Name: _____ Block: _____

Periodicity Homework

1. ATOMIC/IONIC RADIUS REVIEW

a. When families of the periodic table are examined, what trend is observed for atomic size?

Size of atom increases going down a Family

b. Phosphorus is smaller than Aluminum even though Phosphorus has more valence electrons. Why? Phosphorus has more pt with no Δ E levels

∴ stronger nucleus = smaller atom

c. Circle the atom or ion that has the **biggest radius** then explain **why**:

i. F or (Br) more E levels

ii. (Mg) or S less pt / weaker nucleus

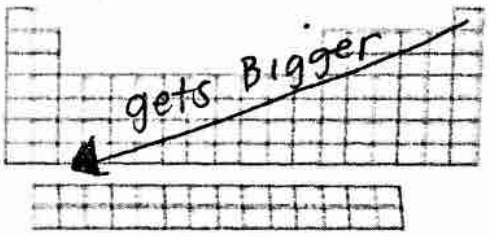
d. Arrange the following atoms in order of increasing atomic size:

i. Cl, Br, I Cl → Br → I

ii. Ca, Ba, Ra Ca → Ba → Ra

iii. S, P, Si S → P → Si

e. Draw the trend of ***increasing*** atomic radius using an arrow(s) on the periodic table



2. IONIZATION ENERGY REVIEW

a. What does ionization energy mean:

energy to remove 1 e⁻

a. Circle the atom that has the **highest ionization energy** then explain **why**:

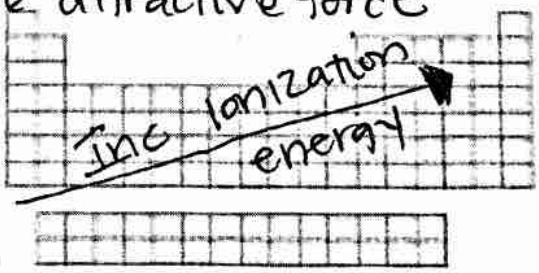
i. Li or (O) more attractive force b/c smaller atom

ii. (Mg) or Sr smaller atom more attractive force

iii. Ga or (Br) smaller atom more attractive force

iv. Ga or (B) smaller atom more attractive force

b. Draw the trend of ***increasing*** **ionization** using an arrow(s) on the periodic table



3. ELECTRONEGATIVITY REVIEW

c. What does electronegativity mean:

likelyhood an atom will take another atom's e⁻ away

d. Circle the atom that has the **highest electronegativity** then explain **why**:

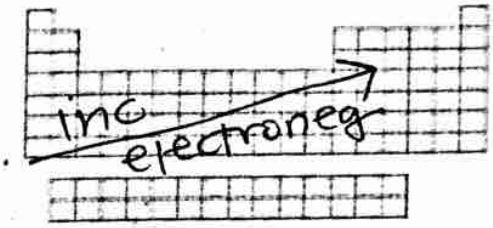
i. Li or (O) closer to being stable

ii. (Mg) or Sr less e⁻

iii. Ga or (Br) closer to being stable

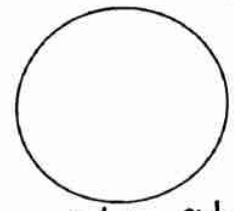
iv. Ga or (B) less e⁻

e. Draw the trend of ***increasing*** **electronegativity** using an arrow(s) on the periodic table



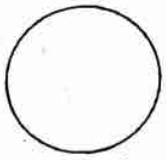
4. **ION SIZE CHANGE** *(use your Trend: Ion Charge in the main block elements note sheet)*

a. Label the atoms below as either Sodium or as Sodium Ion:



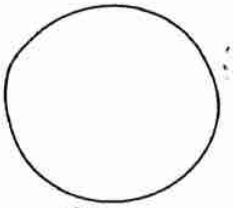
Na atom

lose e⁻



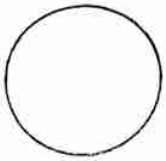
Na^{1+} ion

b. Label the atoms below as either Oxygen or as Oxygen Ion:



O^{2-} Ion

gains e⁻



O atom

c. The ionic radius of Aluminum (Al^{+3}) is 54 pm while the ionic radius of Sodium (Na^{+1}) is 102pm. Explain why Aluminum ions have smaller radii than Sodium ions even though both ions have the same electron configuration.

Aluminum has 13 p⁺ and 10 e⁻ * more attractive force = smaller

Sodium has 11 p⁺ and 10 e⁻

d. Arrange the following in order of increasing ionic size.

- I^-, Br^-, Cl^- $Cl^- \rightarrow Br^- \rightarrow I^-$
- P^{3-}, S^{2-}, Cl^- (gain e⁻) $Cl^- \rightarrow S^{2-} \rightarrow P^{3-}$ (3 more e⁻ than p⁺)
- Ba^{2+}, Sr^{2+}, Ca^{2+} (lose e⁻) $Ca^{2+} \rightarrow Sr^{2+} \rightarrow Ba^{2+}$