

Worksheet - Periodic Trends Practice

1.) What is the difference between electronegativity and ionization energy?

Answer - ionization energy is the energy required to remove an electron whereas electronegativity is the affinity of an atom to a neighbouring atoms electrons.

2.) Why does fluorine have a higher ionization energy than iodine?

Answer - fluorine has a higher ionization energy than iodine as it has less electrons causing less energy levels. The lesser energy levels allow fluorine to be a smaller atom. Smaller atoms hold their electrons in closer and thus with a greater attractive force. This increases the energy needed to remove one of these electrons (ionization energy).

3.) Why do elements in the same family generally have similar properties?

Answer - the similar properties amongst family members is due to the similar electron configuration with the valence electrons being the same but occurring at different energy levels.

4.) Which is the largest atom in Group 14?

Answer - the largest atom would be Flerovium (man-made) or Lead (non-man made) elements.

5.) Which is the smallest atom in Group 17?

Answer - Fluorine is the smallest.

6.) Which is the smallest atom in period 5?

Answer - Xenon would be the smallest.

7.) Rank the following elements by increasing atomic radius: carbon, aluminium, oxygen, potassium.

Answer - Oxygen < Carbon < Aluminium < Potassium

8.) Rank the following elements by increasing electronegativity: sulphur, oxygen, neon, aluminium.

Answer - Aluminium < Sulphur < Oxygen < Neon

9.) Arrange the following atoms in order of decreasing atomic radius. Na Al P Cl Mg

Answer - Na > Mg > Al > P > Cl

10.) For each of the following pairs, circle the element that is larger?

a.) N^{-3} or F^{-1} b.) Mg^{+2} or Ca^{+2} c.) Fe^{+2} or Fe^{+3}

11.) Circle the element in each pair has the larger radius?

a.) Mg or Mg^{+2} b.) O or O^{-2} c.) K^{+} or Cl^{-} d.) P^{-3} or S^{-2}

12.) In each of the following pairs, circle the species with the higher first ionization energy:

a.) Li or Cs (b.) Cl or Ar (c.) Ca or Br (d.) Na or Ne (e.) B or Be

13.) In each of the following pairs, circle the species with the larger atomic radius:

a.) Mg or Ba (b.) S or S^{-2} (c.) Cu^{+2} or Cu (d.) He or H (e.) Na or Cl

- 14.) Circle the best choice in each list:
- a.) highest first ionization energy: C, N, Si ↓
- b.) highest electronegativity: As, Sn, S
- c.) largest radius: S⁻², Cl⁻, Cl ↑
- 15.) Order the following groups from largest to smallest radii.
- a.) Ar, Cl⁻, K, S⁻² K, S⁻², Cl⁻, Ar b.) C, Al, F, Si Al, Si, C, F
- c.) Na, Mg, Ar, P Na, Mg, P, Ar d.) I⁻¹, Ba⁺², Cs⁺¹, F⁻¹ Cs⁺¹, Ba⁺², I⁻, F⁻¹
- 16.) For each of the following sets of atoms, rank the atoms from smallest to largest atomic radius.
- a.) Li, C, F F < C < Li b.) Li, Na, K Li < Na < K c.) Ge, P, O O < P < Ge
- d.) C, N, Al N < C < Al e.) Al, Cl, Ga Cl < Al < Ga
- 17.) For each of the following sets of ions, rank them from smallest to largest ionic radius.
- a.) Mg⁺², Si⁻⁴, S⁻² Mg⁺² < S⁻² < Si⁻⁴ b.) Ca⁺², Ba⁺², Mg⁺² Mg⁺² < Ca⁺² < Ba⁺² c.) Br⁻¹, Cl⁻¹, F⁻¹ F⁻ < Cl⁻ < Br⁻
- d.) Ba⁺², Cu⁺², Zn⁺¹ Cu⁺² < Zn⁺¹ < Ba⁺² e.) Si⁻⁴, P⁻³, O⁻² O⁻² < P⁻³ < Si⁻⁴
- 18.) For each of the following sets of atoms, rank them from lowest to highest ionization energy.
- a.) Mg, S, Si Mg < Si < S b.) Ba, Ca, Mg Ba < Ca < Mg c.) Br, Cl, F Br < Cl < F
- d.) Ba, Cu, Ne Ba < Cu < Ne e.) He, P, Si Si < P < He
- 19.) For each of the following sets of atoms, rank them from lowest to highest electronegativity.
- a.) C, Li, N Li < C < N b.) C, Ne, O Ne < C < O c.) O, P, Si Si < P < O
- d.) K, Mg, P K < Mg < P e.) S, F, He He < S < F