

Atomic and ionic radii

49. (d) $S^{2-} > Cl^{-} > K^{+} > Ca^{2+}$

50. (a) N, O, F

(a) **N, O, F** → Period 2, very high electronegativity → **strongest tendency** to form anions.

(b) P, S, Cl → Period 3 → less strong.

(c) As, Se, Br → Period 4 → weaker.

(d) Sb, Te, I → Period 5 → weakest.

51. (b) **Decreases with the increase of nuclear charge**

Isoelectronic species = same number of electrons, but different nuclear charges.

Example: O^{2-} , F^{-} , Na^{+} , Mg^{2+} all have 10 electrons.

More protons (higher nuclear charge) → stronger attraction → **smaller radius**.

So, as nuclear charge increases → radius **decreases**.

52. (a) Covalent radii decreases on going from left to right in periods. However among the transition elements the size do not changes much because the electrons add to the penultimate d -subshells i.e. $(n-1)d$ -subshell.

59. (c) During the conversion of neutral atom to cation size decreases because after removal one e^{-} or more

(i) Nuclear charge per electron increases.

(ii) Outermost shell is completely removed.

60. (b) Atomic radius increases as no. of shells increases.

62. (d) Chloride ion and potassium ion are isoelectronic, isoelectronic ions are those ions having same number of electrons.

$K = 2,8,8,1$

$K^{+} = 2,8,8$

$Cl = 2,8,7$

$Cl = 2,8,8$



63. (c) Cs^+ has the largest ionic radius in the periodic table.
64. (a) Ionic radii increases down the group.
65. (d) Si^{4+} is smallest in size due to their greater +ve charge.
66. (d) Due to having three electrons atomic size increases.
 $F^- = 9 + 1 = 10$ electrons ; $O^{2-} = 8 + 2 = 10$ electrons
 $Al + 3 = 13 - 3 = 10$ electrons ; $N^{3-} = 7 + 3 = 10e^-$.
 Because electrostatic force between nucleus and \bar{e} cloud is least in nitrogen.
67. (d) The trivalent ion having largest size in lanthanide series is lanthanum. This is due to lanthanide contraction.
68. (c) As we know that hydration power decreases on moving down the group hence among alkali metals Li has excessive hydration & hence it has low mobility in aqueous solution.
69. (c) Ionic radius in the n^{th} orbit is given by $r_n = \frac{n^2 a}{Z}$ or $r_n \propto \frac{1}{Z}$ where n is principal equation no., a is bohr's radius of hydrogen atom and Z is the effective nuclear energy.
70. (c) Order of polarising power $Be^{++} > Li^+ > Na^+$
 Hence order of covalent character $BeCl_2 > LiCl > NaCl$
71. (b) Higher the $(n+1)$ value higher is the energy associated with orbitals.
72. (a) With the increase in size of cation the size of the hydrated ion decreases hence ionic conductance increases.

