

**Chemistry: Unit V- Periodic Table Review****Concepts:**

- Periodic Table Development
  - Mendeleev
  - Moseley
- Periodic Table Organization
  - Periodic Law
  - Metals
  - Nonmetals
  - Metalloids
- Families
  - Alkali Metals, Alkaline Earth Metals, Halogen, Noble Gases
- Periodic Trends
  - Atomic Radius
  - Electronegativity
  - Ionization Energy
  - Reactivity

**Sample Problems:** \*All trends need to be explained using the **Force of Attraction ( $F_A$ )**\*

1) What is the trend in atomic radius across a period? Explain.

**The  $F_A$  increases as more protons and electrons (opposite charges) are added. This increased  $F_A$  between the nucleus and electrons pulls the electrons closer, decreasing the atomic radius.**

2) What is the trend in atomic radius down a group/family? Explain.

**The  $F_A$  decreases as more energy levels/distance is added. This decreased  $F_A$  between the nucleus and electrons allows the electrons to move further away, increasing the atomic radius.**

3) What is the trend in electronegativity across a period? Explain.

**The  $F_A$  increases as more protons and electrons (opposite charges) are added. This increased  $F_A$  between the nucleus and electrons increases an atom's ability to attract electrons from another atom while bonded. \*THIS TREND STOPS AT THE NOBLE GASES\***

4) What is the trend in electronegativity down a group/family? Explain.

**The  $F_A$  decreases as more energy levels/distance is added. This decreased  $F_A$  between the nucleus and electrons decreases an atom's ability to attract electrons from another atom while bonded.**

5) What is the trend in ionization energy across a period? Explain.

**The  $F_A$  increases as more protons and electrons (opposite charges) are added. This increased  $F_A$  between the nucleus and electrons leads to more energy being required to remove an electron from an atom. (forming a cation)**

6) What is the trend in ionization energy down a group/family? Explain.

**The  $F_A$  decreases as more energy levels/distance is added. This decreased  $F_A$  between the nucleus and electrons leads to less energy being required to remove an electron from an atom. (forming a cation)**

7) What is the trend in reactivity for metals? Explain.

**Across a period:** The  $F_A$  increases as more protons and electrons (opposite charges) are added. This increased  $F_A$  between the nucleus and electrons makes it more difficult for a metal atom to lose an electron to form a cation.

**Down a group/family:** The  $F_A$  decreases as more energy levels/distance is added. This decreased  $F_A$  between the nucleus and electrons makes it easier for a metal atom to lose an electron to form a cation.

8) What is the trend in reactivity for nonmetals? Explain

**Across a period:** The  $F_A$  increases as more protons and electrons (opposite charges) are added.

**This increased  $F_A$  between the nucleus and the electrons makes it easier for a nonmetal atom to gain an electron to form an anion.**

**Down a group/family:** The  $F_A$  decreases as more energy levels/distance is added.

**This decreased  $F_A$  between the nucleus and electrons makes it more difficult for a nonmetal atom to gain an electron to form an anion.**

9) Rank the following elements in order of atomic radius from *smallest* to *largest*: Na, Si, Cl

10) Which element would have a larger atomic radius: fluorine (F) or bromine (Br)? Explain.

11) Rank the following elements in order of electronegativity from *smallest* to *largest*: O, Se, Po

12) Which element would have a larger electronegativity value: magnesium (Mg) or chlorine (Cl)?

Explain.

13) Rank the following elements in order of ionization energy from *smallest* to *largest*: Be, Ca, Ra

14) Which element would have a larger ionization energy value: Sr or I? Explain.

15) How many atoms of calcium are present in 1.50 mol of calcium (Ca)?

16) The chemical formula of xenon tetrafluoride is  $\text{XeF}_4$ . A light bulb is filled with xenon tetrafluoride and found to contain  $3.56 \times 10^{24}$  atoms of fluorine. How many moles of  $\text{XeF}_4$  are in the light bulb?

17) The mass of a sample of  $\text{Na}_2\text{O}$  is measured to be 45.50 g. How many moles of  $\text{Na}_2\text{O}$  are in the sample?

18) An experiment calls for the use of 2.50 mol of  $\text{Mg}(\text{NO}_3)_2$ . How many grams of  $\text{Mg}(\text{NO}_3)_2$  are required for the experiment?

19) How many atoms of oxygen are present in a 5.65 g sample of beryllium carbonate ( $\text{BeCO}_3$ )?

20) Methane gas is produced from rotting garbage. Methane is represented by the molecule  $\text{CH}_4$ . What is the mass of a sample of methane that contains  $9.04 \times 10^{24}$  molecules of methane?