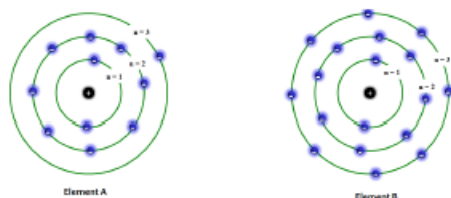


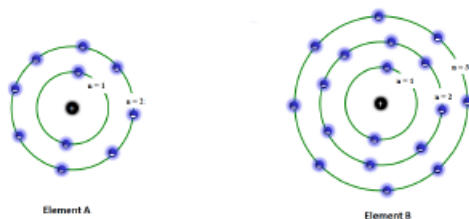
Periodic trends

- 1) Which atom in each set has the larger radius?
- Be or O
 - Cu or Br
 - F or I
 - O or As
 - Kr or K
 - Ba or Li
- 2) The shell models of two neutral atoms are drawn below. The representations are not drawn to scale. Which atom has the smallest radius? Justify your answer.



- 3) Explain each of the following occurrences by referring to the structure of the atoms in question (energy levels, orbitals, protons, etc.).
- The atomic radius of oxygen is smaller than the atomic radius of carbon.
 - The atomic radius of Mg is smaller than the atomic radius of Ca.
- 4) Mg^{2+} and F^- are isoelectronic.
- Which ion has the smaller radius?
 - Explain why the radii of these two ions are different sizes. Justify your claims.
- 5) Which species has a smaller radius: Ca or Ca^{2+} ? Provide an explanation and justify your claims using your knowledge of atomic structure.
- 6) Which species has a smaller radius: F or F^- ? Provide an explanation and justify your claims using your knowledge of atomic structure.
- 7) Explain each of the following occurrences by referencing the structure of the atoms in question (energy levels, orbitals, protons, etc.).
- The first ionization energy of Mg is 738.1 kJ/mol, while the first ionization energy of Al is only 577.9 kJ/mol.
 - The first ionization energy of Mg is greater than the first ionization energy of Ca.
 - The first ionization energy of Na is less than the first ionization energy of Cl.

- d. The second ionization energy of Na is 4560 kJ/mol, while the second ionization energy of Mg is only 1450 kJ/mol.
- 8) The shell models of two neutral atoms are drawn below. The representations are not drawn to scale. Which atom would have the highest first ionization energy? Justify your answer.



- 9) Why do the halogens have a negative electron affinity value, while the noble gases have a positive electron affinity value?
- 10) Why do the Group 1A elements have negative electron affinity values, while Group 2A elements have positive electron affinity values?
- 11) Which element from each set is most electronegative?
- F or C
 - Al or Cl
 - Po or S
 - Cs or I
 - Ca or Cl
 - O or Se
 - Zn or K
 - C or Pb
 - Ga or O
- 12) Sulfur is more electronegative than calcium. Explain why this is and justify your claims using your knowledge of atomic structure.