

CHAPTER # 04

Periodic Tables and it's Periodicity

Shielding effect

Atomic size

Ionization Energy

Electron Affinity

Electronegativity

Metallic character

Topic: "Periodic Table and Periodicity of Properties"

★ Give short answer.

i) Write the valence shell electronic configuration of an element present in the third period and group III A.

The element present in the third period and group III A is Al.

The valence shell configuration is:
 $3s^2, 3p^1$

ii) Define Halogens.

Halogens:- The elements in group 17 are called "Halogens". The name halogen is derived from Greek word halous means "salt" and gen means "former". They are highly reactive non-metals and their reactivity increases as you move up the group. They are highly reactive because have high electronegativity and low atomic radius. They exist as diatomic molecule.

iii) Which atom have higher shielding effect, Li or Na?

Na has the higher shielding effect.

This is because as you move too to

bottom in a group the shielding effect increases. This is due to increase in the shell and increase in the number of electron.

iv) Explain why, Na has higher ionization energy than K?

Na has higher ionization energy because as you move top to bottom in a group the ionization energy decreases due to increased atomic size and lower force of attraction.

v) Alkali metals belongs to s-block in the periodic table, why?

Alkali metals belongs to s-block in the periodic table because their group number is I. Their outer most electron occupies the s-orbital, which is the first orbital in the energy level. This means they have a single electron in s-orbital, making them highly reactive.

Q3:- Arrange the elements in each of the following groups in order of increasing ionization energy.

a) Li, Na, K

$K < Na < Li$

b) Cl, Br, I
 $I < Br < Cl$

Q4:- Arrange the elements in each of the following in order of decreasing shielding effect.

a) Li, Na, K
 $K > Na > Li$

b) Cl, Br, I
 $I > Br > Cl$

d) Cl, Br
 $Br > Cl$

Q5:- Specify which of the following elements would you expect to have greater electron affinity. S, P, Cl.

Cl has greater electron affinity. As you move left to right across the period the electron affinity generally increases. This is due to increase in nuclear charge and decrease in the atomic radius.

Q6:- Electronic configuration of some elements are given below, group the elements in pairs that would represent similar chemical properties.

$A = 1s^2, 2s^2$, $B = 1s^2, 2s^2, 2p^6$, $C = 1s^2, 2s^2, 2p^3$,
 $D = 1s^2$, $E = 1s^2, 2s^2, 2p^6, 3s^2, 3p^3$, $F = 1s^2, 2s^2$,
 $G = 1s^2, 2s^2, 2p^6, 3s^2$, $H = 1s^2, 2s^2, 2p^6, 3s^2$.

1. A and H have come in the same group due to their similar chemical properties.
2. F and G have come in the same group due to their similar chemical properties.
3. C and E have come in the same group due to their similar chemical properties.
4. D and B have come in the same group due to their similar chemical properties.

Q8:- For normal elements, the number of valence electron is equal to the group number. Find the group number of the following elements:-

a) $^{27}_{13}\text{Al}$

Electronic configuration:

$1s^2, 2s^2, 2p^6, 3s^2, 3p^1$

Group = III A

b) $^{32}_{16}\text{S}$

Electronic configuration:

$1s^2, 2s^2, 2p^6, 3s^2, 3p^4$

Group = VI

c) $^{39}_{19}\text{K}$
Electronic configuration:
 $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$
Group = IA

d) $^{16}_8\text{O}$
Electronic configuration:
 $1s^2, 2s^2, 2p^4$
Group = VIA

Q9: Write the valence shell electronic configuration for the following groups

a) Alkali Metals

Valence shell configuration: ns^1

b) Alkaline Earth Metals

Valence shell configuration: ns^2

c) Halogens

Valence shell configuration: ns^2, np^5

d) Noble gases

Valence shell configuration: ns^2, np^6

Q10: Write electron dot symbols for an atom of the following elements:

a) Be

Be: (2 valence electron)

b) K

K. (1 valence electron)

c) N

:N: (5 valence electron)

d) I

:I: (7 valence electron)

21. Write the valence shell electronic configuration of the atoms of the following elements.

a) An element present in period 3 of group VA.

 $3s^2, 3p^3$

b) An element present in period 3 of group VIA.

 $3s^2, 3p^4$

23. In which block, group, period in the periodic table where would you place each of the following elements with the following electronic configuration.

a) $1s^2, 2s^1$

Block: s-block

Period: 2nd

Group: IA

b) $1s^2, 2s^2, 2p^5$

Block: p-block

Period: 2nd

Group: VII A

c) $1s^2, 2s^2, 2p^6, 3s^2$

Block: s-block

Period: 3rd

Group: II A

d) $1s^2$

Block: s-block

Period: 1st

Group: VII A

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