

Which is the electron configuration of an atom of a Period 3 element?

- (1) $1s^2 2s^1$ (3) $1s^2 2s^2 2p^3$
 (2) $1s^2 2s^2 2p^1$ (4) $1s^2 2s^2 2p^6 3s^1$

In which category of elements in the Periodic Table do all of the atoms have valence electrons in the second principal energy level (second shell)?

- (1) Group 2 (IIA) (3) the alkaline earth family
 (2) Period 2 (4) the alkali metals family

Which elements have the most similar chemical properties?

- (1) K and Na (2) K and Cl (3) K and Ca (4) K and S

Because of its high reactivity, which element is ~~never~~ found free in nature?

- (1) O (2) F (3) N (4) Ne

According to the Periodic Table, which element has more than one positive oxidation state?

- (1) cadmium (2) iron (3) silver (4) zinc

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

- (1) 5 (2) 2 (3) 3 (4) 4

In which set do the elements exhibit the most similar chemical properties?

- (1) H, O and F (3) Li, Na and K
 (2) Hg, Br and Rn (4) Al, S and P

Atoms of elements in a group of the Periodic Table have similar chemical properties. This similarity is most closely related to the atoms'

- (1) number of principal energy levels
 (2) number of valence electrons
 (3) atomic structure
 (4) atomic masses

Which group below contains elements with the greatest variation in chemical properties?

- (1) Li, Be, B (2) Li, Na, K (3) B, Al, Ga (4) Be, Mg, Ca

9. The chemical properties of the elements are periodic functions of their atomic
 (1) masses (2) weight (3) numbers (4) radii

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?

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

A diatomic element with a high first ionization energy would most likely be a

- (1) nonmetal with a high electronegativity
 (2) nonmetal with a low electronegativity
 (3) metal with a high electronegativity
 (4) metal with a low electronegativity

10. An atom of which of the following elements has the smallest covalent radius?

- (1) Li (2) Be (3) C (4) F

11. According to Reference Table P, which of the following elements has the smallest covalent radius?

- (1) nickel (2) cobalt (3) calcium (4) potassium

12. Which electron configuration represents the atom with the largest covalent radius?

- (1) $1s^1$ (2) $1s^2 2s^1$ (3) $1s^2 2s^2$ (4) $1s^2 2s^2 2p^1$

13. Which of the following elements has the largest covalent radius?

- (1) beryllium (2) magnesium (3) calcium (4) strontium

Which element in Period 3 has the largest covalent atomic radius?

- (1) Cl (2) Al (3) Na (4) P

14. Which of the following atoms has the largest atomic radius?

- (1) Na (2) K (3) Mg (4) Ca

15. An atom of which of the following elements has the smallest covalent radius?

- (1) Li (2) Be (3) C (4) F

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

- (1) the relative electronegativity decreases, and the covalent radius decreases
 (2) the relative electronegativity decreases, and the covalent radius increases
 (3) the relative electronegativity increases, and the covalent radius decreases
 (4) the relative electronegativity increases, and the covalent radius increases

15. Which is the electron configuration of an atom of a Period 3 element?
 (1) $1s^2 2s^1$ (2) $1s^2 2s^2 2p^1$ (3) $1s^2 2s^2 2p^3$ (4) $1s^2 2s^2 2p^6 3s^2 3p^1$

16. Which element's ionic radius is smaller than its atomic radius?
 (1) neon (2) nitrogen (3) sodium (4) sulfur

17. An ion of which element is smaller than its atom?
 (1) F (2) O (3) Cl (4) Na

18. An ion of which element is larger than its atom?
 (1) Al (2) Br (3) Ca (4) Sr

19. Which atom has a radius larger than the radius of its ion?
 (1) Cl (2) Ca (3) S (4) Se

20. When a sodium atom becomes an ion, the size of the atom
 (1) decreases by gaining an electron
 (2) decreases by losing an electron
 (3) increases by gaining an electron
 (4) increases by losing an electron

21. When a metal reacts with a nonmetal, the metal will
 (1) lose electrons and form a positive ion
 (2) lose protons and form a positive ion
 (3) gain electrons and form a negative ion
 (4) gain protons and form a negative ion

17. As the elements are considered from top to bottom in Group 15 of the Periodic Table, the ionization energy
 (1) decreases (2) increases (3) remains the same

18. Which group contains an element that has diatomic molecules with triple covalent bonds? (1) 15(VA) (2) 16(VIA)
 (3) 7(VIIB) (4) 18(0)

19. In which group do all the elements have the same number of electrons in the outermost principal energy level? (1) 6(VIB)
 (2) 9(VIII) (3) 18(0) (4) 14(IVA)

20. Which group contains two semi-metals (metalloids)? (1) 2(IIA)
 (2) 12(IIIB) (3) 13(IIIA) (4) 17(VIIA)

21. Which element in Group 16(VIA) has the greatest tendency to gain electrons? (1) Te (2) Se (3) S (4) O

22. Which element forms a -2 ion with the largest radius?
 (1) oxygen (2) sulfur (3) selenium (4) tellurium

23. As the elements of Group 15(VA) are considered in order of increasing atomic radius, their tendency to lose electrons
 (1) decreases (2) increases (3) remains the same

24. An atom in the ground state with eight valence electrons would most likely be classified as (1) an active metal (2) an inactive metal (3) a noble gas (4) a halogen.

25. When atoms of the elements of Group 18(0) are compared in order from top to bottom, the attractions between the atoms of each successive element (1) increase and the boiling point decreases (2) decrease and the boiling point increases (3) increases and the boiling point increases (4) decrease and boiling point decreases.

26. Which element in Group 15(VA) is the most metallic? (1) N (2) P (3) Bi (4) As

1. The chemical properties of the elements are periodic functions of atomic
 (1) masses (2) weights (3) numbers (4) radii

2. According to the Periodic Table, which element has more than one positive oxidation state?
 (1) cadmium (2) iron (3) silver (4) zinc

3. Boron and arsenic are similar in that they both
 (1) have the same ionization energy.
 (2) have the same covalent radius
 (3) are in the same family of elements
 (4) are metalloids (semimetals)

4. An atom of an element has 28 innermost electrons and 7 outermost electrons. In which period of the Periodic Table is this element located?
 (1) 5 (2) 2 (3) 3 (4) 4

5. Which atom has a radius larger than the radius of its ion?
 (1) Cl (2) Ca (3) S (4) Se

6. Which of the following substances is the best conductor of electricity?
 (1) NaCl(s) (2) Cu(s) (3) H₂O(l) (4) Br₂(l)

7. Atoms of nonmetals generally react with atoms of metals by
 (1) gaining electrons to form ionic compounds
 (2) gaining electrons to form covalent compounds
 (3) sharing electrons to form ionic compounds