

- 1) What is the Effective Nuclear Charge (Z_{eff})?

- 2) How is the effective nuclear charge calculated?

- 3) The shielding electrons are the (**inner core, outer valence**) electrons.
- 4) Calculate the effective nuclear charge for the following elements: (Show calculation.)
 - a. Ca _____
 - b. S _____
- 5) The larger the atomic radius, the (**larger, smaller**) the size of the atom.
- 6) The size or radius of an atom mainly depends on the space (**the nucleus takes up, the electrons take up**)
- 7) Why do the radii of atoms increase as one goes down a family?
(*Make sure to discuss both the effective nuclear charge and the number of main energy levels.*)

- 8) Why do the radii of atoms decrease as one goes across to the right in a period?
(*Make sure to discuss both the effective nuclear charge and the number of main energy levels.*)

- 9) Circle the atom of each pair that would have the smaller radius.
a) Na or Cs b) Na or Cl c) Na or Al d) F or I e) Ge or Ne
- 10) Arrange the following elements in order of *increasing* radius: Na, Si, K, O, Cs, F:
Smallest radius _____ < _____ < _____ < _____ < _____ < _____ **Largest radius**
- 11) Can you determine which of two unknown elements has the larger radius if the only known information is that the atomic number of one of the elements is 20 greater than the other? Explain