Unit-4: TRANSITION AND INNER TRANSITION ELEMENTS

Learning Objectives

After studying this unit, the students will be able to

- Recognise the position of d and f block elements in the periodic table
- Describe the general trend in properties of elements of 3d series
- Discuss the trends in M^{n+}/M standard electrode potential
- Predict the oxidising and reducing property based in E^{o} values
- Explain the tendencies of d-block elements towards the formation of alloy, complex and interstitial compounds
- Describe the preparation and properties of potassium permanganate and potassium dichromate
- Describe the properties of f-block elements
- Compare the properties of lanthanoides and actinides

Important Notes and Points

- The extra stability due to symmetrical distribution can also be visualized as follows. When the d orbitals are considered together, they will constitute a sphere. So the half filled and fully filled

configuration leads to complete symmetrical distribution of electron density. On the other hand, an unsymmetrical distribution of electron density as in the case of partially filled configuration will result in building up of a potential difference. To decrease this and to achieve a tension free state with lower energy, a symmetrical distribution is preferred.

- Most of the compounds of transition elements are paramagnetic. Magnetic properties are related to the electronic configuration of atoms.

- HCl cannot be used for making the medium acidic since it reacts with KMnO4 as follows. $2MnO_4^- + 10\ Cl^- + 16H^+ \rightarrow 2Mn^{2+} + 5Cl_2 + 8H_2O$

- HNO_3 also cannot be used since it is good oxidising agent and reacts with reducing agents in the reaction.

- However,H_2SO_4 is found to be most suitable since it does not react with potassium permanganate.

- The atomic and ionic radii of lanthanoids gradual decrease with increse in atomic number. This decrese in ionic size is called lanthanoid contraction.