

SUBJECT - CHEMISTRY

CLASS - BSc (Hons) PART-II

PAPER - III

GROUP - B

TOPIC - TRANSITION METALS

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Transition elements: Elements having position between s and p-block elements of the periodic table are called transition elements. They are so called as they have transitional properties between s and p-block elements. Transition elements are now characterised by the presence of incompletely i.e. partially filled inner d or f-orbitals in any of their commonly occurring oxidation states. In such elements, the filling of electrons invariably takes place in  $(n-1)$  d-orbitals, so they have their last electron invariably in  $(n-1)$  d-orbitals, hence they are also called d-block elements. All of them are metals. Their atomic volumes are small. Their  $(n-1)$  d-electrons are included in the valence electrons, hence they all are placed in the 3-12 group of the periodic table. Their valence state electronic configuration is  $(n-1)d^{1-10} ns^{2 \text{ or } 1 \text{ or } 0}$  where  $n$  stands for the valence shell number. The value of  $n$  may be 4, 5, 6 or 7. When  $n=4$ , we get 3d or 1st transition series. It starts from element Sc (21) and ends at Zn (30). When  $n=5$ , we get 4d or 2nd transition series. It starts from element Y (39) and ends at Cd (48). When  $n=6$ , we get 5d or 3rd transition series. Its 1st member is Lanthanum La (57) and it again starts from element Hf (72) and ends at Hg (80). When  $n=7$ , we get 6d or 4th transition series.

It starts from element Unq (104) and other members of this Series are being discovered. So, this Series is still incomplete. Therefore, we see that we have only three main transition Series — 1st, 2nd and 3rd, each containing 10 elements.

Q. What are the members of 3d-block elements? Write symbol with electronic configuration of each of them.

Ans - Elements having the atomic numbers from 21 to 30 are the members of 3d block elements. Their symbols and electronic configurations are given below -

