

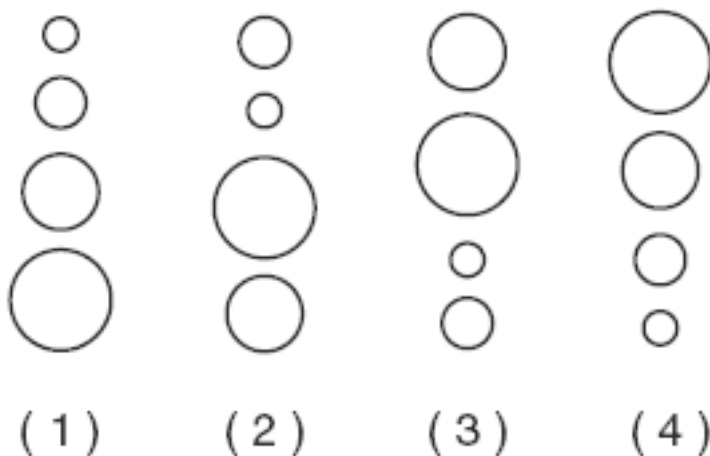
I have reformatted this quiz from the Radii quiz on the Chemcool site. I have removed the questions from their quiz that do not relate to what we have done. I have marked some questions with an asterisk because they don't directly relate to ideas we have addressed in lecture. I think most of you can figure out the answers anyway so I have included them. The numbering is the same as the numbering on the site, so that you can relate the two. We have not gone over electronegativity yet, what you need to know to answer these is that it is strongly related to ionization energy. A higher ionization energy tends to indicate higher electronegativity.

Reformatted from <http://www.chemcool.com/regents/periodictable/aim3.htm>

*5 Which two characteristics are associated with metals?

- (1) low first ionization energy and low electronegativity
- (2) low first ionization energy and high electronegativity
- (3) high first ionization energy and low electronegativity
- (4) high first ionization energy and high electronegativity

32 Which grouping of circles, when considered in order from the top to the bottom, best represents the relative size of the atoms of Li, Na, K, and Rb, respectively?



*14 An ion of which element has a larger radius than an atom of the same element? (Consider what will happen when you remove an electron vs what will happen if you add an electron to a neutral element.)

- (1) aluminum
- (2) chlorine
- (3) magnesium
- (4) sodium

34 How do the atomic radius and metallic properties of sodium compare to the

atomic radius and metallic properties of phosphorus?

- (1) Sodium has a larger atomic radius and is more metallic.
- (2) Sodium has a larger atomic radius and is less metallic.
- (3) Sodium has a smaller atomic radius and is more metallic.
- (4) Sodium has a smaller atomic radius and is less metallic.

7 Which trends are observed when the elements in Period 3 on the Periodic Table are considered in order of increasing atomic number? (The first ionization energy is simply the energy needed to pull the first electron off an element.)

- (1) The atomic radius decreases, and the first ionization energy generally increases.
- (2) The atomic radius decreases, and the first ionization energy generally decreases.
- (3) The atomic radius increases, and the first ionization energy generally increases.
- (4) The atomic radius increases, and the first ionization energy generally decreases.

35 Which list of elements from Group 2 on the Periodic Table is arranged in order of increasing atomic radius?

- (1) Be, Mg, Ca
- (2) Ca, Mg, Be
- (3) Ba, Ra, Sr
- (4) Sr, Ra, Ba

*33 As the elements in Group 17 on the Periodic Table are considered from top to bottom, what happens to the atomic radius and the metallic character of each successive element? (Metallic character increases when electrons are freer to move away from the nucleus of an element)

- (1) The atomic radius and the metallic character both increase.
- (2) The atomic radius increases and the metallic character decreases.
- (3) The atomic radius decreases and the metallic character increases.
- (4) The atomic radius and the metallic character both decrease.

8 The amount of energy required to remove the outermost electron from a gaseous atom in the ground state is known as

- (1) first ionization energy
- (2) activation energy
- (3) conductivity
- (4) electronegativity

34 As the atoms of the Group 17 elements in the ground state are considered from top to bottom, each successive element has (Valence electrons are the electrons in

the most recently filled, or partially filled shell. For example the valence electrons in period 2 elements would be electrons in the 2s and 2p orbitals, but not those in the 1s orbital. Similarly valence electrons in period 3 would be 3s and 3p, but not electrons in 2p, 2s or 1s orbitals.

- (1) the same number of valence electrons and similar chemical properties
- (2) the same number of valence electrons and identical chemical properties
- (3) an increasing number of valence electrons and similar chemical properties
- (4) an increasing number of valence electrons and identical chemical properties

49 As each successive element in Group 15 of the Periodic Table is considered in order of increasing atomic number, the atomic radius (You don't need to know what elements are in Group 15 to answer this question.)

- (1) decreases
- (2) increases
- (3) remains the same

50 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

- (1) decreases
- (2) increases
- (3) remains the same

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

- (1) number of protons increases, and the number of shells of electrons remains the same
- (2) number of protons increases, and the number of shells of electrons increases
- (3) number of protons decreases, and the number of shells of electrons remains the same
- (4) number of protons decreases, and the number of shells of electrons increases

*2 Which of the following Group 15 elements has the greatest metallic character?

- (1) nitrogen
- (2) phosphorus
- (3) antimony
- (4) bismuth

3 What are two properties of most nonmetals?

- (1) high ionization energy and poor electrical conductivity

- (2) high ionization energy and good electrical conductivity
- (3) low ionization energy and poor electrical conductivity
- (4) low ionization energy and good electrical conductivity

4 Compared to the radius of a chlorine atom, the radius of a chloride ion is

- (1) larger because chlorine loses an electron
- (2) larger because chlorine gains an electron
- (3) smaller because chlorine loses an electron
- (4) smaller because chlorine gains an electron

2 Which of the following Group 2 elements has the *lowest* ionization energy?

- (1) Be
- (2) Mg
- (3) Ca
- (4) Ba

4 As the elements in Group 17 (These are the halogens (F₂, Cl₂, Br₂, I₂) are considered in order of increasing atomic number, the chemical reactivity of each successive element

- (1) decreases
- (2) increases
- (3) remains the same

5 In Period 3, from left to right in order, each successive element will

- (1) decrease in electronegativity
- (2) decrease in atomic mass
- (3) increase in number of protons
- (4) increase in metallic character