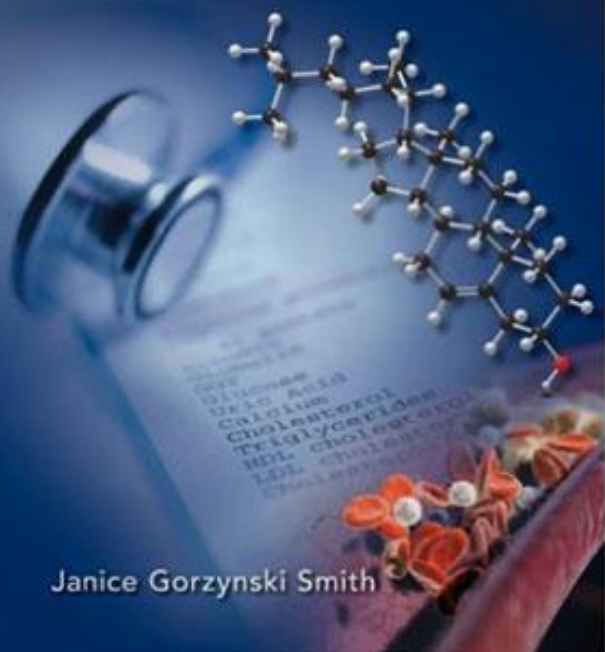


TEST BANK

General, Organic, & Biological

CHEMISTRY



Janice Gorzynski Smith

Chapter 2 - Atoms and the Periodic Table

1. Which element is a nonmetal?

A) K B) Co C) Br D) Al

Ans: C Difficulty: Easy

2. Which element is a metal?

A) Li

B) Si

C) Cl

D) Ar

E) More than one of the elements above are metals.

Ans: A Difficulty: Easy

3. Which element is a metalloid?

A) B B) C C) Ar D) Al

Ans: A Difficulty: Difficult

4. What is the mass number of the isotope with the symbol ${}_{17}^{37}\text{Cl}$?

A) 17 B) 18 C) 35.45 D) 37

Ans: D Difficulty: Medium

5. What is the atomic number of the isotope with the symbol ${}_{17}^{37}\text{Cl}$?

A) 17 B) 18 C) 35.45 D) 37

Ans: A Difficulty: Medium

6. How many protons are in the isotope with the symbol ${}_{17}^{37}\text{Cl}$?

A) 17 B) 18 C) 35.45 D) 37

Ans: A Difficulty: Easy

7. Silicon has three naturally occurring isotopes: Si-28, Si-29 and Si-30. If the average atomic mass of silicon is 28.09, which isotope has the highest isotopic abundance?

A) Si-28

B) Si-29

C) Si-30

D) All isotopes have the same isotopic abundance.

Ans: A Difficulty: Difficult

8. The chemical formula $\text{C}_3\text{H}_6\text{O}_2$ indicates that there are _____ carbon atoms in each $\text{C}_3\text{H}_6\text{O}_2$ molecule.

A) 1 B) 2 C) 3 D) 6 E) 11

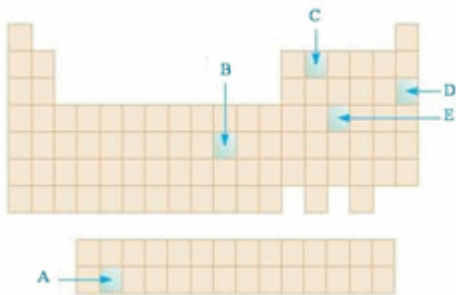
Ans: C Difficulty: Easy

9. Which element is a transition metal in period 4?
A) K B) Db C) Ga D) Sc
Ans: D Difficulty: Easy
10. Which element is a noble gas?
A) H
B) Ne
C) Pr
D) Ra
E) More than one of the elements listed is a noble gas.
Ans: B Difficulty: Easy
11. Which element is not an alkali metal?
A) Li B) K C) Rb D) H E) All of the above elements are alkali metals.
Ans: D Difficulty: Difficult
12. Which element is not an alkali metal?
A) Li B) Kr C) Rb D) Na E) All of the above elements are alkali metals.
Ans: B Difficulty: Medium
13. The chemistry of an element is determined by the number of _____ in an atom.
A) protons B) electrons C) neutrons
Ans: B Difficulty: Easy
14. The element symbol for manganese is
A) M. B) Ma. C) Mg. D) Mn.
Ans: D Difficulty: Medium
15. The element symbol for sulfur is
A) S. B) Su. C) Sf. D) Sl.
Ans: A Difficulty: Easy
16. Which statement is not part of the modern description of the electronic structure of an atom?
A) Electrons occupy discrete energy levels.
B) Electrons move freely in space.
C) The energy of electrons is quantized.
D) The energy of electrons is restricted to specific values.
Ans: B Difficulty: Difficult
17. What is the maximum number of electrons that can occupy the $n=3$ shell?
A) 1 B) 3 C) 6 D) 8 E) 9 F) 18
Ans: F Difficulty: Difficult

18. What is the proper order to fill orbitals?
 A) $1s, 2s, 2s, 2p, 3s, 3p, 4s, 3d, 4p$ C) $1s, 2s, 2p, 3s, 3p, 4s, 3d, 4p$
 B) $1s, 2s, 3s, 4s, 2p, 3p, 4p, 3d,$ D) $1s, 2s, 2p, 3s, 3d, 3p, 4s, 4p$
 Ans: C Difficulty: Difficult
19. Which atom is the largest?
 A) K B) Ga C) Br D) Rb
 Ans: D Difficulty: Medium
20. Which atom is the smallest?
 A) K B) Ga C) Br D) Rb
 Ans: C Difficulty: Medium
21. Which element has the smallest ionization energy?
 A) K B) Ga C) Br D) Rb
 Ans: A Difficulty: Medium
22. How many protons are in the isotope $^{238}_{92}\text{U}$?
 A) 238 B) 146 C) 92 D) 330
 Ans: C Difficulty: Medium
23. How many neutrons are in the isotope $^{238}_{92}\text{U}$?
 A) 238 B) 146 C) 92 D) 330
 Ans: B Difficulty: Medium
24. How many electrons are in the isotope $^{238}_{92}\text{U}$?
 A) 238 B) 146 C) 92 D) 330
 Ans: C Difficulty: Medium
25. Which isotope is not possible?
 A) ^1_1H
 B) ^4_9Be
 C) $^{241}_{95}\text{Am}$
 D) ^2_1H
 E) More than one of the above isotopes is not possible.
 Ans: B Difficulty: Difficult
26. An atom of the isotope chlorine-37 consists of how many protons, neutrons, and electrons? (p = proton, n = neutron, e = electron)
 A) 18 p, 37 n, 18 e D) 37 p, 37 n, 17 e
 B) 17 p, 20 n, 17 e E) 37 p, 20 n, 37 e
 C) 17 p, 20 n, 18 e
 Ans: B Difficulty: Medium

27. The elements in a column of the periodic table are known as
A) metals. B) a period. C) a group. D) a series. E) metalloids.
Ans: C Difficulty: Easy
28. Which element is most likely to be a good conductor of electricity?
A) Ar B) N C) F D) Ni E) O
Ans: D Difficulty: Medium
29. Which element is chemically similar to lithium?
A) sulfur B) magnesium C) iron D) lanthanum E) potassium
Ans: E Difficulty: Medium
30. Which element is chemically similar to chlorine?
A) sulfur B) calcium C) oxygen D) bromine E) argon
Ans: D Difficulty: Easy
31. Which element is an *s* block element?
A) S B) Ar C) He D) La E) None of these elements are *s* block elements.
Ans: C Difficulty: Difficult
32. Which element is a *d* block element?
A) S B) Ar C) Ag D) As E) None of these elements are *d* block elements.
Ans: C Difficulty: Medium
33. The electron-dot symbol for aluminum is _____.
A) $\cdot\overset{\cdot}{\text{Al}}\cdot$ B) $\cdot\text{Al}$ C) $\cdot\overset{\cdot\cdot}{\text{Al}}$ D) $\text{Al}\cdot$
Ans: A Difficulty: Easy
34. Carbon has _____ unpaired electrons.
A) 0 B) 1 C) 2 D) 3 E) 4
Ans: C Difficulty: Difficult
35. What is the symbol for the isotope with $A = 31$ and $Z = 15$?
A) ${}_{31}^{15}\text{P}$ B) ${}_{15}^{46}\text{P}$ C) ${}_{15}^{31}\text{Ga}$ D) ${}_{15}^{31}\text{P}$
Ans: D Difficulty: Medium

36. In the diagram below, which highlighted element is an *f* block element?



A) A B) B C) C D) D E) E

Ans: A Difficulty: Easy

37. An alloy is a mixture of two or more elements that has metallic properties.

Ans: True Difficulty: Easy

38. The correct element symbol for sodium is So.

Ans: False Difficulty: Easy

39. The correct element symbol for iron is Fe.

Ans: True Difficulty: Easy

40. Helium is an *s* block element.

Ans: True Difficulty: Difficult

41. Nonmetals have a shiny appearance, and they are generally poor conductors of heat and electricity.

Ans: False Difficulty: Easy

42. Calcium, aluminum, lead, and nitrogen are all metals.

Ans: False Difficulty: Easy

43. Every element has at least two naturally occurring isotopes.

Ans: False Difficulty: Medium

44. Oxygen, carbon, hydrogen, and calcium are called the building-block elements.

Ans: False Difficulty: Difficult

45. A compound is a pure substance formed by chemically combining two or more atoms together.

Ans: False Difficulty: Medium

46. The farther a shell is from the nucleus, the larger its volume becomes, and the more electrons it can hold.

Ans: True Difficulty: Easy

47. The mass of a neutron is equal to the mass of a proton plus the mass of an electron.
Ans: False Difficulty: Easy
48. All the mass of an atom is concentrated in the nucleus.
Ans: True Difficulty: Easy
49. The 5s orbital is lower in energy than the 4d orbital.
Ans: True Difficulty: Medium
50. The electron-dot symbol for barium is $\text{Ba} \cdot$.
Ans: False Difficulty: Easy
51. All of the elements in group 2A are metals.
Ans: True Difficulty: Easy
52. All of the elements in group 6A are nonmetals.
Ans: False Difficulty: Medium
53. All metals are solids at room temperature.
Ans: False Difficulty: Medium
54. The maximum number of electrons that be contained in the 3d subshell is ten (10).
Ans: True Difficulty: Medium
55. Chlorine has 17 valence electrons.
Ans: False Difficulty: Medium
56. A potassium atom is smaller than a bromine atom.
Ans: False Difficulty: Medium
57. Iodine has a smaller ionization energy than chlorine.
Ans: True Difficulty: Easy
58. The electron configuration for copper is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$.
Ans: False Difficulty: Difficult
59. When orbitals are equal in energy, one electron is added to each orbital until the orbitals are half-filled, before any orbital is completely filled.
Ans: True Difficulty: Medium
60. When two electrons are in the same orbital they must have paired spins—that is, the spins are opposite in direction.
Ans: True Difficulty: Medium

61. Group 6A elements have the general electron configuration of ns^2np^6 .
Ans: False Difficulty: Medium
62. The electron cloud contains most of the volume of an atom.
Ans: True Difficulty: Easy
63. Bromine is abbreviated by the two-letter symbol BR.
Ans: False Difficulty: Easy
64. A period in the periodic table is the same as a group.
Ans: False Difficulty: Easy
65. An atom with $A = 23$ and $Z = 11$ is an isotope of an atom with $A = 22$ and $Z = 11$.
Ans: True Difficulty: Easy
66. The atomic weight is the average of the masses of the naturally occurring isotopes of a particular element.
Ans: False Difficulty: Difficult
67. Strontium and barium have similar chemical properties.
Ans: True Difficulty: Easy
68. The number of electrons that an orbital can contain depends on the type of orbital.
Ans: False Difficulty: Medium
69. A cation is positively charged, and has more electrons than the neutral atom.
Ans: False Difficulty: Medium
70. Fluorine has a higher ionization energy than neon.
Ans: False Difficulty: Medium
71. An iodine atom is larger than both a krypton atom and a tellurium atom.
Ans: False Difficulty: Difficult
72. Radium is a noble gas.
Ans: False Difficulty: Difficult
73. The ground state electron configuration for _____ is $1s^22s^22p^63s^23p^64s^2$.
Ans: calcium
Difficulty: Medium
74. The electron configuration of aluminum using the noble gas notation is _____.
Ans: $[\text{Ne}]3s^23p^1$
Difficulty: Medium

75. The electrons in the outermost shell are called the _____ electrons.

Ans: valence

Difficulty: Medium

76. _____ is an alkali metal in period 5.

Ans: Rb or rubidium

Difficulty: Easy

77. The isotope ${}^{49}_{22}\text{Ti}$ has $A =$ _____ and $Z =$ _____.

Ans: 49, 22

Difficulty: Medium

78. Two isotopes of the same element have the same _____.

Ans: number of protons

Difficulty: Easy

79. Elements in the same group have the same number of _____.

Ans: valence electrons

Difficulty: Easy

80. Iron-56 contains _____ neutrons.

Ans: 30

Difficulty: Medium