

**General, Organic, and Biological Chemistry, 4e (Timberlake)**  
**Chapter 3 Atoms and Elements**

3.1 Multiple-Choice Questions

1) The primary substances of which all other things are composed are

- A) molecules.
- B) compounds.
- C) elements.
- D) electrons.
- E) protons.

Answer: C

Objective: 3.1

Global Outcomes: GO7

2) Au is the symbol for

- A) gold.
- B) silver.
- C) argon.
- D) aluminum.
- E) sodium.

Answer: A

Objective: 3.1

Global Outcomes: GO2

*Select the correct symbol for the element.*

3) aluminum

- A) Al
- B) Am
- C) Au
- D) Sn
- E) Ag

Answer: A

Objective: 3.1

Global Outcomes: GO7

4) iron

- A) Ir
- B) Fs
- C) Fe
- D) In
- E) FE

Answer: C

Objective: 3.1

Global Outcomes: GO7

5) sodium

- A) So
- B) Na
- C) No
- D) Sm
- E) Au

Answer: B

Objective: 3.1

Global Outcomes: GO7

6) potassium

- A) P
- B) Po
- C) Pt
- D) K
- E) Ko

Answer: D

Objective: 3.1

Global Outcomes: GO7

7) silver

- A) S
- B) Si
- C) Ag
- D) Au
- E) AG

Answer: C

Objective: 3.1

Global Outcomes: GO7

8) Ca is the symbol for

- A) calcium.
- B) carbon.
- C) cobalt.
- D) copper.
- E) cadmium.

Answer: A

Objective: 3.1

Global Outcomes: GO7

9) What elements are in hydroxyapatite,  $\text{Ca}_5(\text{PO}_4)_3\text{OH}$ , a major compound in human bones and teeth?

- A) carbon, potassium, oxygen, hydrogen
- B) calcium, phosphorus, oxygen, hydrogen
- C) carbon, phosphorus, oxygen, helium
- D) calcium, phosphorus, oxygen, helium
- E) carbon, potassium, oxygen, helium

Answer: B

Objective: 3.1

Global Outcomes: GO2

10) Which of the following is a characteristic of the modern periodic table?

- A) A group is a horizontal row on the periodic table.
- B) A period is a column on the periodic table.
- C) The elements in each group have similar chemical properties.
- D) The B groups contain the representative elements.
- E) The A groups contain the transition elements.

Answer: C

Objective: 3.2

Global Outcomes: GO2

11) Which of the following properties is NOT a characteristic of the Group 1A(1) elements (alkali metals)?

- A) They are shiny.
- B) They are good conductors of heat.
- C) They react vigorously with water.
- D) Most of them are liquids at room temperature.
- E) They are good conductors of electricity.

Answer: D

Objective: 3.2

Global Outcomes: GO2

12) The Group 8A(18) elements

- A) are unreactive and are rarely found in combination with other elements.
- B) are good conductors of electricity.
- C) melt at high temperatures.
- D) are liquids at room temperature.
- E) react vigorously with water.

Answer: A

Objective: 3.2

Global Outcomes: GO2

13) Which of the following elements is a metal?

- A) nitrogen
- B) fluorine
- C) argon
- D) strontium
- E) phosphorus

Answer: D

Objective: 3.2

Global Outcomes: GO7

14) Which of the following is a characteristic of nonmetals?

- A) shiny
- B) malleable
- C) good conductors of heat
- D) low melting points
- E) good conductors of electricity

Answer: D

Objective: 3.2

Global Outcomes: GO7

15) Which of the following elements is a nonmetal?

- A) nitrogen
- B) sodium
- C) iron
- D) silver
- E) calcium

Answer: A

Objective: 3.2

Global Outcomes: GO7

16) Which of the following elements is a noble gas?

- A) oxygen
- B) chlorine
- C) bromine
- D) argon
- E) nitrogen

Answer: D

Objective: 3.2

Global Outcomes: GO7

17) Which element would have physical and chemical properties similar to chlorine?

- A) Ar
- B) Br
- C) S
- D) O
- E) P

Answer: B

Objective: 3.2

Global Outcomes: GO2

18) What is the symbol of the element in Group 4A(14) and Period 2?

- A) Be
- B) Mg
- C) Ca
- D) C
- E) Si

Answer: D

Objective: 3.2

Global Outcomes: GO2

19) What is the symbol of the element in Period 4 and Group 2?

- A) Be
- B) Mg
- C) Ca
- D) C
- E) Si

Answer: C

Objective: 3.2

Global Outcomes: GO2

20) Identify the noble gas in the following list.

- A) helium
- B) nitrogen
- C) oxygen
- D) gold
- E) chlorine

Answer: A

Objective: 3.2

Global Outcomes: GO2

21) Identify the metalloid in the following list.

- A) sulfur
- B) fluorine
- C) silver
- D) copper
- E) germanium

Answer: E

Objective: 3.2

Global Outcomes: GO2

22) Semiconductors are located in the periodic table on (or in) the

- A) left side of the table.
- B) right side of the table.
- C) line dividing metals from nonmetals in the table.
- D) first period of the table.
- E) last period of the table.

Answer: C

Objective: 3.2

Global Outcomes: GO2

23) The element in this list with chemical properties similar to magnesium is

- A) sodium.
- B) boron.
- C) carbon.
- D) strontium.
- E) chlorine.

Answer: D

Objective: 3.2

Global Outcomes: GO2

24) The smallest particle of an element that retains the characteristics of the element is a(n)

- A) electron.
- B) neutron.
- C) proton.
- D) atom.
- E) nucleus.

Answer: D

Objective: 3.3

Global Outcomes: GO2

25) According to the Atomic Theory,

- A) all atoms are different.
- B) atoms are neither created nor destroyed during a chemical reaction.
- C) atoms of the same element combine to form compounds.
- D) all matter is made up of tiny particles called electrons.
- E) a compound can contain different numbers of atoms as long as it has the same kinds of atoms.

Answer: B

Objective: 3.3

Global Outcomes: GO2

26) Which of the following descriptions of a subatomic particle is correct?

- A) A proton has a positive charge and a mass of approximately 1 amu.
- B) An electron has a negative charge and a mass of approximately 1 amu.
- C) A neutron has no charge and its mass is negligible.
- D) A proton has a positive charge and a negligible mass.
- E) A neutron has a positive charge and a mass of approximately 1 amu.

Answer: A

Objective: 3.3

Global Outcomes: GO2

27) In an atom, the nucleus contains

- A) an equal number of protons and electrons.
- B) all the protons and neutrons.
- C) all the protons and electrons.
- D) only neutrons.
- E) only protons.

Answer: B

Objective: 3.3

Global Outcomes: GO2

28) The atomic number of an atom is equal to the number of

- A) nuclei.
- B) neutrons.
- C) neutrons plus protons.
- D) electrons plus protons.
- E) protons.

Answer: E

Objective: 3.4

Global Outcomes: GO7

29) The number of neutrons in an atom is equal to

- A) the atomic number.
- B) the mass number.
- C) the mass number + the atomic number.
- D) the mass number - the atomic number.
- E) the number of protons.

Answer: D

Objective: 3.4

Global Outcomes: GO7

30) The mass number of an atom can be calculated from

- A) the number of electrons.
- B) the number of protons plus neutrons.
- C) the number of protons.
- D) the number of electrons plus protons.
- E) the number of neutrons.

Answer: B

Objective: 3.4

Global Outcomes: GO7

31) What is the mass number of an atom of potassium that has 20 neutrons?

- A) 15
- B) 19
- C) 35
- D) 39
- E) 59

Answer: D

Objective: 3.4

Global Outcomes: GO4

32) Consider a neutral atom with 30 protons and 34 neutrons. The atomic number of the element is

- A) 30.
- B) 32.
- C) 34.
- D) 64.
- E) 94.

Answer: A

Objective: 3.4

Global Outcomes: GO3



33) Consider a neutral atom with 30 protons and 34 neutrons. The mass number for this atom is

- A) 30.
- B) 32.
- C) 34.
- D) 64.
- E) 94.

Answer: D

Objective: 3.4

Global Outcomes: GO4

34) Consider a neutral atom with 30 protons and 34 neutrons. The number of electrons in this atom is

- A) 30.
- B) 32.
- C) 34.
- D) 64.
- E) 94.

Answer: A

Objective: 3.4

Global Outcomes: GO4

35) How many protons are in an isotope of sodium with a mass number of 25?

- A) 11
- B) 14
- C) 15
- D) 25
- E) 32

Answer: A

Objective: 3.4

Global Outcomes: GO4

36) Consider an isotope of sodium with a mass number of 25. The number of neutrons in this isotope of sodium is

- A) 11.
- B) 14.
- C) 16.
- D) 25.
- E) 32.

Answer: B

Objective: 3.4

Global Outcomes: GO4

37) Which of the following gives the correct numbers of protons, neutrons, and electrons in a neutral atom of  $^{118}_{50}\text{Sn}$ ?

- A) 118 protons, 50 neutrons, 118 electrons
- B) 118 protons, 118 neutrons, 50 electrons
- C) 50 protons, 68 neutrons, 50 electrons
- D) 68 protons, 68 neutrons, 50 electrons
- E) 50 protons, 50 neutrons, 50 electrons

Answer: C

Objective: 3.5

Global Outcomes: GO2

38) Isotopes are atoms of the same element that have

- A) different atomic numbers.
- B) the same atomic numbers but different numbers of protons.
- C) the same atomic numbers but different numbers of electrons.
- D) the same atomic number but different numbers of neutrons.
- E) the same atomic mass but different numbers of protons.

Answer: D

Objective: 3.5

Global Outcomes: GO7

39) The correct symbol for the isotope of potassium with 22 neutrons is

- A)  $^{41}_{19}\text{K}$ .
- B)  $^{19}_{41}\text{K}$ .
- C)  $^{37}_{15}\text{P}$ .
- D)  $^{15}_{37}\text{P}$ .
- E)  $^{22}_{19}\text{K}$ .

Answer: A

Objective: 3.5

Global Outcomes: GO2

40) Given the following:  ${}_{19}^{41}\text{X}$ ,  ${}_{19}^{39}\text{X}$ ,  ${}_{20}^{41}\text{X}$ , and  ${}_{18}^{39}\text{X}$ . Which are isotopes of each other?

A)  ${}_{19}^{41}\text{X}$  and  ${}_{20}^{41}\text{X}$  are isotopes of each other; and  ${}_{19}^{39}\text{X}$  and  ${}_{18}^{39}\text{X}$  are isotopes of each other.

B)  ${}_{19}^{41}\text{X}$  and  ${}_{19}^{39}\text{X}$  are isotopes of each other.

C)  ${}_{19}^{41}\text{X}$ ,  ${}_{19}^{39}\text{X}$ ,  ${}_{20}^{41}\text{X}$ , and  ${}_{18}^{39}\text{X}$  are isotopes of each other.

D) None are isotopes of each other.

Answer: B

Objective: 3.5

Global Outcomes: GO2

41) The atomic mass of an element is equal to

A) its mass number.

B) its atomic number.

C) one-twelfth of the mass of a carbon-12 atom.

D) a weighted average mass of all of the naturally occurring isotopes of the element.

E) the average mass of all of the naturally occurring isotopes of the element.

Answer: D

Objective: 3.5

Global Outcomes: GO7

42) A sample of chlorine has two naturally occurring isotopes. The isotope Cl-35 (mass 35.0 amu) makes up 75.8% of the sample, and the isotope Cl-37 (mass = 37.0 amu) makes up 24.3% of the sample. What is the average atomic mass for chlorine?

A) 36.0 amu

B) 35 amu

C) 36.6 amu

D) 35.5 amu

E) 35.521 amu

Answer: D

Objective: 3.5

Global Outcomes: GO4

43) A sample of silicon has three naturally occurring isotopes: Si-28 (mass 28.0 amu); Si-29 (mass 29.0 amu) and Si-30 (mass = 30.0 amu). If the average atomic mass of silicon is 28.1 amu, which isotope is the most abundant?

A) Si-28

B) Si-29

C) Si-30

D) All isotopes have the same natural abundance.

Answer: A

Objective: 3.5

Global Outcomes: GO4

44) Which of the following is NOT true for the atoms  $^{13}\text{N}$ ,  $^{14}\text{N}$ , and  $^{15}\text{N}$ ?

- A) They all have the same mass number.
- B) They are isotopes.
- C) They all have the same atomic number.
- D) They all have 7 protons.
- E) They all have 7 electrons.

Answer: A

Objective: 3.5

Global Outcomes: GO2

45) The elements lithium, sodium, and potassium

- A) are isotopes of each other.
- B) are in the same period of elements.
- C) have the same number of neutrons.
- D) are in the same group.
- E) have the same mass number.

Answer: D

Objective: 3.2, 3.5

Global Outcomes: GO7

46) The elements sodium, magnesium, and silicon

- A) are isotopes of each other.
- B) are in the same period of elements.
- C) have the same number of neutrons.
- D) are in the same group.
- E) have the same mass number.

Answer: B

Objective: 3.2, 3.5

Global Outcomes: GO7

47) The electron arrangement of any particular atom shows

- A) the number of isotopes possible.
- B) a description of the shape of each energy level.
- C) the number of electrons in each energy level.
- D) a diagram of an atomic nucleus.
- E) the maximum number of electrons each energy level can hold.

Answer: C

Objective: 3.6

Global Outcomes: GO7

48) The number of electron levels in a magnesium atom is

- A) 1.
- B) 2.
- C) 3.
- D) 4.
- E) 5.

Answer: C

Objective: 3.6

Global Outcomes: GO2

49) The maximum number of electrons that may occupy the third energy level is

- A) 2.
- B) 8.
- C) 10.
- D) 18.
- E) 32.

Answer: D

Objective: 3.6

Global Outcomes: GO4

50) What is the element with the electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^5$ ?

- A) Be
- B) Cl
- C) F
- D) S
- E) Ar

Answer: B

Objective: 3.7

Global Outcomes: GO2

51) What is the electron configuration for aluminum?

- A)  $1s^2 2s^2 2p^6 3s^2 3p^1$
- B)  $1s^2 2s^2 2p^6 3s^2 3p^3$
- C)  $1s^2 2s^2 2p^6 3s^2 3p^5$
- D)  $1s^2 2s^2 2p^6 3s^2 3p^6$
- E)  $1s^2 2s^2 2p^6 3s^2 3p^8$

Answer: A

Objective: 3.7

Global Outcomes: GO2

52) Which of the following electron configurations is impossible?

- A)  $1s^2 2s^2 2p^6 3s^2 3p^1$
- B)  $1s^2 2s^4 2p^6 3s^2 3p^3$
- C)  $1s^2 2s^2 2p^6 3s^2 3p^5$
- D)  $1s^2 2s^2 2p^6 3s^2 3p^6$
- E)  $1s^2 2s^2 2p^6 3s^2 3p^3$

Answer: B

Objective: 3.7

Global Outcomes: GO2

53) What is the electron configuration for potassium (atomic number 19)?

- A)  $1s^2 2s^2 2p^6 3s^2 3p^7$
- B)  $1s^2 2s^2 2p^6 3s^2 3p^5 3d^2$
- C)  $1s^2 2s^2 2p^8 3s^2 3p^5$
- D)  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
- E)  $1s^2 2s^2 2p^6 3s^2 3p^5 4s^1$

Answer: D

Objective: 3.7

Global Outcomes: GO2

54) What element has the electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^2$ ?

- A) carbon
- B) oxygen
- C) sulfur
- D) iron
- E) silicon

Answer: E

Objective: 3.7

Global Outcomes: GO2

55) The number of electrons in the outer energy level of a neutral atom of boron (atomic number 5) is

- A) 2.
- B) 3.
- C) 5.
- D) 8.
- E) 10.

Answer: B

Objective: 3.7

Global Outcomes: GO2

56) What is the correct electron configuration for the lithium atom?

- A)  $1s^3$
- B)  $2s^1$
- C)  $1s^1 2s^2$
- D)  $1s^2 2s^1$
- E)  $1s^2 2s^5$

Answer: D

Objective: 3.7

Global Outcomes: GO2

57) What is the abbreviated electron configuration for nickel (atomic number 28)?

- A)  $[\text{He}]2s^2 2p^3$
- B)  $[\text{Ar}]4s^2 3d^8$
- C)  $[\text{Kr}]4s^2 3d^8$
- D)  $[\text{Ar}]4s^2 4p^4$
- E)  $[\text{Ar}]3d^8$

Answer: B

Objective: 3.7

Global Outcomes: GO2

58) What is the element with the abbreviated electron configuration  $[\text{Kr}]5s^2 4d^8$ ?

- A) Ni
- B) Pd
- C) Pt
- D) Kr
- E) Xe

Answer: B

Objective: 3.7

Global Outcomes: GO2

59) The number of valence electrons found in an atom of a Group A element is equal to

- A) its atomic number.
- B) its mass number.
- C) its group number.
- D) eight.
- E) eight minus the group number.

Answer: C

Objective: 3.8

Global Outcomes: GO2

- 60) Valence electrons are electrons located
- A) in the outermost energy level of an atom.
  - B) in the nucleus of an atom.
  - C) in the innermost energy level of an atom.
  - D) throughout the atom.
  - E) in the first three shells of an atom.

Answer: A

Objective: 3.8

Global Outcomes: GO2

- 61) In an electron-dot structure of an element, the dots are used to represent
- A) all of the electrons in the atom.
  - B) the valence electrons.
  - C) the electron arrangement.
  - D) only the electrons that will participate in bond formation.
  - E) the electrons that the element will gain when it forms a compound.

Answer: B

Objective: 3.8

Global Outcomes: GO7

- 62) How many valence electrons are in the electron-dot structures for the elements in group 3A(13)?

- A) 1
- B) 2
- C) 3
- D) 4
- E) 6

Answer: C

Objective: 3.8

Global Outcomes: GO4

- 63) The number of dots in the electron dot structure of nitrogen is

- A) one.
- B) two.
- C) three.
- D) four.
- E) five.

Answer: E

Objective: 3.8

Global Outcomes: GO4



64) The number of dots in the electron dot structure of carbon is

- A) one.
- B) two.
- C) three.
- D) four.
- E) five.

Answer: D

Objective: 3.8

Global Outcomes: GO4

65) Which of the following is the correct electron-dot structure for carbon?

- A)  $\cdot\ddot{\text{C}}$
- B)  $\cdot\dot{\text{C}}:$
- C)  $\cdot\dot{\text{C}}\cdot$
- D)  $:\ddot{\text{C}}:$
- E)  $\cdot\ddot{\text{C}}\cdot$

Answer: C

Objective: 3.8

Global Outcomes: GO2

66) The atomic size of atoms

- A) increases going across a period.
- B) decreases going across a period.
- C) decreases going down within a group.
- D) does not change going across a period.
- E) None of the above.

Answer: B

Objective: 3.8

Global Outcomes: GO7

67) The ionization energy of atoms

- A) decreases going across a period.
- B) decreases going down within a group.
- C) increases going down within a group.
- D) does not change going down within a group.
- E) None of the above.

Answer: B

Objective: 3.8

Global Outcomes: GO7

68) Of the elements: B, C, F, Li, and Na., the element with the largest atomic radius is

- A) B.
- B) C.
- C) F.
- D) Li.
- E) Na.

Answer: E

Objective: 3.8

Global Outcomes: GO2

69) Of the elements: B, C, F, Li, and Na, the element with the smallest atomic radius is

- A) B.
- B) C.
- C) F.
- D) Li.
- E) Na.

Answer: C

Objective: 3.8

Global Outcomes: GO2

70) Of the elements: B, C, F, Li, and Na. The element with the highest ionization energy is

- A) B.
- B) C.
- C) F.
- D) Li.
- E) Na.

Answer: C

Objective: 3.8

Global Outcomes: GO2

71) Ionization energy is

- A) the energy an ion acquires from an electron.
- B) the energy needed to remove the least tightly bound electron.
- C) highest for metals in Group 1A (1).
- D) higher for potassium than for lithium.
- E) None of the above.

Answer: B

Objective: 3.8

Global Outcomes: GO2

72) Of the elements: B, C, F, Li, and Na. The element with the smallest ionization energy is

- A) B.
- B) C.
- C) F.
- D) Li.
- E) Na.

Answer: E

Objective: 3.8

Global Outcomes: GO7

73) Of the elements: B, C, F, Li, and Na. The element with the most metallic character is

- A) B.
- B) C.
- C) F.
- D) Li.
- E) Na.

Answer: E

Objective: 3.8

Global Outcomes: GO7

74) Of the elements: B, C, F, Li, and Na. The element with the least metallic character is

- A) B.
- B) C.
- C) F.
- D) Li.
- E) Na.

Answer: C

Objective: 3.8

Global Outcomes: GO6

### 3.2 Short Answer Questions

*Write in the electronic configuration for the atom shown.*

1) Sodium

Answer:  $1s^2 2s^2 2p^6 3s^1$

Objective: 3.7

Global Outcomes: GO7

2) Chlorine

Answer:  $1s^2 2s^2 2p^6 3s^2 3p^5$

Objective: 3.7

Global Outcomes: GO7

3) Argon

Answer:  $1s^2 2s^2 2p^6 3s^2 3p^6$

Objective: 3.7

Global Outcomes: GO7

4) Sulfur

Answer:  $1s^2 2s^2 2p^6 3s^2 3p^4$

Objective: 3.7

Global Outcomes: GO7

5) Magnesium

Answer:  $1s^2 2s^2 2p^6 3s^2$

Objective: 3.7

Global Outcomes: GO7

6) Phosphorus

Answer:  $1s^2 2s^2 2p^6 3s^2 3p^3$

Objective: 3.7

Global Outcomes: GO7

### 3.3 True/False Questions

1) The symbol for potassium is P.

Answer: FALSE

Objective: 3.1

Global Outcomes: GO2

2) The symbol for gold is Au.

Answer: TRUE

Objective: 3.1

Global Outcomes: GO2

3) Sulfur is a nonmetal.

Answer: TRUE

Objective: 3.2

Global Outcomes: GO2

4) Chromium is a metal.

Answer: TRUE

Objective: 3.2

Global Outcomes: GO2

5) Radon is a metal.

Answer: FALSE

Objective: 3.2

Global Outcomes: GO2

6) Mercury is a metal.

Answer: TRUE

Objective: 3.2

Global Outcomes: GO3

7) Iodine is a metal.

Answer: FALSE

Objective: 3.2

Global Outcomes: GO2

8) An electron has a positive charge.

Answer: FALSE

Objective: 3.3

Global Outcomes: GO2

9) Protons and neutrons are located in the nucleus of an atom.

Answer: TRUE

Objective: 3.3

Global Outcomes: GO2

10) Sulfur has 16 valence electrons.

Answer: FALSE

Objective: 3.4

Global Outcomes: GO2

11) Isotopes have the same atomic number but different mass numbers.

Answer: TRUE

Objective: 3.5

Global Outcomes: GO2

12) Potassium has one valence electron.

Answer: TRUE

Objective: 3.6

Global Outcomes: GO2

13) The electron configuration of potassium is  $1s^2 2s^2 2p^6 3s^1$ .

Answer: FALSE

Objective: 3.7

Global Outcomes: GO2

14) A lithium atom is larger than a potassium atom.

Answer: FALSE

Objective: 3.8

Global Outcomes: GO2

15) A sodium atom is larger than a silicon atom.

Answer: TRUE

Objective: 3.8

Global Outcomes: GO2

16) Chlorine has a higher ionization energy than aluminum.

Answer: TRUE

Objective: 3.8

Global Outcomes: GO2

17) Chlorine has a higher ionization energy than fluorine.

Answer: FALSE

Objective: 3.8

Global Outcomes: GO2

18) Ionization energy increases going down a group.

Answer: FALSE

Objective: 3.8

Global Outcomes: GO2

19) Atomic size decreases going from left to right within a period.

Answer: TRUE

Objective: 3.8

Global Outcomes: GO2

20) Chlorine has more metallic character than fluorine.

Answer: TRUE

Objective: 3.8

Global Outcomes: GO2

### 3.4 Matching Questions

*Do the following represent elements in a group, a period, or neither?*

A) period

B) neither

C) group

1) Li, C, F

Objective: 3.2

Global Outcomes: GO2

2) F, S, P

Objective: 3.2

3) O, S, Se

Objective: 3.2

Global Outcomes: GO2

4) He, H, I

Objective: 3.2

Global Outcomes: GO2

Answers: 1) A 2) B 3) C 4) B

*Match the correct symbols with the names of elements.*

- A) C
- B) Co
- C) Cu
- D) Cl
- E) Ca

5) calcium  
Objective: 3.1  
Global Outcomes: GO2

6) copper  
Objective: 3.1  
Global Outcomes: GO2

7) carbon  
Objective: 3.1  
Global Outcomes: GO2

8) chlorine  
Objective: 3.1  
Global Outcomes: GO2

9) cobalt  
Objective: 3.1  
Global Outcomes: GO2

Answers: 5) E 6) C 7) A 8) D 9) B



*Give the correct number of electrons.*

- A) one
- B) seven
- C) two
- D) eight
- E) five

10) in the second energy level of magnesium

Objective: 3.6

Global Outcomes: GO2

11) in the highest occupied energy level of chlorine

Objective: 3.6

Global Outcomes: GO2

12) in the outer energy level of nitrogen

Objective: 3.6

Global Outcomes: GO2

13) in the first energy level of chlorine

Objective: 3.6

Global Outcomes: GO2

14) in the third energy level of sodium

Objective: 3.6

Global Outcomes: GO2

Answers: 10) D 11) B 12) E 13) C 14) A

*Classify the following elements.*

- A) noble gas
- B) alkali metal
- C) nonmetal
- D) alkaline earth metal
- E) transition element
- F) halogen

15) sodium  
Objective: 3.2  
Global Outcomes: GO2

16) argon  
Objective: 3.2  
Global Outcomes: GO2

17) bromine  
Objective: 3.2  
Global Outcomes: GO2

18) copper  
Objective: 3.2  
Global Outcomes: GO2

19) magnesium  
Objective: 3.2  
Global Outcomes: GO2

20) phosphorus  
Objective: 3.2  
Global Outcomes: GO2

Answers: 15) B 16) A 17) F 18) E 19) D 20) C

*Classify the following elements as metals, nonmetals or metalloids.*

- A) nonmetal
- B) metal
- C) metalloid

21) chlorine  
Objective: 3.2  
Global Outcomes: GO2

22) cobalt  
Objective: 3.2  
Global Outcomes: GO2

23) sulfur  
Objective: 3.2  
Global Outcomes: GO2

24) silicon  
Objective: 3.2  
Global Outcomes: GO2

25) nickel  
Objective: 3.2  
Global Outcomes: GO2

Answers: 21) A 22) B 23) A 24) C 25) B