide? Ans: Br₂O₇ Category: Medium Section: 2.7
- 150. What is the formula for xenon difluoride? Ans: XeF₂ Category: Medium Section: 2.7
- 151. What is the formula for xenon hexafluoride? Ans: XeF₆ Category: Medium Section: 2.7
- 152. What is the formula for the compound hydrogen peroxide Ans: H₂O₂ Category: Medium Section: 2.7
- 153. Name the compound CH₃CH₂OH Ans: Ethanol Category: Medium Section: 2.8
- 154. Name the compound CH₃CH₂NH₂ Ans: Ethylamine Category: Medium Section: 2.8

Chapter 2: Atoms, Molecules, and Ions

- 155. What is the formula for octane? Ans: C₈H₁₈ Category: Medium Section: 2.8
- 156. What is the formula for nonane? Ans: C₉H₂₀ Category: Medium Section: 2.8

Page 41