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AP Chemistry – Periodicity – 7

Name _____Per ___

1. Which experiences a greater effective nuclear charge in a Be atom, the 1s electrons or the 2s electrons? Explain.

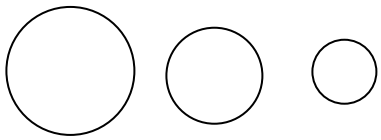
2. Arrange the following atoms in order of increasing effective nuclear charge experienced by the electrons in the n = 3 energy level: K, Mg, P, Rh, and Ti. Explain the basis for your ordering.

3. Among the nonmetals, the change in atomic radius in moving one place left or right in a row is smaller than the change in moving one row up or down. Explain.

4. Arrange the following atoms in order of increasing atomic radius: Si, S, Ge, Se.

5. Explain the variation in atomic or ionic radii for Iodine where: $I^- > I > I^+$.

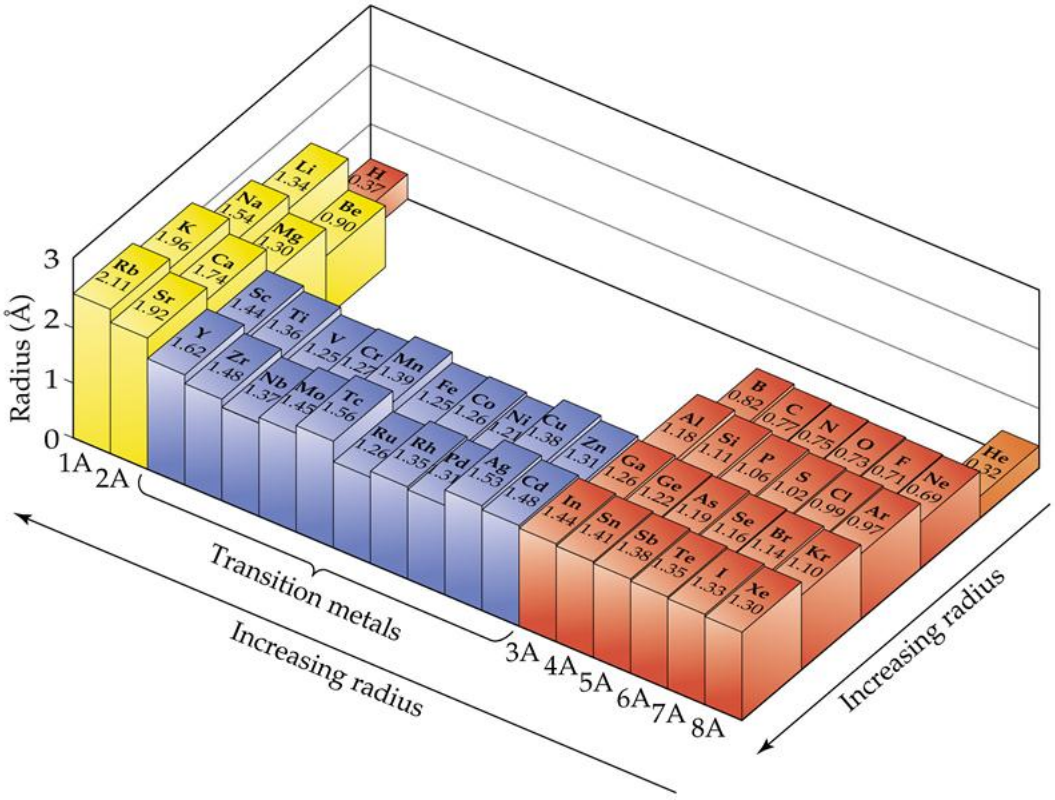
6. Label the following spheres: Mg^{2+}, Ca, Ca^{2+}



7. Circle the ions or atoms from the following sets that are isoelectronic with each other:

(a) K^+, Rb^+, Ca^{2+} (b) Cu^+, Ca^{2+}, Sc^{3+} (c) S^{2-}, Se^{2-}, Ar (d) Fe^{2+}, Co^{3+}, Mn^{2+}

8. Predict the distance between Si atoms in solid Silicon.



9. In the series of group V hydrides, of general formula XH_3, where X is an element from group V, the measured bond distances are as follows: P-H, 1.419 Å, As-H, 1.519 Å, Sb-H, 1.707 Å. (a) Compare these values with those estimated in the chart above. (b) Explain the steady increase in X-H bond distance in this series in terms of the electron configurations of the X atoms.

10. Consider S, Cl, and K and their ions S^{2-}, Cl^- and K^+. (a) List the atoms in order of increasing size. (b) List the ions in order of increasing size. (c) Explain any differences in the orders of the atomic and ionic sizes.

11. Write the condensed electron configuration for Ununhexium, element 116.