| Daily Tutorial Sheet-1 | JEE Advanced (Archive) |
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**1. Electron Affinity**

**2.(B)** Hydration energy depends on the charge and radius of the ion. Greater the charge, greater is the hydration energy smaller the radius, greater is the hydration energy.

$\therefore$ Hydration energy of $Mg^{2+}$ > Hydration energy of $Na^{+}$

**3.** ***(i)*** $O^{2-} > F^{-} > Na^{+} > Mg^{2+}$, ***(ii)*** $Na < Al < Mg < Si$, ***(iii)*** $N_2 < O_2 < F_2 < Cl_2$

**(i)** $Mg^{2+}, O^{2-}, Na^{+}$ and $F^{-}$ are all isoelectronic, has 10 electrons each. Among isoelectronic species, the order of size is cation < neutral < anion. Also, between cations, higher the charge, smaller the size and between anions, greater the negative charge, larger the size. Therefore, the decreasing order of ionic radii : $O^{2-} > F^{-} > Na^{+} > Mg^{2+}$

**(ii)** First ionisation energy increases from left to right in a period. However, exception occur between group 2 and 13 and group 15 and 16 where trend is reversed on the grounds of stability of completely filled and completely half-filled orbitals. Therefore, Ionisation energy ($1^{st}$) : $Na < Al < Mg < Si$

**(iii)** If the atom are from same period, bond length is inversely proportional to bond order. In a group, bond length is related directly to atomic radius. Therefore, bond length $N_2 < O_2 < F_2 < Cl_2$

**4. Electronegativity**

Electronegativity $= \dfrac{I.E + E.A}{2}$ (According to mulliken scale)

**5.(T)** Size increases down the graph. Larger the size, more is the softness.

**6.** $I.E_1$ $Zn > Cu$, $I.E_2$ $Cu > Zn$

$Zn = 3d^{10}4s^{2}$, $Cu = 3d^{10}4s^{1}$

The first ionization energy is greater for Zn but reverse true for $2^{nd}$ ionization energy.

**7.** $Ca^{2+} < Ar < Cl^{-} < S^{2-}$

Size $Ca^{2+} < Ar < Cl^{-} < S^{2-}$

**8.(F)** Ionisation potential decreases down the graph but is not the only criteria for reducing power.

**9.(C)** Electronegativity increases from left to right in a period and decreases from top to bottom in a group. Variation is more rapid in a group than in a period. Hence electronegativity : $Si < P < C < N$

**10.(A)** In the same period, the atomic radii of the noble gas is greater, than that of the halogen.

**11.(A)** First ionisation potential of nitrogen is greater than that of oxygen due to stable half filled valence subshell of nitrogen.

**12.(A)** Ionisation energy increases from left to right in a period. However exception occurs in cases where ionisation would disrupt the stable half filled or fully filled subshells.
Ionisation energy of group 2 > Ionisation energy of group 13

**13.(ACD)** The long from of the periodic table does not help to predict the stable valency states of the elements.

**14.(ABC)** Due to stable half filled valence subshell of nitrogen, its first ionization potential is slightly greater than that of oxygen.

**15.(D)** For isoelectronic species, size decreases with increase in atomic number.