Ionisation energy

61. (d) $M^{2+} \rightarrow M^{3+}$ After the removal of $2e^-$ the nuclear charge per e^- increases, due to which high energy is required to remove $3e^-$.

62. **(d) O_2^-**

Reason: Extra electron in anion is weakly bound → easiest to remove → lowest ionization potential.

63. (a) I.E. increases from left to right in a period.

64. (b) More because of stable configuration of *Mg*.

65. (b) *He* and *Xe* belongs to same group but *He* has higher ionisation energy because of small size.

66. (c) In second transition electron is to be removed from half filled orbital.

67. **(a) 13.6 eV**

Reason: The electron in hydrogen's 1s orbital is bound with 13.6 eV of energy, so exactly this amount is needed to ionize it.

68. (b) As it belongs to IA group and has maximum size.

69. (a) Since, they have larger size as compared to other.

70. (c) The second I.E. is greater than first I.E. similarly second E.A. is greater than first E.A. the energy is to be supplied to force the second e^- into the anion.

71. (a) Increases as the atomic size decreases and hence effective nuclear charge increases.

72. (b) *B*, *Be*, *C*, *N* as I.E. increases across the period.

73. (d) Ionization potential is least for alkali metals and it decreases down the group.

74. (b) It has maximum ionization energy due to half filled orbitals.

75. (d) It has maximum no. of e^- in outermost shell. So it has maximum I.E.

76. (b) Ionization potential increases as we go from left to right in a period, while it decreases as we come down a group.

Be	*B*	*Li*	*Na*
9.3	8.3	5.4	5.1

77. (c) Half filled *p*-orbitals possess extra stability.

78. (c) Ionization potential decreases down the group.

79. (d) Li^+ and Mg^{+2} ions have similar polarising power or ionic potential and therefore have similar properties. This type of relationship of the first element of a group with the second element of the next group is known as diagonal relationship.

80. (a) The addition of second electron in an atom or ion is always endothermic.

81. (d) We know that ionisation potential gradually decreases of moving down the group while atomic size increases as we move down the group. Hence larger the atomic size, smaller is ionisation potential.

82. (b) Fluorine has highest E^o red {Equal to +2.9 *V*} due to which it can easily accept an electron & hence it is the best oxidising agent.

83. (b) The ionisation energy of tin {*Sn*} is less than that of lead (*Pb*). It is due to the poor shielding of *d*- and *f*-electron in *Pb* due to which it feels greater attraction from nucleus.

84. (a) The order of screening effect in a given shell are in order $s > p > d > f$.

85. (d) The ionisation energy of Li, Be, B and *C* is 520, 899, 801, 1086 *kJ* / *mol* respectively hence, carbon has highest IE_1.

86. (c) Isoelectronic species are those which have same no. of electrons.
$K^+ = 19 - 1 = 18$; $Ca^{+2} = 20 - 2 = 18$
$Sc^{+3} = 21 - 3 = 18$; $Cl^- = 17 + 1 = 18$

87. (a) We know that atomic no. of fluorine (*F*), chlorine (*Cl*), Bromine (*Br*) and Iodine (*I*) are 9, 17, 35 and 53 respectively. Therefore correct reactivity of halogens is $F > Cl > Br > I$

88. (b) Ionisation potential generally increases when we more in a period from left to right but IE_1 of N_2 is greater than that of O_2. It is due to the more stable (half-filled orbitals) configurations of *N*.

89. (c) Nitrogen has more ionisation potential than carbon & oxygen because, if outermost orbit is half filled so it is more stable & order is $C < N > O$