



## d -and f -Block Elements

### Q.No.1:

Explain the following observations:

- (i) Transition elements generally form coloured compounds.
- (ii) Zinc is not regarded as a transition element.

**CBSE Board Paper 2010**

### Q.No.2:

How would you account for the following?

- (i) The atomic radii of the metals of the third (5d) series of transition elements are virtually the same as those of the corresponding members of the second (4d) series.
- (ii) The  $E^\circ$  Value for the  $\text{Mn}^{3+}/\text{Mn}^{2+}$  couple is much more positive than that for  $\text{Cr}^{3+}/\text{Cr}^{2+}$  couple or  $\text{Fe}^{3+}/\text{Fe}^{2+}$  couple.
- (iii) The highest oxidation state of a metal is exhibited in its oxide or fluoride.

**CBSE Board Paper 2010**

### Q.No.3:

Complete the following chemical equations:

- (i)  $\text{Cr}_2\text{O}_7^{2-} + \text{H}^+ + \text{I}^- \rightarrow$
- (ii)  $\text{MnO}_4^- + \text{NO}_2^- + \text{H}^+ \rightarrow$

**CBSE Board Paper 2012**

### Q.No.4:

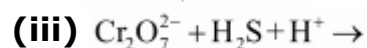
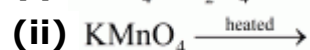
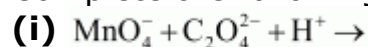
Explain the following observations giving as appropriate reason for each.

- (i) The enthalpies of atomization of transition elements are quite high.
- (ii) There occurs much more frequent metal-metal bonding in compounds of heavy transition metals (i.e 3<sup>rd</sup> series).
- (iii)  $\text{Mn}^{2+}$  is much more resistant than  $\text{Fe}^{2+}$  towards oxidation.

**CBSE Board Paper 2012**

### Q.No.5:

Complete the following chemical equations:



**CBSE Board Paper 2011**

**Q.No.6:**

Assign reasons for each of the following:

(i) Transition metals generally form coloured compounds.

(ii) Manganese exhibits the highest oxidation state of +7 among the 3d series of transition elements.

**CBSE Board Paper 2011**

**Q.No.7:**

(a) Which metal in the first transition series (3d series) exhibits + 1 oxidation state most frequently and why?

(b) Which of the following cations are coloured in aqueous solutions and why ?

$\text{Sc}^{3+}$ ,  $\text{V}^{3+}$ ,  $\text{Ti}^{4+}$ ,  $\text{Mn}^{2+}$  (At. Nos. Sc = 21, V = 23, Ti = 22, Mn = 25)

**CBSE Board Paper 2013**

**Q.No.8:**

How would you account for the following?

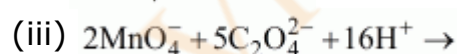
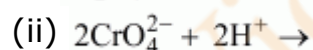
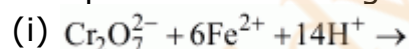
(i) Transition metals exhibit variable oxidation states.

(ii) Zr (Z = 40) and Hf (Z = 72) have almost identical radii.

(iii) Transition metals and their compounds act as catalyst.

**OR**

Complete the following chemical equations:



**CBSE Board Paper 2013**

**Q.No.9:**

Explain the following giving an appropriate reason in each case.

(i)  $\text{O}_2$  and  $\text{F}_2$  both stabilize higher oxidation states of metals but  $\text{O}_2$  exceeds  $\text{F}_2$  in doing so.

(ii) Structures of Xenon fluorides cannot be explained by Valence Bond approach.

**CBSE Board Paper 2012**

**Q.No.10:** (a) How do you prepare:

(i)  $\text{K}_2\text{MnO}_4$  from  $\text{MnO}_2$ ?

(ii)  $\text{Na}_2\text{Cr}_2\text{O}_7$  from  $\text{Na}_2\text{CrO}_4$ ?

(b) Account for the following:

(i)  $\text{Mn}^{2+}$  is more stable than  $\text{Fe}^{2+}$  towards oxidation to +3 state.

(ii) The enthalpy of atomisation is lowest for Zn in 3d series of the transition elements.

(iii) Actinoid elements show wide range of oxidation states.

**OR**

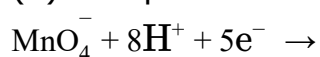
(i) Name the elements of 3d transition series that show maximum number of oxidation states. Why does this happen?

(ii) Which transition metal of 3d series has positive  $E^\circ (\text{M}^{2+}/\text{M})$  value and why?

(iii) Out of  $\text{Cr}^{3+}$  and  $\text{Mn}^{3+}$ , which is a stronger oxidising agent and why?

(iv) Name a member of the lanthanoid series that is well-known to exhibit +2 oxidation state.

(v) Complete the following equation:



**CBSE Board Paper 2014**

**Q.No.11:** What are the transition elements? Write two characteristics of the transition elements.

**CBSE Board Paper 2015**

**Q.No.12:** (a) How would you account for the following :

(i) Actinoid contraction is greater than lanthanoid contraction.

(ii) Transition metals form coloured compounds

(b) Complete the following equation :



**CBSE Board Paper 2015**