

## D & F BLOCK ELEMENTS

### 1 MARK QUESTIONS

1. What is meant by 'lanthanoid contraction'?
2. Why do transition elements show variable oxidation states?
3. Write the formula of an oxo-anion of Manganese (Mn) in which it shows the oxidation state equal to its group number.
4. Zinc, cadmium and mercury are not considered as transition metals. Why?
5. Write the general configuration of d- block elements.
6. What are the factors that decide the ionization potential?
7. What are interstitial compounds. Give two examples.
8. What is the effect of adding a base to potassium dichromate?
9. Draw the structure of chromate and dichromate ions.
10. The chemistry of actinoids is more complicated than lanthanoids. Why?
11. Actinoid contraction is more than lanthanoid contraction. Give reason.
12. Actinoids show larger number of oxidation states than lanthanoids. Why?

### 2 MARK QUESTIONS

13. Give an explanation for the catalytic properties shown by transition metals.
14. What happens when
  - (a) A lanthanoid reacts with dil- acid
  - (b) A lanthanoid reacts with water.
15. Write the formula of an oxo-anion of Chromium (Cr) in which it shows the oxidation state equal to its group number.

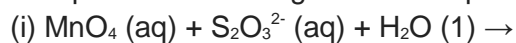
### 3 MARKS QUESTIONS

16. Explain the following observations :
  - (i) Generally there is an increase in density of elements from titanium ( $Z = 22$ ) to copper ( $Z = 29$ ) in the first series of transition elements.
  - (ii) Transition elements and their compounds are generally found to be good catalysts in chemical reactions.
17. Explain the following observations :
  - (i) Transition elements generally form coloured compounds.
  - (ii) Zinc is not regarded as a transition element
18. Assign reasons for the following :
  - (i) Copper (I) ion is not known in aqueous solution.
  - (ii) Actinoids exhibit greater range of oxidation states than lanthanoids.
19. 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.
20. How would you account for the following :
  - (i)  $\text{Cr}^{2+}$  is reducing in nature while with the same d-orbital configuration ( $d^4$ )  $\text{Mn}^{3+}$  is an

oxidising agent.

(ii) In a transition series of metals, the metal which exhibits the greatest number of oxidation states occurs in the middle of the series.

21. Complete the following chemical equations : (All India 2011)



22. State reasons for the following :

(i) Cu (I) ion is not stable in an aqueous solution.

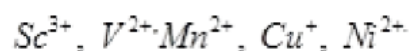
(ii) Unlike  $\text{Cr}^{3+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{3+}$  and the subsequent other  $\text{M}^{2+}$  ions of the 3d series of elements, the 4d and the 5d series metals generally do not form stable cationic species.

23. Explain giving a suitable reason for each of the following :

(i) Transition metals and their compounds are generally found to be good catalysts.

(ii) Metal-metal bonding is more frequent for the 4d and the 5d series of transition metals than that for the 3d series.

24. Transition metals generally form coloured ions. Why? Which of the following will be colored?



25. Explain the steps of preparation of potassium dichromate? What is the lanthanoid contraction? What are its causes and consequences?

26. Explain the following :

(a) The enthalpies of atomization of transition metals are quite high.

(b) The transition metals and many of their compounds act as good catalysts.

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

(b) Which of the following cations are coloured in aqueous solutions and why?  
 $\text{Sc}^{3+}$ ,  $\text{V}^{3+}$ ,  $\text{Ti}^{4+}$ ,  $\text{Mn}^{2+}$ .

28. Assign reasons for the following :

(i) Copper(I) ion is not known to exist in aqueous solutions.

(ii) Both  $\text{O}_2$  and  $\text{F}_2$  stabilize high oxidation states of transition metals but the ability of oxygen to do so exceeds that of fluorine.

29. Suggest reasons for the following features of transition metal chemistry :

(i) The transition metals and their compounds are usually paramagnetic.

(ii) The transition metals exhibit variable oxidation states.

30. Describe the preparation of potassium permanganate. How does the acidified permanganate solution react with oxalic acid? Write the ionic equations for the reactions.