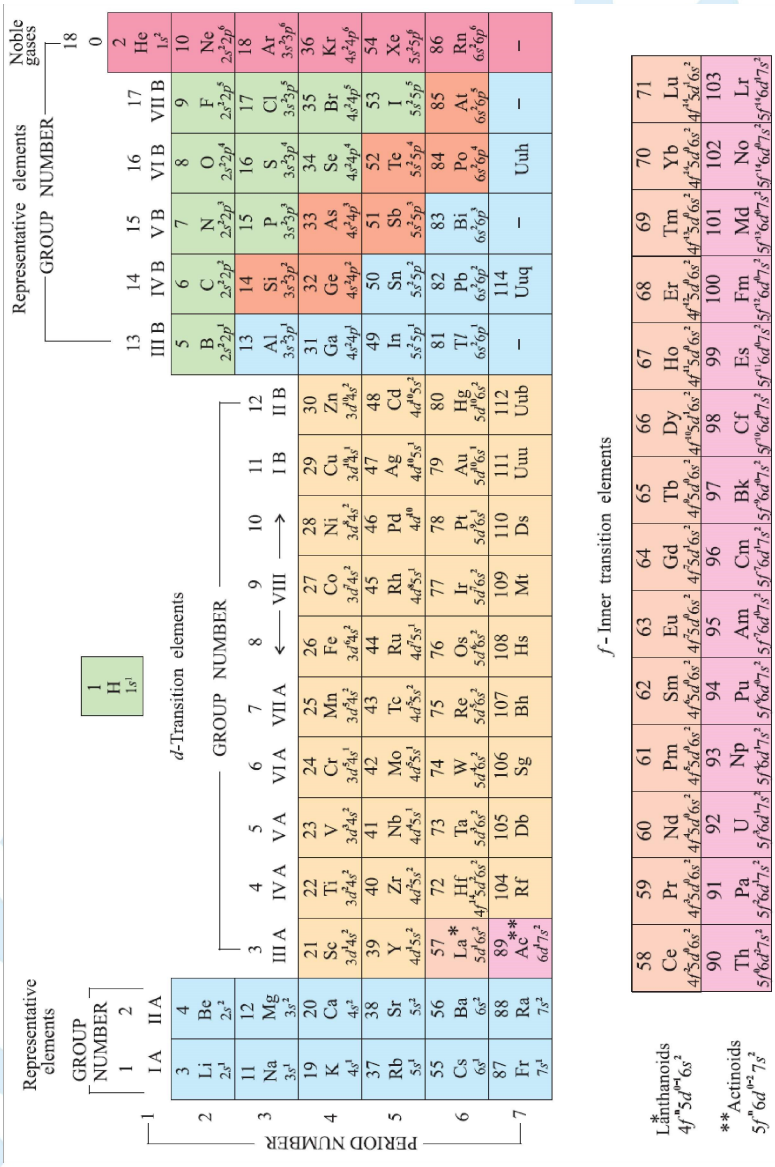
4. PERIODIC CLASSIFICATION OF ELEMENTS

In 1869, a Russian chemist, Dmitri Ivanovich Mendeleev gave a very handy and useful concept to chemists. He stated that elements, if arranged according to their atomic weight, show a distinct periodicity of their properties. Based on this statement, Mendeleev arranged all elements in periodic table in the ascending order of their atomic weights (or atomic numbers). There are horizontal and periods (horizontal columns are also called zero group and sub-groups–these have numbers 1A-7A, 1B-7B, and 8 (three columns). The properties of all elements in one sub-group are the same.



(i) Valency The valency depends on the number of electrons present in the valence or outermost orbit of an atom. In some cases, valency is equal to the number of electrons in the valence orbit of the atom, while in others it is equal to 8 minus valence electrons.

Sodium (2, 8, 1) has valency 1 and chorine (2, 8, 7) also has valency 1, i.e. (8-7).

Group Valency of all elements in a group is same.

Period From moving left to right in a period, valency first increases from 1 to 4 (valence electrons) and then decreases from 4 to 0 (8 minus valence electrons).

(ii) Atomic Size The atomic size is the radius of an atom.

Group Atomic size increases down the group because the number of orbits occupied by electrons increase.

Period Atomic size decreases from moving left to right in a period because of increase in the effective nuclear charge (no. of protons) which pulls the electrons inwards.

(iii) Electro positivity is defined as the tendency of the atom of form positive ions or losing electrons.

$$M \rightarrow M^{+} + e^{-}$$

Group Electro positivity increases down the group because of increasing atomic size.

Period Electro positivity decreases across the period because of the decrease of atomic size.

(iv) Electro negativity is the tendency of the atom of an element to form negative ions by accepting electrons.

$$X^{+}\ e^{-} \rightarrow X^{-}$$

If follows the reverse trend down the group and across the period than that of electro positivity for the same reasons.