



**INDIAN SCHOOL MUSCAT**  
**SENIOR SECTION**  
**DEPARTMENT OF CHEMISTRY**  
**CLASS XII**  
**CHAPTER - The d and f Block Elements**  
**WORKSHEET - 13**



1. What is Misch metal? Give its use.
2. Why do most of the transition metal ions exhibit characteristic colour in aqueous solution?
3. Why do transition elements show variable oxidation states? How is the variability in oxidation states of d-block different from that of the p-block elements?
4. What is Lanthanoid contraction? Give its consequences.
5. Explain with equations, how the colour of a solution of  $K_2Cr_2O_7$  depends on pH.
6. Complete and balance the following chemical equations:
  - a)  $Cr_2O_7^{2-} + I^- + H^+ \rightarrow$
  - b)  $MnO_4^- + SO_3^{2-} + H^+ \rightarrow$
7. Answer the following questions:
  - a) Why do actinoids in general exhibit a greater range of oxidation states than the Lanthanoids?
  - b) Which element in the first series of transition elements does not exhibit variable oxidation states and why?
8. Describe the preparation of
  - a) Potassium dichromate from sodium chromate and
  - b)  $KMnO_4$  from  $K_2MnO_4$
9.
  - a)  $E^0$  value for the  $Mn^{3+}/Mn^{2+}$  couple is positive (+ 1.5 V) whereas that of  $Cr^{3+}/Cr^{2+}$  is negative (-0.4 V). Why?
  - b) The chemistry of actinoids is not so smooth as that of lanthanoids.
  - c) Complete the following equation :
$$2MnO_4^- + 16 H^+ + 5C_2O_4^{2-} \rightarrow$$
10. Explain the following observations:
  - a) Transition metals generally form coloured compounds.
  - b) Zinc is not regarded as a transition metal.
  - c) Transition elements and their compounds are generally found to be good catalysts in chemical reactions.

11. Account for the following:
- The enthalpy of atomization of the transition metals is high.
  - The lowest oxide of a transition metal is basic while the highest is amphoteric or acidic.
  - Cobalt (II) is stable in aqueous solution but in the presence of complexing agents, it is easily oxidized.
12. i) Complete and balance the following chemical equations:
- $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- + \text{H}^+ \rightarrow$
  - $\text{MnO}_4^- + \text{SO}_3^{2-} + \text{H}^+ \rightarrow$
- ii) How would you account for the following:
- The oxidizing power of oxoanions are in the order  
 $\text{VO}_2^+ < \text{Cr}_2\text{O}_7^{2-} < \text{MnO}_4^-$
  - The third ionization enthalpy of manganese ( $Z = 25$ ) is exceptionally high.
  - $\text{Cr}^{2+}$  is a stronger reducing agent than  $\text{Fe}^{2+}$ .

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