

- The amount of energy to remove its most loosely bound electron is the definition of:
A) electronegativity B) ionization energy
C) chemical bond D) radiation
- Which statement describes the general trends in electronegativity and first ionization energy as the elements in Period 3 are considered in order from Na to Cl?
A) Electronegativity increases, and first ionization energy decreases.
B) Electronegativity decreases, and first ionization energy increases.
C) Electronegativity and first ionization energy both increase.
D) Electronegativity and first ionization energy both decrease.
- Which atom in the ground state requires the *least amount of energy to remove its valence electron*?
A) lithium atom B) potassium atom
C) rubidium atom D) sodium atom
- In the ground state, each atom of an element has two valence electrons. This element has a lower first ionization energy than calcium. Where is this element located on the Periodic Table?
A) Group 1, Period 4 B) Group 2, Period 5
C) Group 2, Period 3 D) Group 3, Period 4
- 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
- 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
- The amount of energy required to remove the outermost electron from a gaseous atom in the ground state is known as
A) first ionization energy
B) activation energy
C) conductivity
D) electronegativity
- Which of the following Group 2 elements has the *lowest* first ionization energy?
A) Be B) Mg C) Ca D) Ba
- 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
- How much energy is required to remove the most loosely bound electron from a neutral atom of carbon in the gaseous phase?
A) 363 kJ B) 441 kJ
C) 1086 kJ D) 1242 kJ
- In Period 2 of the Periodic Table, which Group contains the element with the highest first ionization energy?
A) alkali metals
B) alkaline earth metals
C) halogens
D) noble gases
- Which sequence correctly places the elements in order of increasing ionization energy?
A) H → Li → Na → K
B) I → Br → Cl → F
C) O → S → Se → Te
D) H → Be → Al → Ga
- Which electron configuration represents an element with the highest first ionization energy?
A) 2-1 B) 2-2 C) 2-8-1 D) 2-8-2

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14. Which noble gas has the highest first ionization energy?
- A) radon B) krypton
C) neon D) helium
15. Which of these metals loses electrons most readily?
- A) calcium B) magnesium
C) potassium D) sodium
16. Which number most likely represents the first ionization energy, in kiloJoules per mole of atoms, for a nonmetallic element?
- A) 500 B) 70 C) 900 D) 1100
17. Which element has an atom in the ground state with the most loosely bound electron?
- A) He B) As C) Xe D) Cs
18. Which of the Group 15 elements can lose an electron most readily?
- A) N B) P C) Sb D) Bi
19. What is the first ionization energy of an element that has the electron configuration 2-8?
- A) 2372 kJ B) 2081 kJ
C) 1313 kJ D) 10 kJ
20. Which element in Group 17 is *least* likely to lose an electron?
- A) chlorine B) iodine
C) bromine D) fluorine
21. In which reaction is the first ionization energy greatest?
- A) $\text{Na} + \text{energy} \rightarrow \text{Na}^+ + \text{e}^-$
B) $\text{K} + \text{energy} \rightarrow \text{K}^+ + \text{e}^-$
C) $\text{Mg} + \text{energy} \rightarrow \text{Mg}^+ + \text{e}^-$
D) $\text{Al} + \text{energy} \rightarrow \text{Al}^+ + \text{e}^-$
22. Which type of energy is represented in the equation $\text{Na} + \text{energy} \rightarrow \text{Na}^+ + \text{e}^-$?
- A) neutralization energy
B) ionization energy
C) nuclear energy
D) formation energy
23. Which atom requires the *least* energy to form a positive ion?
- A) Ge B) Ca C) Ga D) K
24. The highest ionization energies in any period are found in Group
- A) 1 B) 2 C) 17 D) 18
25. Low ionization energies are most characteristic of atoms that are
- A) metals B) nonmetals
C) metalloids D) noble gases
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