

- _____ 1. As atomic number increases within Group 15 on the Periodic Table, atomic radius
- A) decreases, only
 - B) increases, only
 - C) decreases, then increases
 - D) increases, then decreases
- _____ 2. Which trends are observed when the elements in Period 3 on the Periodic Table are considered in order of increasing atomic number?
- A) The atomic radius decreases, and the first ionization energy generally increases.
 - B) The atomic radius decreases, and the first ionization energy generally decreases.
 - C) The atomic radius increases, and the first ionization energy generally increases.
 - D) The atomic radius increases, and the first ionization energy generally decreases.
- _____ 3. 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
- A) number of protons increases, and the number of shells of electrons remains the same
 - B) number of protons increases, and the number of shells of electrons increases
 - C) number of protons decreases, and the number of shells of electrons remains the same
 - D) number of protons decreases, and the number of shells of electrons increases
- _____ 4. 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
- A) atomic number
 - B) mass number
 - C) the number of protons occupying the nucleus
 - D) the number of occupied electron shells
- _____ 5. For which element is the ionic radius larger than the atomic radius?
- A) Na B) Mg C) Al D) Cl
- _____ 6. An Mg atom differs from an Mg^{2+} ion in that the atom has a
- A) smaller radius B) larger radius
 - C) smaller nucleus D) larger nucleus
- _____ 7. When an atom of bromine forms a bromide ion, the radius
- A) decreases B) increases
 - C) remains the same
- _____ 8. Which atom has the *weakest* attraction for electrons in a chemical bond?
- A) a boron atom B) a calcium atom
 - C) a fluorine atom D) a nitrogen atom
- _____ 9. Which general trend is found in Period 3 as the elements are considered in order of increasing atomic number?
- A) increasing atomic radius
 - B) increasing electronegativity
 - C) decreasing atomic mass
 - D) decreasing first ionization energy
- _____ 10. Which general trend is demonstrated by the Group 17 elements as they are considered in order from top to bottom on the Periodic Table?
- A) a decrease in atomic radius
 - B) a decrease in electronegativity
 - C) an increase in first ionization energy
 - D) an increase in nonmetallic behavior
- _____ 11. An atom of which element has the greatest attraction for electrons in a chemical bond?
- A) As B) Ga C) Ge D) Se
- _____ 12. Which general trend is found in Period 2 on the Periodic Table as the elements are considered in order of increasing atomic number?
- A) decreasing atomic mass
 - B) decreasing electronegativity
 - C) increasing atomic radius
 - D) increasing first ionization energy
- _____ 13. As the elements of Group 1 on the Periodic Table are considered in order of increasing atomic radius, the ionization energy of each successive element generally
- A) decreases B) increases
 - C) remains the same

14. Based on Reference Table S, which of the following atoms requires the *least* energy for the removal of the most loosely bound electron?

- A) Sn B) Sr C) Be D) Br

15. As elements of Group 1 of the Periodic Table are considered in order from top to bottom, the ionization energy of each successive element decreases. This decrease is due to

- A) decreasing radius and decreasing shielding effect
B) decreasing radius and increasing shielding effect
C) increasing radius and decreasing shielding effect
D) increasing radius and increasing shielding effect

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

17. Compared to an atom of potassium, an atom of calcium has a

- A) larger radius and lower reactivity
B) larger radius and higher reactivity
C) smaller radius and lower reactivity
D) smaller radius and higher reactivity

18. An element with an electronegativity of 3.2 is most likely classified as a

- A) metal
B) nonmetal
C) semimetal (metalloid)
D) noble gas

19. Elements that readily gain electrons tend to have

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

20. Base your answer to the following question on the elements in Group 2 on the Periodic Table.

State, in terms of the number of electron shells, why the radius of a strontium atom in the ground state is larger than the radius of a magnesium atom in the ground state.