

Name (PRINT) KEY-Ivory Version

1. TRUE or FALSE

a) Magnesium (Mg) atoms have a lower first ionization energy than sulfur (S) atoms. [2 pts]

TRUE

b) Magnesium (Mg) atoms have a *smaller* atomic radius than sulfur (S) atoms. [2 pts]

FALSE

2. Which element will display an unusually *large* jump in ionization energy values between I_4 and I_5 , the fourth and fifth ionization energies? [3 pts]

a) P b) Si c) Al d) Mg e) Na

3. Which of the following is **larger**? [6 pts]

a) Na or Na^+

Na

b) S or S^{2-}

S^{2-}

c) Mg^{2+} or O^{2-}

O^{2-}

4. Consider an element (X) with a valence electron configuration of ns^2np^4 . What is the most likely formula of the ionic compound formed between this element and potassium (K)? [3 pts]

K_2X

5. List the following bonds in order of *increasing* ionic character; i.e., from the most covalent to the most ionic. [3 pts]

Cs to F, Cl to Cl, and Br to Cl.

Cl to Cl < Br to Cl < Cs to Cl

6. Write the ground-state electron configuration for the following ions. You may use shorthand notation.
[4 pts]

a) Ge^{4-}

[Kr] or [Ar]4s²3d¹⁰4p⁶

b) Mn^{3+}

[Ar]3d⁴

7. Write the best Lewis structure for the following molecules:
[9 pts]

Molecule	No. of valence electrons	Lewis Structure
OCl_2	20	
NO_2^-	18	
CF_4	32	