

Review: PERIODIC TABLE

Name: _____

- C 1) Which element is in Group 2 and Period 7 of the Periodic Table?
A) manganese B) magnesium C) radium D) radon
- D 2) An atom of an element has 28 innermost electrons and 7 outermost electrons. In what period of the Periodic Table is this element located?
A) 5 B) 2 C) 3 D) 4
- D 3) Which two elements have the most similar chemical properties? *same group.*
A) K and S B) K and Ca C) K and Cl D) K and Na
- B 4) As the elements in the ground state in Period 3 are considered in order of increasing atomic number, the number of electrons in the 2p sublevel
A) increases B) remains the same C) decreases
- C 5) Which compound contains an alkali metal and a halogen? *Group 1 + Group 17*
A) CaS B) CaCl₂ C) RbCl D) Rb₂S
- A 6) Which represents the correct electron configuration of the outermost principal energy level of a Group 14 element in the ground state?
A) s^2p^2 B) s^2p^8 C) s^2p^6 D) s^2p^4
- D 7) In the Periodic Table of the Elements, all the elements within Group 16 have the same number of
A) neutrons B) protons C) energy levels D) valence electrons
- C 8) In the ground state, atoms of the elements in Group 15 of the Periodic Table all have the same number of
A) filled principal energy levels B) neutrons in the nucleus C) electrons in the valence shell D) occupied principal energy levels
- B 9) Which electron configuration represents the first two elements in Group 17 of the Periodic Table? *F and Cl*
A) $1s^22s^1$ and $1s^22s^2$ B) $1s^22s^22p^5$ and $[\text{Ne}]3s^23p^5$ C) $1s^22s^2$ and $1s^22s^22p^1$ D) $1s^22s^22p^6$ and $[\text{Ne}]3s^23p^5$
- B 10) Which three elements have the most similar chemical properties? *same group.*
A) O, N, Si B) K, Rb, Cs C) Ar, Kr, Br D) B, C, N
- D 11) The pair of elements with the most similar chemical properties are *same group.*
A) Ca and Br B) Mg and S C) S and Ar D) Mg and Ca
- A 12) The atoms of the elements in the ground state in Period 2 of the Periodic Table are similar in that the atoms all have
A) 2 principal energy levels containing electrons B) 2 valence electrons C) a 2p sublevel containing 2 electrons D) a 2s sublevel containing 2 electrons
- D 13) The elements of Period 2 have the same *(2 PEELS)*
A) atomic mass B) number of occupied sublevels C) atomic number D) number of occupied principal energy levels
- C 14) Alkali metals, alkaline earth metals, and halogens are found respectively in Groups
A) 1, 2, and 18 B) 1, 2, and 14 C) 1, 2, and 17 D) 2, 13, and 17
- B 15) The properties of carbon are expected to be most similar to those of *same group (Group 14)*
A) aluminum B) silicon C) phosphorus D) boron
- A 16) Which group contains elements with a total of four electrons in the outermost principal energy level? *Group 14*
A) 14 B) 16 C) 18 D) 1
- B 17) What is the electron configuration of an atom of a Period 3 element? *3 PEELS filled*
A) 2-1 B) 2-8-1 C) 2-3 D) 2-8-9-2
- D 18) In the modern Periodic Table, the elements are arranged according to
A) atomic mass B) oxidation number C) mass number D) atomic number

19. Which sequence of atomic numbers represents elements which have similar chemical properties?
 A) 4, 20, 38, 88 B) 19, 23, 30, 36 C) 9, 16, 33, 50 D) 3, 12, 21, 40
20. On the Periodic Table, an element classified as a semimetal (metalloid) can be found in B, Si, As, Te, Ge, Sb
 A) Period 2, Group 14 B) Period 6, Group 15 C) Period 4, Group 15 D) Period 3, Group 16
21. As the atoms of the metals of Group 1 in the ground state are considered in order from top to bottom, the number of occupied principal energy levels
 A) decreases B) remains the same C) increases
22. Atoms of elements in a group on the Periodic Table have similar chemical properties. This similarity is *most* closely related to the atoms!
 A) number of valence electrons C) atomic masses
 B) number of principal energy levels D) atomic numbers
23. As atoms of elements in Group 16 are considered in order from top to bottom, the electronegativity of each successive element
 A) decreases B) remains the same C) increases
(more shielding)
24. How many halogens are in Period 3 of the Periodic Table? chlorine
 A) 1 B) 2 C) 3 D) 4
25. In which category of elements in the Periodic Table do *all* of the atoms have valence electrons in the second principal energy level?
 A) Group 2 C) the alkali metals family
 B) the alkaline earth family D) Period 2
26. Who was credited with creating the first Periodic Table that organized the elements according to atomic mass?
 A) Ernest Rutherford B) John Dalton C) Henry Moseley D) Dmitri Mendeleev
- ATOMIC RADIUS.
27. As the elements in Group 2 are considered in order of increasing atomic number, the atomic radius of each successive element increases. This increase is primarily due to an increase in the number of
 A) occupied principal energy levels C) neutrons in the nucleus
 B) electrons in the outermost shell D) unpaired electrons
28. Which element has the *largest* atomic radius?
 A) calcium B) strontium C) magnesium D) beryllium
29. Which electron configuration represents the element with the *smallest* atomic radius?
 A) 2-5 B) 2-6 C) 2-4 D) 2-7
30. As the atoms of the elements from atomic number 3 to atomic number 9 are considered in sequence from left to right on the Periodic Table, the atomic radius of each successive atom is
 A) smaller, and the nuclear charge is less C) larger, and the nuclear charge is greater
 B) larger, and the nuclear charge is less D) smaller, and the nuclear charge is greater
31. Which element has properties of electrical conductivity and luster and exists as a liquid at STP? metal
 A) Hg B) Br C) C D) I
32. As the elements are considered from top to the bottom of Group 15, which sequence in properties occurs?
 A) metalloid → metal → nonmetal C) metal → metalloid → nonmetal
 B) metal → nonmetal → metalloid D) nonmetal → metalloid → metal
33. Which properties are characteristic of nonmetals?
 A) high thermal conductivity and high electrical conductivity
 B) low thermal conductivity and high electrical conductivity
 C) low thermal conductivity and low electrical conductivity
 D) high thermal conductivity and low electrical conductivity
34. Proceeding from left to right in Period 2 of the Periodic Table, the atomic radius of the elements generally
 A) increases B) decreases C) remains the same
35. Compared to the atomic radius of a sodium atom, the atomic radius of a magnesium atom is smaller. The smaller radius is primarily a result of the magnesium atom having
 A) more principal energy levels

IONIC RADIUS

- C 36. As the elements in Group 1 are considered in order of increasing atomic number, the atomic radius of each successive element increases. This is primarily due to an increase in the number of
 A) unpaired electrons
 B) neutrons in the nucleus
 C) principal energy levels
 D) electrons in the outermost shell.
- C 37. The alkaline earth element having the largest atomic radius is found in Period increases going down
 A) 1
 B) 2
 C) 7
 D) 6
- A 38. When an atom of chlorine forms an ionic bond with an atom of sodium, the atom of chlorine
 A) becomes an ion with a larger radius than the atom of chlorine
 B) loses a proton
 C) becomes an ion with a smaller radius than the atom of chlorine
 D) loses an electron
↳ becomes -1 charged (gains an e⁻)
- A 39. How does the size of an aluminum atom change when it becomes an ion with a charge of +3?
 A) It becomes smaller by losing 3 electrons.
 B) It becomes larger by losing 3 electrons.
 C) It becomes larger by gaining 3 electrons.
 D) It becomes smaller by gaining 3 electrons.
↳ loses 3 e⁻ to become stable
- B 40. Which atom will lose an electron most readily? *most reactive (furthest down)*
 A) calcium
 B) rubidium
 C) strontium
 D) potassium
- C 41. Which element will form an ion whose ionic radius is larger than its atomic radius? *(needs a negative charge)*
 A) Mg +2
 B) Li +1
 C) F -1
 D) K +1
- A 42. Which element in Period 2 has the greatest tendency to form a negative ion? *(most reactive nm)*
 A) fluorine
 B) neon
 C) lithium
 D) carbon
- B 43. When a metal reacts with a nonmetal, the metal will
 A) gain protons and form a negative ion
 B) lose electrons and form a positive ion
 C) gain electrons and form a negative ion
 D) lose protons and form a positive ion
- C 44. Which element has an atomic radius that is greater than its ionic radius? *↳ loses e⁻*
 A) S -2
 B) F -1
 C) K +1
 D) O -2
- B 45. The atom of which element has an ionic radius smaller than its atomic radius? *↳ loses e⁻*
 A) Br -1
 B) Rb +1
 C) S -2
 D) N -3
- C 46. Which element's atoms have a larger atomic radius than atoms of silicon? *2-8-4*
 A) carbon 2-4
 B) sulfur 2-8-6
 C) sodium 2-8-1
 D) chlorine 2-8-7
- D 47. Which atom has the largest atomic radius? *furthest left and furthest down*
 A) Ca
 B) Mg
 C) Na
 D) K
- C 48. Which ion has the smallest radius?
 A) Na⁺ 2-8 (+1)
 B) K⁺ 2-8-8
 C) Mg²⁺ 2-8 (+2)
 D) Ca²⁺ 2-8-8
- B 49. Which element's ionic radius is smaller than its atomic radius? *↳ loses e⁻*
 A) sulfur -2
 B) sodium +1
 C) nitrogen -3
 D) neon 0
↳ pulls e⁻ closer
- C 50. Which ion has the largest radius?
 A) Cl⁻ 2-8-8
 B) Br 2-8-18-8
 C) I 2-8-18-18-8
 D) F 2-8
- A 51. As a sulfur atom gains electrons, its radius
 A) increases
 B) decreases
 C) remains the same
- A 52. The S²⁻ ion differs from the S⁰ atom in that the S²⁻ ion has a *gains 2 e⁻*
 A) larger radius and more electrons
 B) smaller radius and fewer electrons
 C) larger radius and fewer electrons
 D) smaller radius and more electrons
- D 53. From what sublevel or sublevels can an atom of Fe lose electrons when forming the Fe³⁺ ion? *4s²3d⁶*
 A) the 3p, only
 B) the 4d, only
 C) both the 3s and 4d
 D) both the 3d and 4s

Ionization Energy

- B 54. How much energy is required to remove 1 mole of the *most* loosely bound electrons from 1 mole of Mg(g)?
 A) 717 kJ B) 736 kJ C) 496 kJ D) 578 kJ
- A 55. Which element has the *highest* first ionization energy?
 A) phosphorus B) sodium C) aluminum D) calcium
- D 56. The amount of energy required to remove the *most* loosely bound electron from an atom in the gaseous phase is called
 A) electron affinity B) kinetic energy C) potential energy D) ionization energy
- B 57. What type of energy is represented in the equation $\text{Na} + \text{energy} \rightarrow \text{Na}^+ + \text{e}^-$?
 A) nuclear energy C) neutralization energy
 B) ionization energy D) formation energy
- D 58. The element in Period 3 that has the *highest* first ionization energy is
 A) an alkali metal C) a halogen
 B) an alkaline earth metal D) a noble gas
- B 59. As the elements in Group 18 are considered in order of increasing atomic number, the ionization energy of each successive element
 A) increases B) decreases C) remains the same
- C 60. Which element has the *highest* first ionization energy?
 A) Na B) Rb C) Li D) K
- D 61. A reason why fluorine has a *higher* ionization energy than oxygen is that fluorine has a
 A) larger number of neutrons C) smaller nuclear charge
 B) smaller number of neutrons D) larger nuclear charge
- A 62. Which electron-dot symbol represents the atom in Period 4 with the *highest* first ionization energy?
 A) $\cdot\ddot{\text{X}}\cdot$ B) $\ddot{\text{X}}$ C) $\ddot{\text{X}}\cdot$ D) $\cdot\ddot{\text{X}}\cdot$
- B 63. Which element in Period 3 has the *least* tendency to lose an electron?
 A) sodium B) argon C) aluminum D) phosphorus
- D 64. Which atom will lose an electron *most* readily?
 A) calcium B) potassium C) strontium D) cesium
- D 65. Which is the *most* active nonmetal in the Periodic Table of Elements?
 A) I B) Na C) Cl D) F
- B 66. The elements that have the *most* pronounced nonmetallic properties are located toward which corner of the Periodic Table?
 A) lower right B) upper right C) upper left D) lower left
- A 67. Electronegativity
 Compared to atoms of metals, atoms of nonmetals generally have
 A) higher electronegativities and higher ionization energies
 B) lower electronegativities and higher ionization energies
 C) higher electronegativities and lower ionization energies
 D) lower electronegativities and lower ionization energies
- C 68. A nonmetal could have an electronegativity of
 A) 1.6 B) 2.0 C) 2.6 D) 1.0
- A 69. An atom of which element has the *greatest* ability to attract electrons?
 A) oxygen B) bromine C) sulfur D) silicon
- D 70. Which element in Period 3 has the *greatest* tendency to gain electrons?
 A) Si B) Ar C) Na D) Cl
- B 71. As the elements in Period 3 of the Periodic Table are considered from left to right, the degree of nonmetallic character of each successive element tends to
 A) decrease B) increase C) remain the same

72. Which element in Period 3 has the *greatest* metallic character?

- A) Mg B) Si C) Ar D) S

73. Compared to a neon atom, a helium atom has a

- A) larger atomic number
B) smaller first ionization energy
C) greater number of electrons
D) smaller radius

74. Which electron configuration represents the atom with the *largest* atomic radius?

- A) 1 B) 2-2 C) 2-1 D) 2-3

75. The table below shows some properties of elements A, B, C, and D.

Element	Ionization Energy	Electronegativity	Conductivity of Heat and Electricity
A	low	low	low
B	low	low	high
C	high	high	low
D	high	high	high

Which element is *most* likely a nonmetal?

- A) A B) B C) C D) D

76. Which element in Period 2 has the *greatest* tendency to gain electrons?

- A) Ne B) F C) Li D) C

77. As the elements Li to F in Period 2 of the Periodic Table are considered in succession, how do the relative electronegativity and the atomic radius of each successive element compare?

- A) The relative electronegativity decreases and the atomic radius increases.
B) The relative electronegativity increases and the atomic radius increases.
C) The relative electronegativity increases and the atomic radius decreases.
D) The relative electronegativity decreases and the atomic radius decreases.

78. Which element in Period 2 of the Periodic Table is the *most* reactive nonmetal?

- A) fluorine B) nitrogen C) carbon D) oxygen

79. As the elements of Group 17 are considered in order of increasing atomic number, the nonmetallic character of each successive element

- A) increases B) decreases C) remains the same

80. Which element is considered malleable?

- A) hydrogen B) radon C) gold D) sulfur

81. As the Group 1 elements of the Periodic Table are considered from top to bottom, the first ionization energy of each successive element decreases. One reason for this is that the:

- A) distance between the valence electron and the nucleus is increasing
B) nuclear charge is decreasing
C) number of neutrons is increasing
D) number of principal energy levels is decreasing

82. Which element in Group 17 is the *most* active nonmetal?

- A) I B) Cl C) Br D) F

83. Elements that readily gain electrons tend to have

- A) high ionization energy and high electronegativity
B) low ionization energy and low electronegativity
C) low ionization energy and high electronegativity
D) high ionization energy and low electronegativity

84. When a metal atom combines with a nonmetal atom, the nonmetal atom will

- A) gain electrons and decrease in size
B) lose electrons and decrease in size
C) lose electrons and increase in size
D) gain electrons and increase in size

85. Which group contains elements composed of diatomic molecules at STP? **HOFBrINCl**
 A) 11 B) 2 C) 17 D) 7
86. To what group in the Periodic Table do the alkaline earth metals belong? **Group 2**
 A) 1 B) 2 C) 11 D) 12
87. Which element in Period 3 exists as diatomic molecules at STP? **HOFBrINCl**
 A) chlorine B) argon C) aluminum D) sodium
88. When fluorine reacts with a Group 1 metal, fluorine becomes an ion with a charge of.
 A) 1^+ B) 2^+ C) 2^- D) 1^-
89. Which electron-dot symbol could represent a noble gas?
 A) $X \cdot$ B) $X \cdot$ C) $\cdot X \cdot$ D) $\cdot X \cdot$
90. Which compound forms a colored aqueous solution? **transition metal**
 A) $CrCl_3$ B) $NaOH$ C) KBr D) $CaCl_2$
91. Which of the following statements *best* describes the alkaline earth elements?
 A) They have two valence electrons, and they form ions with a 2^- charge.
 B) They have two valence electrons, and they form ions with a 2^+ charge.
 C) They have one valence electron, and they form ions with a 1^- charge.
 D) They have one valence electron, and they form ions with a 1^+ charge.
92. What is the electron configuration of a metalloid in the ground state?
 A) 2 B) 2-3 C) 2-1 D) 2-2-1
93. Which element would *most* likely be found uncombined in nature?
 A) Ag B) K C) I D) Mg
94. The element in Period 2 with the *least* metallic character is
 A) carbon B) oxygen C) beryllium D) lithium
95. As the elements in Group 2 are considered from beryllium to radium, the degree of metallic activity
 A) decreases and atomic radius increases C) decreases and atomic radius decreases
 B) increases and atomic radius decreases D) increases and atomic radius increases
96. In which group do the elements usually form chlorides which have the general formula MCl_2 ?
 A) 1 B) 2 C) 17 D) 18
+2 joins w/ 2 chloride ions
97. If M represents an atom of an alkali metal, the correct formula for a compound of this atom with chlorine is
 A) MCl_3 B) MCl C) M_2Cl D) MCl_2
98. Which element in Period 4 forms a 2^+ ion by losing electrons from the two outermost principal energy levels?
 A) K B) Kr C) Cu D) Ca
99. At STP, potassium is classified as
 A) a network solid B) a molecular solid C) an ionic solid D) a metallic solid
100. At STP, which substance is the *best* conductor of electricity? **metal**
 A) hydrogen B) oxygen C) mercury D) helium
101. Which element is brittle in the solid phase and is a poor conductor of heat and electricity?
 A) calcium B) strontium C) sulfur D) copper
102. What element in Period 2 is the *most* active metal?
 A) lithium B) fluorine C) beryllium D) neon
103. Given the reaction:
 $M + 2H_2O \rightarrow M(OH)_2 + H_2$
 The metal represented by M is *most* likely a metal from Group
 A) 1 B) 2 C) 11 D) 13