

- The elements on the Periodic Table are arranged in order of increasing
 - atomic mass
 - atomic number
 - molar mass
 - oxidation number
- Which list includes elements with the most similar chemical properties?
 - Br, Ga, Hg
 - Cr, Pb, Xe
 - O, S, Se
 - N, O, F
- Which list of elements contains a metal, a metalloid, a nonmetal, and a noble gas?
 - Be, Si, Cl, Kr
 - C, N, Ne, Ar
 - K, Fe, B, F
 - Na, Zn, As, Sb
- Which of the following Period 4 elements has the most metallic characteristics?
 - Ca
 - Ge
 - As
 - Br
- Which Group 15 element exists as a diatomic molecule at STP?
 - phosphorus
 - nitrogen
 - bismuth
 - arsenic
- On the Periodic Table, an element classified as a semimetal (metalloid) can be found in
 - Period 6, Group 15
 - Period 2, Group 14
 - Period 3, Group 16
 - Period 4, Group 15
- Which Group 14 element is classified as a metal?
 - carbon
 - germanium
 - silicon
 - tin
- A sample of an element is malleable and can conduct electricity. This element could be
 - H
 - He
 - S
 - Sn
- Which two characteristics are associated with metals?
 - low first ionization energy and low electronegativity
 - low first ionization energy and high electronegativity
 - high first ionization energy and low electronegativity
 - high first ionization energy and high electronegativity
- Which element is malleable and conducts electricity?
 - iron
 - iodine
 - sulfur
 - phosphorus
- At STP, which element is solid, brittle, and a poor conductor of electricity?
 - Al
 - K
 - Ne
 - S
- Which element can be brittle or soft in the solid phase and is a *poor* conductor of heat and electricity?
 - calcium
 - sulfur
 - strontium
 - copper
- Which of the following gases is monatomic at STP?
 - hydrogen
 - chlorine
 - oxygen
 - helium
- An atom of argon in the ground state tends *not* to bond with an atom of a different element because the argon atom has
 - more protons than neutrons
 - more neutrons than protons
 - a total of two valence electrons
 - a total of eight valence electrons
- Pure silicon is chemically classified as a metalloid because silicon
 - is malleable and ductile
 - is an excellent conductor of heat and electricity
 - exhibits metallic and nonmetallic properties
 - none of the above
- Which element is a metal that is in the liquid phase at STP?
 - bromine
 - cobalt
 - hydrogen
 - mercury
- Which element is a solid at STP?
 - H₂
 - I₂
 - N₂
 - O₂
- At 25°C, in which phase of matter do most of the known elements exist?
 - solid
 - liquid
 - gas
 - supercooled liquid
- At STP, both diamond and graphite are solids composed of carbon atoms. These solids have
 - the same crystal structure and the same properties
 - the same crystal structure and different properties
 - different crystal structures and the same properties
 - different crystal structures and different properties
- The carbon atoms in graphite and the carbon atoms in diamond have different
 - atomic numbers
 - atomic masses
 - electronegativities
 - structural arrangements
- An atom of aluminum in the ground state and an atom of gallium in the ground state have the same
 - mass
 - electronegativity
 - total number of protons
 - total number of valence electrons
- Which compound forms a colored aqueous solution?
 - CaCl₂
 - CrCl₃
 - NaOH
 - KBr
- When an atom of lithium loses an electron, the atom becomes a
 - negative ion with a radius smaller than the radius of the atom
 - negative ion with a radius larger than the radius of the atom
 - positive ion with a radius smaller than the radius of the atom
 - positive ion with a radius larger than the radius of the atom

24. Compared to a phosphorus atom, a P^{3-} ion has
- 1) more electrons and a larger radius
 - 2) more electrons and a smaller radius
 - 3) fewer electrons and a larger radius
 - 4) fewer electrons and a smaller radius
25. As the atoms in Period 3 of the Periodic Table are considered from left to right, the atoms generally show
- 1) an increase in radius and an increase in ionization energy
 - 2) an increase in radius and a decrease ionization energy
 - 3) a decrease in radius and an increase in ionization energy
 - 4) a decrease in radius and a decrease in ionization energy
26. What occurs as the atomic number of the elements in Period 2 increases?
- 1) The nuclear charge of each successive atom decreases, and the atomic radius decreases.
 - 2) The nuclear charge of each successive atom decreases, and the atomic radius increases.
 - 3) The nuclear charge of each successive atom increases, and the atomic radius decreases.
 - 4) The nuclear charge of each successive atom increases, and the atomic radius increases.
27. Which of the following atoms has the largest atomic radius?
- 1) Na 2) K 3) Mg 4) Ca
28. Which element forms an ion larger than its atom?
- 1) Na 2) Ne 3) Ba 4) Br
29. Which atom has the *weakest* attraction for electrons in a chemical bond?
- 1) a boron atom 3) a fluorine atom
 - 2) a calcium atom 4) a nitrogen atom
30. Which general trend is demonstrated by the Group 17 elements as they are considered in order from top to bottom on the Periodic Table?
- 1) a decrease in atomic radius
 - 2) a decrease in electronegativity
 - 3) an increase in first ionization energy
 - 4) an increase in nonmetallic behavior
31. As the elements in Period 3 are considered from left to right, they tend to
- 1) lose electrons more readily and increase in metallic character
 - 2) lose electrons more readily and increase in nonmetallic character
 - 3) gain electrons more readily and increase in metallic character
 - 4) gain electrons more readily and increase in nonmetallic character
32. Which element requires the *least* amount of energy to remove the most loosely held electron from a gaseous atom in the ground state?
- 1) bromine 2) calcium 3) sodium 4) silver
33. 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
- 1) decreasing radius and decreasing shielding effect
 - 2) decreasing radius and increasing shielding effect
 - 3) increasing radius and decreasing shielding effect
 - 4) increasing radius and increasing shielding effect
34. Which general trend is found in Period 2 on the Periodic Table as the elements are considered in order of increasing atomic number?
- 1) decreasing atomic mass
 - 2) decreasing electronegativity
 - 3) increasing atomic radius
 - 4) increasing first ionization energy
35. In which group of the Periodic Table do most of the elements exhibit both positive and negative oxidation states?
- 1) 17 2) 2 3) 12 4) 7
36. Which nonmetal is the most reactive?
- 1) fluorine 2) chlorine 3) bromine 4) iodine