**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_**

**Unit 4 REVIEW– Electron Arrangement and The Periodic Table**

Answer each question in the space provided with thorough answers.

1. Complete the following table to review atomic structure:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Element Symbol | Atomic Number | Number of protons | Number of neutrons | Number of electrons | Mass number | Nuclear charge | Ionic Charge |
|  |  | **3** |  | **2** | **6** |  |  |
|  | **50** |  | **65** |  |  |  | **4+** |
|  |  |  |  | **36** | **72** |  | **3-** |

1. Identify the elements in the table above as metals or nonmetals AND describe them in terms of texture (malleable or brittle), luster, and conductivity.

1. Write the abbreviated electron configurations for the following atoms and give the group # and family name for the elements location on the periodic table.

**Abbreviated Electron Configuration Group # Family name # of E Levels** **# Val e-**

* 1. Mg \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_
  2. Br \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_

* 1. Xe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_

1. Identify the elements described below (assume neutral atoms in ground state):
   1. The transition metal with the lowest mass \_\_\_\_\_\_\_\_\_\_\_\_
   2. Has the lowest electronegativity in group1 \_\_\_\_\_\_\_\_\_\_\_\_
   3. Electron configuration = 1s22s22p63s23p4 \_\_\_\_\_\_\_\_\_\_\_\_
   4. The smallest atom with a full second energy level \_\_\_\_\_\_\_\_\_\_\_\_
   5. Has the lowest ionization energy in period 2 \_\_\_\_\_\_\_\_\_\_\_\_
   6. Contains exactly seven electrons in the fourth energy level \_\_\_\_\_\_\_\_\_\_\_\_
   7. Has the largest atomic radius in the alkali metals \_\_\_\_\_\_\_\_\_\_\_\_
   8. Contains 3 ***unpaired*** electrons in the 3p orbitals \_\_\_\_\_\_\_\_\_\_\_\_
   9. Has 2 paired and 4 unpaired electrons in the 3d orbitals \_\_\_\_\_\_\_\_\_\_\_\_
   10. Has 3 valence electrons and has exactly 3 energy levels\_\_\_\_\_\_\_\_\_\_\_\_
   11. Is the heaviest alkaline earth metal \_\_\_\_\_\_\_\_\_\_\_\_
   12. Is a halogen with a valence energy level of 5 \_\_\_\_\_\_\_\_\_\_\_\_
   13. Has 2 energy levels and forms a (-3) ion \_\_\_\_\_\_\_\_\_\_\_\_
   14. Is a (+2) ion with the same electron configuration as argon \_\_\_\_\_\_\_\_\_\_\_\_

6. Name the family and determine valence electrons for the elements with the outermost electron configurations given below.

a. s1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ V.E. \_\_\_\_\_\_\_

b. s2p6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ V.E. \_\_\_\_\_\_\_

1. Identify the 3 elements (A, B, and C) based on the following characteristics.

Elements A, B, and C, have the same number of valence electrons. Element A has 33 electrons when neutral. When element B gains 3 electrons, it has a total of 10 electrons. Element C is lighter than A and heavier than B. Identify each element by symbol or name. **Explain each identification.**

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ B \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Element A must be \_\_\_\_\_\_\_\_\_\_ *because …*

Element B

Element C

1. Predict the most likely charge when the following atoms form ions, classify as ANION or CATION, and ID noble gas with same e- configuration.

CHARGE ANION or CATION NOBLE GAS W/ SAME E- CONFIG

* 1. Na: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. O: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. S: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  4. Sr: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  5. F: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  6. As: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  7. Al: \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Combine ions of the elements given and write the formula for the ionic compound that is formed.
   1. Sr and F
   2. Na and As
   3. Al and S
   4. Sr and O
2. Compare the following elements by completing each box below. Use energy levels, shielding, and nuclear charge in your explanations.
3. **Na, Li, Mg**

**Ionization Energy**: List elements from part (a) in order from smallest to largest I.E.

Explain the trend in ionization energy for these 3 elements.

**Atomic Radius:** List elements from part (a) in order from smallest to largest:

Explain the trend in atomic radius for these 3 elements.

**Electronegativity**: List elements from part (a) in order from smallest to largest electronegativity

Explain the trend in electronegativity for these 3 elements.

**b. Si, Ga, S**

**Atomic Radius:** List elements from part (b) in order from smallest to largest

Explain the trend in atomic radius for these 4 elements.

**Ionization Energy**: List elements from part (b) in order from smallest to largest I.E.

Explain the trend in ionization energy for these 4 elements.

**Electronegativity**: List elements from part(b) in order from smallest to largest electronegativity

Explain the trend in electronegativity for these 4 elements.

1. Compare the atoms/ions below.
   1. Write an abbreviated electron configuration for each atom/ion below.
   * Kr:
   * Sr2+:
   * Rb:
   * As3-:
   * Br:
   1. Describe general similarities and differences in the electron arrangement for the atoms/ions above.
   2. Rank the atoms/ions from smallest to largest atomic radius.

Smallest Largest

* 1. Explain your ranking. (Include the terms: energy levels, nuclear charge, shielding)