

# D.A.V. PUBLIC SCHOOL, HEHAL, ITKI ROAD , RANCHI-5

## CLASS-XII

### Topic :d- and f- block elements

#### Assignment & H.W.

1. What do you mean by true transition elements ? Zn, Cd & Hg are not considered as true transition elements ?
2. Explain giving reasons :-
  - (i)Transition metals are hard having high melting and boiling points & enthalpy of atomization.
  - (ii)Transition metals and their ions form coloured compounds.
  - (iii)Transition metals and their many compounds act as good catalyst.
  - (iv)Transition metals and many of their compounds show paramagnetic behavior.
  - (v)Transition metals are capable of exhibiting variable oxidation states.
  - (vi)Transition metals easily form alloy with each other.
  - (vii)Transition metals are capable of forming interstitial compounds.
3. What is meant by disproportionation ? Give three examples of disproportionation reactions in aqueous solution shown by transition metallic compounds or ions.
4. Name the elements of 1<sup>st</sup> transition series which do not exhibit variable oxidation states.
5. Name the divalent cation of 3d-transition series having maximum unpaired electrons in d-sub-shell.
6. How would you account for the following ?
  - (i) $K_2[PtCl_6]$  is a well known compound whereas corresponding Ni compound is not known.
  - (ii) $E^0_{Mn^{3+}/Mn^{2+}}$  is more positive than  $E^0_{Fe^{3+}/Fe^{2+}}$  . (At Nos. : Mn=25, Fe=26)
  - (iii)Ionisation enthalpies of 5d-transition elements are higher than those of 4d- & 3d-transition elements in their corresponding groups.
  - (iv)Atomic radii of 4d- and 5d-transition metals have almost equal atomic radii in their groups.
  - (v) $Sm^{2+}$ ,  $Eu^{2+}$  and  $Yb^{2+}$  ions in solutions are good reducing agents but aqueous solution of  $Ce^{4+}$  ion a good oxidizing agent.
  - (vi)Actinoids exhibit a large number of oxidation states than the corresponding Lanthanoids.
  - (vii) $Cr^{2+}$  is reducing but  $Mn^{3+}$  is oxidising though both have  $d^4$  configuration .
  - (viii) $Cu^{2+}$  ion is not stable in aqueous solution .
  - (ix)Actinoid Contraction is greater for element to element than Lanthanoid Contraction.
  - (x)Transition metals show highest oxidation states in their oxide and fluoride only.

7. What do you mean by inner transition elements ?
8. What are Lanthanoids ? What do you mean by Lanthanoid Contraction ? Explain its cause. Explain the consequences of Lanthanoid Contraction.
9. How is the variability in oxidation states of transition metals different from that of the non-transition metals ? Illustrate with examples.
10. Describe the preparation of potassium dichromate from iron chromite ore. What is the effect of increasing pH on a solution of potassium dichromate ? Describe the oxidising action of potassium dichromate and write ionic equations for its reactions with (i) iodide (ii) iron(II) solution & (iii) H<sub>2</sub>S.
11. Describe the preparation of potassium permanganate from pyrolusite ore. (i) How does the acidified permanganate solution react with: (a) Iron(II) ions (b) SO<sub>2</sub> (c) Oxalic acid ?

(ii) How does neutral or faintly alkaline solution of KMnO<sub>4</sub> react with : (a) iodide solution (b) thiosulphate solution. Write the balanced equations for the above redox reactions.

12.  $E^{\circ}_{M^{2+}/M}$ :-

Cr	Mn	Fe	Co	Ni	Cu
-0.91	-1.18	-0.44	-0.28	-0.25	+0.34

From the given data  $E^{\circ}$  values, answer the following questions :

- (i) Why is  $E^{\circ}_{(Cu^{2+}/Cu)}$  value exceptionally positive ?
- (ii) Why is  $E^{\circ}_{(Mn^{2+}/Mn)}$  value highly negative as compared to other elements ?
- (iii) Which is a stronger reducing agent Cr<sup>2+</sup> or Fe<sup>2+</sup> ? Give reasons.

13. What can be inferred from the magnetic moment values of the following complex species ?

<u>Example</u>	<u>Magnetic Moment(BM)</u>
K <sub>4</sub> [Mn(CN) <sub>6</sub> ]	2.2
[Fe(H <sub>2</sub> O) <sub>6</sub> ] <sup>2+</sup>	5.3
K <sub>2</sub> [MnCl <sub>4</sub> ]	5.9

14. A violet compound of manganese (A) decomposes on heating to liberate oxygen and compounds (B) and (C) of manganese are formed. Compound (C) reacts with

KOH in the presence of potassium nitrate to give compound (B). On heating compound (C) with conc. H<sub>2</sub>SO<sub>4</sub> and NaCl, chlorine gas is liberated and a compound (D) of manganese along with other products is formed. Identify

compounds A and D and also explain the reactions involved.

15. When oxide of manganese (A) is fused with KOH in the presence of oxidizing agent and dissolved in water, it gives a dark solution of compound (B).

Compound (B) disproportionates in neutral or acidic solution to give purple compound (C). An alkaline solution of compound (C) oxidises potassium iodide solution to a compound (D) and compound (A) is also formed. Identify compounds

A and D and also explain the reactions involved.

16. Solve all the NCERT intext and Exercises questions.

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