

U3 – Periodic Table TWITTER Review

U3-1:

- A) The horizontal rows on the PT are also known as _____.
- B) The vertical columns on the PT are also known as _____.

- Answer: A) periods B) groups

U3-2: Determine how the PT was organized/arranged according to the following scientists (Be specific):

- A) Mendeleev
- B) Moseley

- Answer: A) increasing atomic mass B) increasing atomic #

U3-3: What was special about Mendeleev's PT that made it widely accepted?

- Answer: left open blanks for future discovered elements based on his predictions of physical and chemical properties

U3-4: The PT can be categorized into two major categories: _____ & _____.

- Answer: metals & nonmetals

U3-5: What group of the PT contains the LEAST electronegative elements?

- Answer: alkali metals (Francium – Fr)

U3-6: What group of the PT contains the MOST electronegative elements?

- Answer: halogens (Fluorine – F)

U3-7: Which of the following elements is NOT in the same group as lithium?

- A) Rubidium
- B) Sodium
- C) Chromium
- D) Potassium

- Answer: C) chromium

U3-8: Which of the following elements is in the same period as beryllium?

- A) Nitrogen
- B) Iron
- C) Iodine
- D) Strontium

- Answer: A) nitrogen

U3-9: Why are the noble gas elements so important and why? Be specific.

- Answer: noble gases = most stable and non-reactive (inert) elements (gases) due to full octet of 8 val e⁻ & complete e⁻ config

U3-10: The modern periodic law (Mendeleev) states that the properties of the elements are a periodic function of their _____.

- Answer: atomic #

U3-11: In general, how many electrons should an atom have in its outer level (shell) to be chemically stable?

- Answer: 8 val e⁻ (full octet)

U3-12: Elements with three or fewer valence electrons are considered to be what type of elements?

- Answer: metals

U3-13: What is unique about metalloid elements?

- Answer: metalloids = property of both metals & nonmetals

U3-14: Which of the following is an example of a metalloid?

- A) I
- B) B
- C) Br
- D) In

- Answer: B) Boron

U3-15: What is the name of the group of elements who have 7 electrons in its outer level (shell)?

- Answer: halogens

U3-16: As the atomic number in a period increases, the degree of non-metallic character _____.

- A) Increases
- B) Decreases
- C) Remains same

- Answer: A) increases

U3-17: Elements found within the same group on the PT have similar properties: True or False.

- Answer: true

U3-18: Which is the most important in determining the properties of an element?

- A) Atomic Mass
- B) Atomic Radius
- C) PT position
- D) e- Config

- Answer: D) e- config

U3-19: Which pairs of particles does the 2nd particle listed have the smaller atomic radius?

- A) Ni, K
- B) Na, Cs
- C) Cl, Cl-
- D) Li, Li+

- Answer: D) Li, Li⁺

U3-20: The amount of energy required to remove the outermost electrons is the _____.

- Answer: ionization energy (IE)

U3-21: The ability of an atom to attract electrons to form bonds in a chemical compound is known as _____.

- Answer: electronegativity (EN)

U3-22: For each subsequent electron removed from an atom, the ionization energy required ____.

- A) Increases
- B) Decreases
- C) Remains constant

- Answer: A) increases

U3-23: Which factor most impacts atomic radius moving down a group?

- A) Increased # energy levels
- B) Increased Z_{eff}
- C) Increased atomic mass

- Answer: A) increased # energy levels

U3-24: Radii of atoms become smaller from Na to Cl across Period 3 due to:

- A) Shielding effect
- B) Increased nuclear charge
- C) Increased # e-

- Answer: B) increased nuclear charge (Z_{eff})

U3-25: Complete the following for Atomic Radius:

- A) What is the periodic trend as you move down a group?
B) Provide a reasoning for trend

- Answer: A) increases DOWN group B) e^- occupy higher successive energy levels

U3-26: Complete the following for Atomic Radius:

- A) What is the periodic trend as you move across a period?
B) Provide a reasoning for trend

- Answer: A) decreases ACROSS period
B) more protons in nucleus have greater attractive force to pull electrons (and energy levels) closer to nucleus (Z_{eff}), thus decreasing atomic radius

U3-27: Complete the following for Ionic Radius:

- A) What is the periodic trend as you move down a group?
B) Which is larger? Sr vs Sr^{2+}

- Answer: A) increases DOWN group (same as Atomic Radius) B) Sr

U3-28: Complete the following for Ionic Radius:

- A) What is the periodic trend as you move across a period?
B) Which is larger? As vs As^{3-}

- Answer: A) decreases ACROSS period (same as Atomic Radius) B) As^{3-}

U3-29: Complete the following for Ionization Energy:

- A) What is the periodic trend as you move down a group?
B) Provide a reasoning

- Answer: A) decreases DOWN group B) increased distance of v.e- from nucleus

U3-30: Complete the following for Ionization Energy:

- A) What is the periodic trend as you move across a period?
B) Provide a reasoning.

- Answer: A) increases ACROSS period B) more protons in nucleus have greater attractive force to pull electrons (and energy levels) closer to nucleus (Z_{eff}), thus decreasing atomic radius

U3-31: Complete the following for Electronegativity:

- A) What is the periodic trend as you move down a group?
B) Provide a reasoning

- Answer: A) decreases DOWN group B) Val e^- shielded from pull of protons inside nucleus due to increased distance

U3-32: Complete the following for Electronegativity:

A) What is the periodic trend as you move across a period?

B) Provide a reasoning

- Answer: A) increases ACROSS period B) bonding attraction is stronger with nonmetals as they chemically favor gaining ve-

U3-33: Rank the following in increasing atomic radius: C, Li, F

- Answer: F, C, Li (*smallest* → *largest*)

U3-34: Rank the following in increasing atomic radius: Al, Cl, Ga

- Answer: Cl, Al, Ga (*smallest* → *largest*)

U3-35: Rank the following in decreasing atomic radius: O, Ge, P

- Answer: Ge, P, O (*largest* → *smallest*)

U3-36: Rank the following in decreasing atomic radius: C, N, Al

- Answer: Al, C, N (*largest* → *smallest*)

U3-37: Rank the following in increasing ionic radius (Hint: Same trend as AR): Se^{2-} , Al^{3+} , Ca^{2+}

- Answer: Al^{3+} (Ne), Ca^{2+} (Ar), Se^{2-} (Kr)

U3-38: Rank the following in increasing ionic radius (Hint: Same trend as AR): N^{3-} , Cd^{2+} , I^{1-}

- Answer: N^{3-} (Ne), I^{-} (Xe), Cd^{2+} (Pd)

U3-39: Rank the following in increasing ionization energy: Mg, Ca, Ba

- Answer: Ba, Ca, Mg (*lowest* → *highest*)

U3-40: Rank the following in increasing ionization energy: P, He, Si

- Answer: Si, P, He (*lowest* → *highest*)

U3-41: Rank the following in decreasing ionization energy: Cl, F, Br

- Answer: F, Cl, Br (*highest* → *lowest*)

U3-42: Rank the following in decreasing ionization energy: Cu, Ne, Ba

- Answer: Ne, Cu, Ba (*highest* → *lowest*)

U3-43: Rank the following in increasing electronegativity: N, Li, C

- Answer: Li, C, N (*lowest → highest*)

U3-44: Rank the following in increasing electronegativity: Mg, P, K

- Answer: K, Mg, P (*lowest → highest*)

U3-45: Rank the following in decreasing electronegativity: P, O, Si

- Answer: O, P, Si (*highest → lowest*)

U3-46: Rank the following in decreasing electronegativity: Ca, Rb, Na

- Answer: Na, Ca, Rb (*highest → lowest*)

U3-47: Which is the most active (reactive) nonmetal on the periodic table?

- Answer: Fluorine (F)

U3-48: Which element in Group 17 (VIIA) is least likely to lose an electron?

- Answer: Fluorine (F)

U3-49: Which element in Period 2 has the greatest tendency to form a negative ion?

- Answer: Fluorine (F) – Most reactive Non-metal element

U3-50: The elements that have the most pronounced nonmetallic properties are located toward which corner of the PT?

- Answer: upper/top right

U3-51: The most active metal in Group 2 (IIA) is _____.

- Answer: Radium (Ra)

U3-52: As you move left-to-right across Period 3, the degree of nonmetallic character of each successive element _____(increases/decreases).

- Answer: Increases

U3-53: As elements of Period 4 are considered left-to-right, there is a general decrease in _____.

- Answer: metallic characteristics

U3-54: Explain why elements in Group 2 (IIA) increase in reactivity with each succeeding element within the group.

- Answer: Ionization energy decreases top-to-bottom (down) within a group, and therefore its atomic radius increases. This allows less energy to be used to remove the val e- that are farther from the nucleus, and thus is able to attain a positive (+) charge to have the same e- config of the closest noble gas

U3-55: Which group/family will always contain an element (within any given period) that will have the lowest first ionization energy?

- Answer: Alkali Metals

U3-56: What is true of the number of electrons in the valence shell in elements within Group 4 (IVA)?

- Answer: All contains the same # of val e- (4)

U3-57: Which element in Group 18 has the highest first ionization energy?

- Answer: Helium (He)

U3-58: Identify the element that is found in Group 2 (IIA) and Period 7 of the PT.

- Answer: Radium (Ra)

U3-59: What is true of the number of occupied principal energy levels as you go down within Group 1 (IA)?

- Answer: Increases – Electrons occupy higher successive energy levels as you go down a group (Atomic Radius group trend)

U3-60: The elements from which two groups are most similar in their chemical properties?

- A) 1 & 2
- B) 1 & 17
- C) 2 & 17
- D) 17 & 18

- Answer: A) 1 & 2 (All elements in groups 1 & 2 are metals that have a tendency to lose val e- to attain the e- config of a noble gas)

U3-61: Which element in Period 3 has the least tendency to attract electrons (excluding the noble gas)?

- Answer: Sodium (Na) – Electronegativity period trend