CHAPTER **13**

PERIODIC CLASSIFICATION

13.1 LONG FORM OF PERIODIC TABLE

Long form of periodic table is also called Modern periodic table (MPT). In 1913, Moseley showed that the position of an element in the periodic table depends on its atomic number and not on its atomic mass and gave the following periodic law. 'The physical and chemical properties of the elements vary in relation to their atomic numbers'.

13.1.1 Characteristics of Modern Periodic Table

On the basis of electronic configuration of element.

- (i) The MPT is divided into 4 blocks namely s, p, d and f. All elements have their last electron in the s, p, d and f subshell and are placed in s, p, d and f block, respectively.
- (ii) The MPT is divided into 7 horizontal rows called the periods. The period number tells us the PQN of the outermost occupied orbit of the element.

e.g., x^{15} [Ne] $3s^2 3p^3$ y^{35} $4s^2 4p^5$

Thus, element x and y will be present in the third and fourth periods, respectively.

- (iii) The MPT is also divided into a number of vertical columns called groups. The group number tells us the total number of electrons present in the outermost orbit of an element.
 - e.g., the elements in above example, x and y will be kept in 5th and 7th group, respectively.
- (iv) Groups I to VII are further divided into subgroups A and B. All elements having their last electron in 's or p' orbital are kept in the subgroup A, whereas the subgroup B contains the elements having their last electron in the 'd' or 'f' orbitals.
- (v) In the modern periodic table, the VIII group is divided into three vertical columns, so that all nine elements are given different positions. Hence, MPT contains '18' vertical columns.

13.1.2 Advantages of MPT over Mendeleef's Periodic Table

- (i) Subgroups A and B are given separate positions.
- (ii) In the eighth group, all elements were given separate position.
- (iii) The lanthanides and actinides are given a definite position in the form of f block below the main body of MPT.
- (iv) All isotopes of an element are given same position as they have same atomic number, e.g., ${}^{35}_{17}$ Cl and ${}^{37}_{17}$ Cl.

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- (v) The highly electropositive and electronegative nature of I A and VII A group may be explained on the basis of electronic configuration EC.
- (vi) The variable valencies of 'd' block elements may also be explained with the help of EC.
- (vii) It also explains the cause of periodicity and magic numbers.

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