

- 1 A diatomic element with a high first ionization energy would most likely be a
 A) nonmetal with a high electronegativity
 B) nonmetal with a low electronegativity
 C) metal with a high electronegativity
 D) metal with a low electronegativity
- 2 The metalloids that are included in Group 15 are antimony (Sb) and
 A) N B) P C) As D) Bi
- 3 Which represents the electron configuration of a metalloid in the ground state?
 A) 2-3 B) 2-5 C) 2-8-5 D) 2-8-6
- 4 The elements of the Periodic Table are arranged in horizontal rows according to each successive element's greater
 A) atomic mass B) atomic radius
 C) number of protons D) number of neutrons
- 5 How many Group 17 elements are in Period 3 of the Periodic Table?
 A) 1 B) 2 C) 3 D) 4
- 6 Which sequence of atomic numbers represents elements which have similar chemical properties?
 A) 19, 23, 30, 36 B) 9, 16, 33, 50
 C) 3, 12, 21, 40 D) 4, 20, 38, 88
- 7 Alkali metals, alkaline earth metals, and halogens are elements found respectively in Groups
 A) 1, 2, and 18 B) 2, 13, and 17
 C) 1, 2, and 14 D) 1, 2, and 17
- 8 Which element exists as a diatomic molecule at STP?
 A) bromine B) argon
 C) sulfur D) rubidium
- 9 The element in Period 2 with the largest atomic radius is
 A) a halogen
 B) a noble gas
 C) an alkali metal
 D) an alkaline earth metal
- 10 Which of the following elements in Period 3 has the greatest metallic character?
 A) Ar B) Si C) Mg D) S
- 11 In the formula XF_2 , the element represented by X can be classified as a
 A) Group 1 metal B) Group 2 metal
 C) Group 1 nonmetal D) Group 2 nonmetal
- 12 A solid element that is malleable, a good conductor of electricity, and reacts with oxygen is classified as a
 A) metal B) metalloid
 C) noble gas D) nonmetal
- 13 An atom of lithium-7 has an equal number of
 A) electrons and neutrons
 B) electrons and protons
 C) positrons and neutrons
 D) positrons and protons
- 14 Which element has the highest melting point?
 A) tantalum B) rhenium
 C) osmium D) hafnium
- 15 Atoms of metallic elements tend to
 A) gain electrons and form negative ions
 B) gain electrons and form positive ions
 C) lose electrons and form negative ions
 D) lose electrons and form positive ions
- 16 Which element is considered malleable?
 A) gold B) hydrogen
 C) sulfur D) radon
- 17 Which statement describes a chemical property of iron?
 A) Iron can be flattened into sheets.
 B) Iron conducts electricity and heat.
 C) Iron combines with oxygen to form rust.
 D) Iron can be drawn into a wire.
- 18 Which element is malleable and ductile?
 A) S B) Si C) Ge D) Au
- 19 The *least* active metal of those represented below has an electron configuration abbreviated as
 A) 2-8-2 B) 2-8-8-2
 C) 2-8-18-8-2 D) 2-8-18-18-2
- 20 Which element is a liquid at STP and has low electrical conductivity?
 A) silver B) mercury
 C) barium D) bromine
- 21 Which characteristics describe most nonmetals in the solid phase?
 A) They are malleable and have metallic luster.
 B) They are malleable and lack metallic luster.
 C) They are brittle and have metallic luster.
 D) They are brittle and lack metallic luster.
- 22 Which gaseous element has the greatest density at STP?
 A) N_2 B) O_2 C) Cl_2 D) F_2

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

Element	Ionization Energy	Electronegativity	Conductivity of Heat and Electricity
<i>A</i>	low	low	low
<i>B</i>	low	low	high
<i>C</i>	high	high	low
<i>D</i>	high	high	high

Which element is most likely a nonmetal?

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

24 Which statement explains why neon is a Group 18 element?

- A) Neon is a gas at STP.
 B) Neon has a low melting point.
 C) Neon atoms have a stable valence electron configuration.
 D) Neon atoms have two electrons in the first shell.

25 Which of the following gases is monatomic at STP?

- A) hydrogen B) chlorine
 C) oxygen D) helium

26 Pure silicon is chemically classified as a metalloid because silicon

- A) is malleable and ductile
 B) is an excellent conductor of heat and electricity
 C) exhibits metallic and nonmetallic properties
 D) none of the above

27 Which period contains elements that are all gases at STP?

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

28 An atom in the ground state contains a total of 5 electrons, 5 protons, and 5 neutrons. Which Lewis electron-dot diagram represents this atom?

- A) $\cdot\ddot{X}\cdot$ B) $:\ddot{X}:$ C) $\ddot{X}\cdot$ D) $:\ddot{X}::$

29 Which Lewis electron-dot diagram is correct for a S^{2-} ion?

- A) $[\cdot\ddot{S}\cdot]^{2-}$ B) $[\ddot{S}]^{2-}$
 C) $[\ddot{S}]^{2-}$ D) $[\ddot{S}::]^{2-}$

30 Lithium and potassium have similar chemical properties because the atoms of both elements have the same

- A) mass number
 B) atomic number
 C) number of electron shells
 D) number of valence electrons

31 An atom of an element has 28 innermost electrons and 7 outermost electrons. In which period of the Periodic Table is this element located?

- A) 5 B) 2 C) 3 D) 4

32 Which is a common characteristic of the elements Rb, Te, I, and Xe in the ground state?

- A) They have the same number of valence electrons.
 B) They have similar chemical properties.
 C) They have electrons occupying the same number of principal energy levels.
 D) They have completely filled principal energy levels.

33 Which compound forms a green aqueous solution?

- A) RbCl B) $CaCl_2$ C) $NiCl_2$ D) $ZnCl_2$

34 Which elements contain atoms that form colored ions and have more than one positive oxidation state?

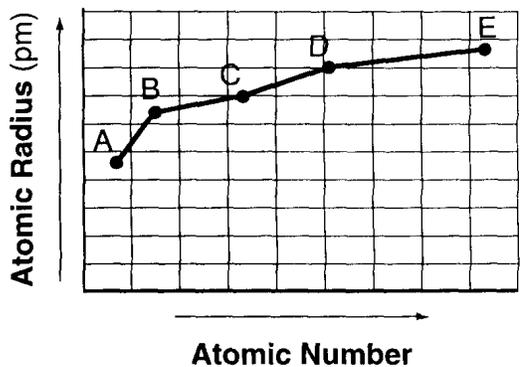
- A) alkali metals
 B) alkaline earth metals
 C) noble gases
 D) transition elements

35 Which particle has the same electron configuration as a potassium ion?

- A) fluoride ion B) sodium ion
 C) neon atom D) argon atom

- 36 Which changes occur as a cadmium atom, Cd, becomes a cadmium ion, Cd²⁺?
- The Cd atom gains two electrons and its radius decreases.
 - The Cd atom gains two electrons and its radius increases.
 - The Cd atom loses two electrons and its radius decreases.
 - The Cd atom loses two electrons and its radius increases.
- 37 When an atom loses an electron, the atom becomes an ion that is
- positively charged and gains a small amount of mass
 - positively charged and loses a small amount of mass
 - negatively charged and gains a small amount of mass
 - negatively charged and loses a small amount of mass
- 38 As the elements in Period 2 of the Periodic Table are considered in succession from left to right, there is a decrease in atomic radius with increasing atomic number. This may best be explained by the fact that the
- number of protons increases, and the number of shells of electrons remains the same
 - number of protons increases, and the number of shells of electrons increases
 - number of protons decreases, and the number of shells of electrons remains the same
 - number of protons decreases, and the number of shells of electrons increases
- 39 As the elements of Group 16 are considered in order from top to bottom, the covalent radius of each successive element increases. This increase is primarily due to an increase in
- atomic number
 - mass number
 - the number of protons occupying the nucleus
 - the number of occupied electron shells
- 40 An atom with the electron configuration 2-8-2 would most likely
- decrease in size as it forms a positive ion
 - increase in size as it forms a positive ion
 - decrease in size as it forms a negative ion
 - increase in size as it forms a negative ion
- 41 Atoms of which of the following elements have the strongest attraction for electrons?
- aluminum
 - chlorine
 - silicon
 - sodium
- 42 Atoms of which element have the *weakest* attraction for electrons?
- Na
 - P
 - Si
 - S
- 43 Which atom in the ground state requires the *least amount of energy to remove its valence electron*?
- lithium atom
 - potassium atom
 - rubidium atom
 - sodium atom
- 44 Which general trend is found in Period 2 on the Periodic Table as the elements are considered in order of increasing atomic number?
- decreasing atomic mass
 - decreasing electronegativity
 - increasing atomic radius
 - increasing first ionization energy
- 45 Which sequence correctly places the elements in order of increasing ionization energy?
- H → Li → Na → K
 - I → Br → Cl → F
 - O → S → Se → Te
 - H → Be → Al → Ga
- 46 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
- nuclear charge is decreasing
 - number of neutrons is increasing
 - number of principal energy levels is decreasing
 - distance between the valence electron and the nucleus is increasing
- 47 Which element has an atom in the ground state with the most loosely bound electron?
- He
 - As
 - Xe
 - Cs
- 48 In which group of the Periodic Table do most of the elements exhibit both positive and negative oxidation states?
- 17
 - 2
 - 12
 - 7

49 The graph below represents the relationship between atomic radii, in picometers, and increasing atomic number for elements in Group 15.



Which element is most metallic

- A) *A* B) *B* C) *D* D) *E*

50 When the elements in Group 1 are considered in order from top to bottom, each successive element at standard pressure has

- A) a higher melting point and a higher boiling point
 B) a higher melting point and a lower boiling point
 C) a lower melting point and a higher boiling point
 D) a lower melting point and a lower boiling point