



# CHEMISTRY

## BOOKS - MBD -HARYANA BOARD

### THE D- AND F- BLOCK ELEMENTS

#### Objective Type Questions

1. Number of unpaired elements in Cu (atomic number = 29) are :

A. 5

B. 0

C. 1

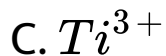
D. 10

**Answer: B**



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2. Which of the following ion is colourless in aqueous solution ?

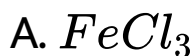


**Answer: D**



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**3. In the following which is not coloured ?**



B.  $CrCl_3$

C.  $TiCl_3$

D.  $HgI_2$

**Answer: D**



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**4. Maximum oxidation state of Zn, Cd and Hg are :**

A. +3

B. +4

C. +2

D. +1

**Answer: C**



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5. Which is not a coinage metal ?

A. Cu

B. Ag

C. Au

D. Zn

**Answer: D**



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**6. Which of the following is not an actinide ?**

A. Curium

B. Californium

C. Uranium

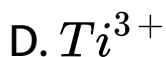
D. Terbium

**Answer: D**



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7. Which of the following will be diamagnetic ?



**Answer: C**



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**8. Which is first man-made element ?**

A. Sc

B. Os

C. TC

D. Zr

**Answer: C**





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9. Misch metal is an alloy of :

A. La

B. Th

C. Ac

D. None of these.

**Answer: A**



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10. Lanthanide contraction is observed in

A. Gd

B. At

C. Xe

D. Ac

**Answer: A**



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11. Which of the following would be paramagnetic ?



**Answer: D**



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12. Lanthanoids and actinides resemble in :

A. Electronic configuration

B. Oxidation states

C. Ionisation energy

D. None of these.

**Answer: D**



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13. Which of the following is not Lanthanides?

A. Curium

B. Thulium

C. Promethium

D. Terbium

**Answer: A**



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**14.** Which transition metal can show highest oxidation state ?

A. Sc

B. Ti

C. Os

D. Zn

**Answer: C**



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**15.** Transition metal with lowest atomic number

A. Sc

B. Ti

C. Cu

D. Zn

**Answer: A**



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**Very Short Answer Type Questions**

1. Calculate the magnetic moment of  $Fe^{2+}$

(At. No. 26)?



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2. Write the electronic configuration of last but one element of 3d series.



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3. What is the electronic configuration of  $Co^{2+}$  (At. No. 27) ?



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4. Write the oxidation states of Europium (At. No. 63).



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5. Write the oxidation states of Samarium (At. No. 62).



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6. Name the oxometal anions of the first series of transition metals in which metal exhibits oxidation state equal to its group number.



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7. What are the different oxidation states exhibited by Lanthanoids?



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8. Define transition elements. Give their general outer electronic configuration.



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9. Would you classify zinc as a transition element ? Give reasons for your answer.

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10. Which of the following species are not coloured ?

Cu(I), Ti(III), Fe(II), V(II), Cd(III), Zn(II).

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11. What happens when potassium dichromate is heated with conc.  $H_2SO_4$  and a solution of NaCl ? Give equations.



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12. Why does Mn (II) ion show maximum paramagnetic character amongst the bivalent ions of first transition series ?



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13. Which of the following do you expect to be coloured out of  $Cr^+$  or  $Cu^+$  and why?



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## Short Answer Type Questions

1. (a) What happens when acidified  $K_2Cr_2O_7$  is treated with :

(i)  $H_2S$  (ii)  $KI$  (iii)  $FeSO_4$

(b) Write formula of :

(1) Pyrolusite ore (ii) Chromite ore.



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2. (a) What happens when acidified  $KMnO_4$  is treated with :

(i) KI (ii)  $H_2S$  (iii)  $KNO_2$

(b) What happens when  $KMnO_4$  is heated ?

Give reaction.



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3. Give example and suggest reasons for the following features of the transition metal chemistry.

(a) The lowest oxide of transition metal is basic, the highest is acidic.

(b) A transition metal exhibits higher oxidation states in oxides and fluorides.

(c) The highest oxidation state is exhibited in oxoanions of a metal.



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4. What is lanthanide contraction ? Give its cause. What are the consequences of lanthanide contraction ?



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5. Give important differences between lanthanides and actinides



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6. Give the differences between lanthanides and actinides



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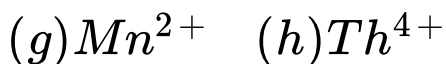
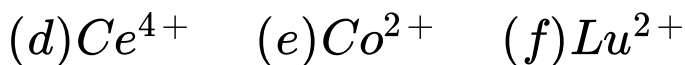
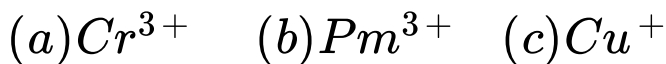
7. In what way, is the electronic configuration of transition elements different from that of non-transition elements ?



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8. Write down the electronic configurations of

:



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9. Compare the chemistry of actinoids with that of lanthanoids with special reference to :

(i) Atomic sizes (ii) Chemical reactivity.



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**10.** Explain : Transition metals have high melting and boiling points.



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**11.** Why transition metals have high enthalpies of atomisation.



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**12.** Transition metals form alloys with other transition metals. Explain.



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**13.** Explain magnetic behaviour of transition metals.



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**14.** Why do transition metals form interstitial compounds ?



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**15.** What are interstitial compounds ? Why are such compounds well known for transition metals?



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16. Why are  $Ni^{2+}$  compounds thermodynamically more stable than  $Pt^{2+}$  compounds while  $Pt^{4+}$  compounds are relatively more stable than  $Ni^{4+}$  compounds ?



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17. Zn, Cd and Hg are not regarded as transition metals. Give reason.



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## Long Answer Type Questions

1. How would you account for the following:

(a) of the  $d^4$  species,  $Cr^{2+}$  is strongly reducing while  $Mn^{3+}$  is strongly oxidizing,

(b)  $Co^{2+}$  is stable in aqueous solution but in the presence of complexing reagents it is easily oxidised.

(c) The  $d^1$  configuration is very unstable in ions.



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2. Describe the preparation of potassium permanganate from pyrolusite ore by electrochemical method. Discuss its important properties and uses.



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3. Describe the preparation of potassium permanganate. How does the acidified potassium permanganate react with : (i)  $SO_2$

(ii) oxalic acid (iii)  $FeSO_4$ . Write the ionic equations for these reactions.



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4. How does acidified  $KMnO$  solution react with the following:

(i)  $FeSO_4$  (i)  $SO_2$  (ii) Oxalic acid (iv) KI (v)

$H_2O_2$



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5. Explain with chemical reactions three oxidising properties of  $KMnO_4$  in acidic medium.



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6. (a) Write ionic equations for the reaction of acidified potassium permanganate with following:

(i) Oxalic acid,

(ii)  $H_2S$

(iii) Sulphite ion.

(b) Describe the reactivity of actinoids.



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7. (a) Why are  $Mn^{2+}$  compounds more stable than  $Fe^{2+}$  towards oxidation to their +3 state?

(b) What are interstitial compounds ? Why are such compounds well-known for transition metals?

(c) Write electronic configuration of  $Pm^{3+}$ .



8. (a) How is potassium dichromate prepared from chromite ? How does it react with :

(i) acidified ferrous sulphate solution

(ii) potassium iodide solution

(iii) hydrochloric acid

(iv) conc.  $H_2SO_4$  and soluble metal chloride ?

(b) The orange colour of potassium dichromate changes to yellow on the addition of alkali, On acidifying the yellow solution, the colour again changes to Orange red. Explain

giving equations. Draw structures of important species formed.



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