



CHEMISTRY

BOOKS - OSWAAL PUBLICATION CHEMISTRY (KANNADA ENGLISH)

D - BLOCK ELEMENTS F - BLOCK ELEMENTS

Topic 1 D Block Elements Their Properties And Compounds Very Short Answer Type Questions

1. Write the electronic configuration of Ti^{+3} ion.

 [Watch Video Solution](#)

2. What is the colour of potassium dichromate in acidic medium ?

 [Watch Video Solution](#)

3. Atomic size of 3d-series elements from chromium to copper is almost the same. Give reason.

 [Watch Video Solution](#)

4. Write the molecular formula of chromyl chloride.

 [Watch Video Solution](#)

5. Why are transition metal compounds coloured ?

 [Watch Video Solution](#)

6. What are d-block elements ?

 [Watch Video Solution](#)

7. Give the general electronic configuration of d-block or transition elements.

 [Watch Video Solution](#)

8. Name any two characteristics of transition elements.

 [Watch Video Solution](#)

9. Mention the elements which show anomalous electronic configuration in transition elements.

 [Watch Video Solution](#)

10. What are transition metals ?

 [Watch Video Solution](#)

11. What is the position of d-block elements ?

 [Watch Video Solution](#)

12. Copper atom has completely filled d-orbitals. How can it be considered as a d-block metal ?

 [Watch Video Solution](#)

13. Zn, Cd and Hg are included in transition elements even though they have completely filled d-orbitals. Give reason.

 [Watch Video Solution](#)

14. How many elements are there in 3d-series elements ?

 [Watch Video Solution](#)

15. Why do transition metals form alloy ?

 [Watch Video Solution](#)

16. What is the common oxidation state of first transition series of elements ?

 [Watch Video Solution](#)

17. Why are the compounds of transition elements coloured?

 [Watch Video Solution](#)

18. Ferrous salts slowly convert to ferric salts on exposure to air. Why?

 [Watch Video Solution](#)

19. Why are Cu(I) salts colourless ?

 [Watch Video Solution](#)

20. What is the reason for the catalytic activity of transition elements and their compounds ?

 [Watch Video Solution](#)

21. most of the transition metal compounds are paramagnetic. Why?

 [Watch Video Solution](#)

22. What is the configuration of Zn^{2+} ion?

 [Watch Video Solution](#)

23. What is the electron configuration of chromium?

 [Watch Video Solution](#)

24. Electronic configuration of copper is $3d^{10}4s^1$ instead of $3d^94s^1$. Why?

 [Watch Video Solution](#)

25. Atomic size of 3d-series elements from chromium to copper is almost the same. Give reason.

 [Watch Video Solution](#)

26. What is the minimum oxidation state of a d-block element ?

 [Watch Video Solution](#)

27. What is the maximum oxidation state of a d-block element ?

 [Watch Video Solution](#)

28. Cu^{2+} ions are coloured but Zn^{2+} ions are colourless. Give reason.

 [Watch Video Solution](#)

29. Copper sulphate solution absorbs red colour from white light. Why?

 [Watch Video Solution](#)

30. Name the reaction in which platinised asbestos is used as catalyst.

 [Watch Video Solution](#)

31. Why are transition elements so named ?



[Watch Video Solution](#)

32. What is paramagnetic character due to ?



[Watch Video Solution](#)

33. Why are transition elements known as d-block elements ?



[Watch Video Solution](#)

34. How many elements are present in the d-block of the periodic table ?



[Watch Video Solution](#)

35. Why does a transition series contain 10 elements ?



[Watch Video Solution](#)

36. Why is copper (At no. 29) considered a transition metal?

 [Watch Video Solution](#)

37. Why does vanadium pentoxide act as a catalyst ?

 [Watch Video Solution](#)

38. Why Cd^{2+} salts are white ?

 [Watch Video Solution](#)

39. Write the formula of a compound where transition metal is in +7 oxidation state.

 [Watch Video Solution](#)

40. Write any two uses of pyrophoric alloys.

 [Watch Video Solution](#)

Topic 1 D Block Elements Their Properties And Compounds Short Answer Type Questions I

1. Calculate the magnetic moment of Mn^{2+} ion.

[Atomic number of Mn=25]

 [Watch Video Solution](#)

2. Name the elements in the 3d-series that shows

(i) maximum oxidation state

(ii) is diamagnetic

 [Watch Video Solution](#)

3. Calculate the magnetic moment of Ti^{2+}

 [Watch Video Solution](#)

4. Explain the position of d-block elements in the periodic table.

 [Watch Video Solution](#)

5. Account for the variation of atomic size along 3d-block elements.

 [Watch Video Solution](#)

6. Explain the variation in the oxidation states of 3d-block elements.

 [Watch Video Solution](#)

7. Why are the compound of transition elements coloured?

 [Watch Video Solution](#)

 Watch Video Solution

8. Explain the magnetic properties of transition metals.

 Watch Video Solution

9. d-block elements form complex compounds, Give reason.

 Watch Video Solution

10. Transition elements show high melting points. Why?

 Watch Video Solution

11. Explain briefly how +2 state becomes more and more stable in the first half of the first row transition elements with increasing atomic number?

 Watch Video Solution

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

 [Watch Video Solution](#)

13. What are the characteristics of the transition elements and why are they called transition elements? Which of the d-block elements may not be regarded as the transition elements ?

 [Watch Video Solution](#)

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

 [Watch Video Solution](#)

15. How is potassium permanganate ($KMnO_4$) prepared from MnO_2 ?
write the equation.

 [Watch Video Solution](#)

16. Write the structure of MnO_4^{2-} and MnO_4^- ions.

 [Watch Video Solution](#)

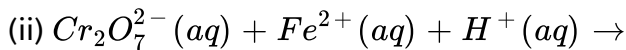
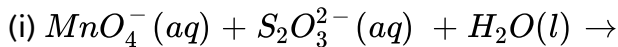
17. Explain why:

(i) E^0 for Mn^{3+}/Mn^{2+} couple is more positive than that for Fe^{3+}/Fe^{2+} . (At. Nos. Mn = 25, Fe = 26).

(ii) Ce^{3+} can be easily oxidised to Ce^{4+} . (At. No. Ce = 58).

 [Watch Video Solution](#)

18. Complete the following chemical equations:



Watch Video Solution

19. 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.



Watch Video Solution

20. 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.



Watch Video Solution

21. How would you account for the following:

(i) Cr^{2+} is reducing in nature while with the same d-orbital configuration

$(d^4)Mn^{3+}$ is an oxidising agent.

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

 [Watch Video Solution](#)

22. State reasons for the following:

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

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

 [Watch Video Solution](#)

23. Explain giving reasons :

(i) Transition metals and their compounds generally exhibit a

paramagnetic behaviour.

(ii) The chemistry of actinoids is not so smooth as that of lanthanoids.

 [Watch Video Solution](#)

24. Account for the following: (i) Cu^+ ions are not stable in aqueous solution.

(ii) Most of the transition metal ions exhibit paramagnetic behaviour.

 [Watch Video Solution](#)

25. 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^0 value for the Mn^{3+} / Mn^{2+} couple is much more positive than that for Cr^{3+} / Cr^{2+} couple or Fe^{3+} / Fe^{2+} couple.

 [Watch Video Solution](#)

26. Name the reaction that takes place when a mixture of potassium dichromate and potassium chloride (or sodium chloride) crystals is warmed with conc. sulphuric acid. Give the equation for the reaction.

 [Watch Video Solution](#)

27. Account for the following:

- (i) In the series Sc to Zn, the enthalpy of atomisation of zinc is the lowest.
- (ii) The E^0 value for the Mn^{3+} / Mn^{2+} couple is much more positive than that for Cr^{3+} / Cr^{2+} .

 [Watch Video Solution](#)

28. Account for the following:

- (i) Transition elements exhibit higher enthalpies of atomisation.
- (ii) Cr^{2+} is reducing and Mn^{3+} is oxidising when both have d^4 configuration.

 [Watch Video Solution](#)

29. 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.

 [Watch Video Solution](#)

30. Explain the following observations:

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

 [Watch Video Solution](#)

1. (a) Transition metals show variable oxidation states. Explain.

(b) Which metal of 3d-series exhibit maximum number of oxidation state?

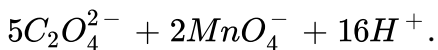
 [Watch Video Solution](#)

2. How is $K_2Cr_2O_7$ manufactured from chromite ore.

 [Watch Video Solution](#)

3. (i) Write the two chemical equations to show the inter conversion of chromates & dichromates in aqueous solution.

(ii) Complete the equation:



 [Watch Video Solution](#)

4. D-block elements form co-ordination compounds. Give reasons.

 [Watch Video Solution](#)



[Watch Video Solution](#)

5. Name the metal of the 1st row transition series that

- (i) has maximum number of unpaired electrons in its ground state.
- (ii) has zero spin only magnetic moment in its + 2 oxidation state.
- (iii) exhibits maximum number of oxidation states.



[Watch Video Solution](#)

6. Write ionic equations for the reaction of dichromate ions with

- (i) hydroxyl ions,
- (ii) Fe^{+2} ions in acidic medium

In which one of the above two reactions will the oxidation number of chromium remains unchanged ?



[Watch Video Solution](#)

7. (a) What are interstitial compounds ? Write any one of their characteristics.

(b) Out of the following elements, identify the element which does not exhibit variable oxidation state : Cr, Co, Zn.

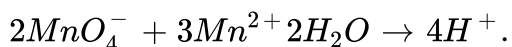
 [Watch Video Solution](#)

8. (a) Which gas is liberated when

(i) crystals of potassium permanganate is heated to 513K ?

(ii) Acidified potassium permanganate is treated with oxalate ion at 333K ?

(b) Complete the following equation:



 [Watch Video Solution](#)

9. Give reason :

(i) Most of the transition metals have high melting point and boiling

point

(ii) 2nd ionization enthalpy of Cu is exceptionally high.

(iii) atomic size of 4d- and 5d-series elements are almost the same.

 [Watch Video Solution](#)

10. (i) What happens when H_2S is passed into potassium dichromate in acidic medium ? Give the equation.

(ii) What is the composition of chromite ore ?

 [Watch Video Solution](#)

11. (a) Transition metals and their compounds are used as catalysts. Give two reasons

(b) Write the outer electronic configuration of chromium (atomic No. = 24)

 [Watch Video Solution](#)

12. How is potassium permanganate ($KMnO_4$) prepared from MnO_2 ?

Write the equations.

 [Watch Video Solution](#)

13. Give reason (one each) for the following:

(a) Transition metals are good catalytic agent

(b) Second ionisation enthalpy of copper is very high.

(c) The spin only magnetic moment of Sc^{3+} is zero ($Z = 21$).

 [Watch Video Solution](#)

14. With reference to the first row transition series:

i) Name the metal which possesses maximum number of oxidation states.

ii) Among Zn^{+2} and Cu^{+2} which is colourless?

iii) Between Ti^{2+} and V^{2+} which ion contains more number of unpaired electrons?

 [Watch Video Solution](#)

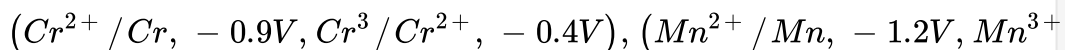
15. What may be the stable oxidation state of the transition element with the following d-electron configuration in the ground state of their atoms $3d^3$, $3d^5$, $3d^8$, and $3d^4$?

 [Watch Video Solution](#)

16. Explain colour of transition metal compounds based on crystal field splitting.

 [Watch Video Solution](#)

17. For M^{2+} / M and M^{3+} / M^{2+} systems the E_0 values for some metals are as follows:



Use this data to comment upon :

(i) The stability of Fe^{3+} in acid solution as compared to that of Cr^{3+} or MnO^{3+} , and

(ii) The case with which iron can be oxidised as compared to similar process for either chromium or manganese metal.

 [Watch Video Solution](#)

18. Predict which of the following will be coloured in aqueous solution ?

Ti^{3+} , V^{3+} , Cu^+ , Sc^{3+} , Mn^{2+} , Fe^{3+} and Co^{2+} . Give reasons for each.

 [Watch Video Solution](#)

19. How would you Account for the following:

(i) Of the d^4 species, Cr^{2+} is strongly reducing while manganese (III) is strongly oxidising,

(ii) Cobalt (II) is stable in aqueous solution but in the presence of complexing reagents, it is easily oxidised.

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

 [Watch Video Solution](#)

20. Comment on the statement that elements of the first transition series possess many properties different from those of heavier transition elements.

 [Watch Video Solution](#)

Topic 1 D Block Elements Their Properties And Compounds Long Answer Type Questions II

1. Describe an experiment to show the effect of concentration on the rate of the reaction between potassium persulphate and potassium iodide.

 [Watch Video Solution](#)

2. Describe experiment to determine the mass of $KMnO_4$ present in $1dm^3$ of the solution using standard ferrous ammonium sulphate solution.



[Watch Video Solution](#)

3. For the estimation of potassium permanganate using standard ferrous ammonium sulphate solution:

- (i) Write the chemical equation for the reaction involved.
- (ii) Write the equivalent mass of potassium permanganate.
- (iii) Name the indicator used.
- (iv) Mention the colour change at the end point.



[Watch Video Solution](#)

4. For the estimation of potassium permanganate using standard ferrous ammonium sulphate solution:

- (i) Write the chemical equation for the reaction involved.
- (ii) Write the equivalent mass of potassium permanganate.
- (iii) Name the indicator used.
- (iv) Mention the colour change at the end point.



[Watch Video Solution](#)

5. Describe the experimental procedure and give the calculations involved in the estimation of potassium permanganate present in one dm^3 of its solution using standard oxalic acid solution. Give the equation for the redox reaction.

 [Watch Video Solution](#)

6. (i) Name the element of 3d-transition series which shows maximum number of oxidation states. Why does it show so?

(ii) Which transition metal of 3d-series has positive $E^0(M^{2+} / M)$ value and why?

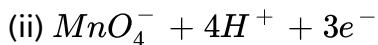
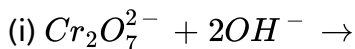
(iii) Out of Cr^{3+} and Mn^{3+} which is a stronger oxidizing agent and why?

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

(v) Complete the following equation: $MnO_4^- + 8H^+ + 5e^- \rightarrow$

 [Watch Video Solution](#)

7. (a) Complete the following equations:



(b) Account for the following:

(i) Zn is not considered as a transition element.

(ii) Transition metals form a large number of complexes.

(iii) The E^0 value for the Mn^{3+} / Mn^{2+} couple is much more positive than that for Cr^{3+} / Cr^{2+} couple.



[Watch Video Solution](#)

8. (i) With reference to structural variability and chemical reactivity, write the differences between lanthanoids and actinoids.

(ii) Name a member of the lanthanoid series which is well known to exhibit + 4 oxidation states.

(iii) Complete the following equation: $MnO_4^- + 8H^+ + 5e^- \rightarrow$

(iv) Out of Mn^{3+} and Cr^{3+} , which is more paramagnetic and why?

(Atomic nos.: Mn = 25, Cr = 24)



[Watch Video Solution](#)

9. Give reasons:

- (i) Zirconium ($Z = 40$) and Hafnium ($Z = 72$) have almost similar atomic radii.
- (ii) d-block elements exhibit more oxidation states than f-block elements.
- (iii) The enthalpies of atomization of the transition metals are high
- (iv) The variation in oxidation states of transition metals is of different type from that of the non transition metals.
- (v) Orange solution of potassium dichromate turns yellow on adding sodium hydroxide to it.



[Watch Video Solution](#)

10. Describe the preparation of potassium permanganate from pyrolusite ore. Write balanced chemical equation for one reaction to show oxidizing nature of potassium permanganate.



[Watch Video Solution](#)

11. (a) Give reasons for the following observations:

(i) Cu^+ ion is not stable in aqueous solution.

(ii) Mn (II) ion shows maximum paramagnetic character amongst the bivalent ions of first transition series.

(iii) Scandium (At. no. 21) salts are white.

(b) Describe the reactions involved in the preparation of $K_2Cr_2O_7$ from chromite ore.

 [Watch Video Solution](#)

12. (a) Describe the following characteristics of the first series (Sc to Zn)

(i) Atomic radii, (ii) Oxidation states (iii) Ionisation enthalpies.

(b) Name an important alloy which contains some of the lanthanoid metals. Mention its two uses.

 [Watch Video Solution](#)

Topic 2 F Block Element Lanthanoids And Actinoids Very Short Answer Types Questions

1. Why lanthanides are called f-block elements ?

 [Watch Video Solution](#)

2. What are f-block elements ?

 [Watch Video Solution](#)

3. Write the general electronic configuration of f-block elements.

 [Watch Video Solution](#)

4. How many series of 'f' block elements are known?

 [Watch Video Solution](#)

5. Why f-block elements are called inner transition elements ?

 [Watch Video Solution](#)

6. What are lanthanoids ? (Or rare earths)

 [Watch Video Solution](#)

7. Write the general electronic configuration of lanthanoids.

 [Watch Video Solution](#)

8. What is the common oxidation state shown by Lanthanoids? Mention any one consequence of Lanthanoid contraction.

 [Watch Video Solution](#)

9. Why Eu and Yb shows +2 oxidation state ?

 [Watch Video Solution](#)

10. Give reasons :

Cerium (Ce) exhibits +4 oxidation state

 [Watch Video Solution](#)

11. What are actinoids?

 [Watch Video Solution](#)

12. Write the general electronic configuration of actinoids.

 [Watch Video Solution](#)

13. What is actinoid contraction? Why actinoid contraction is greater than lanthanoid contraction?

 [Watch Video Solution](#)

14. (i) What is actinide contraction?

(ii) Which is the common oxidation state exhibited by actinides?

 [Watch Video Solution](#)

15. The size of the trivalent cations in the lanthanoid series decrease steadily as the atomic number increases. What is this known as ?

 [Watch Video Solution](#)

16. Give reasons:

Zr and Hf have almost identical radii.



[Watch Video Solution](#)

17. Explain why the members of the actinoid series exhibit a large number of oxidation states than the corresponding members of the lanthanoid series.



[Watch Video Solution](#)

Topic 2 F Block Element Lanthanoids And Actinoids Short Answer Types Questions

1. (i) What is actinide contraction?

(ii) Which is the common oxidation state exhibited by actinides?



[Watch Video Solution](#)

2. Give any two differences between lanthanoids and actinoids.



[Watch Video Solution](#)

3. What is the formula of the products formed when a lanthanoid (Ln) reacts with (i) halogen (X) (ii) nitrogen?

 [Watch Video Solution](#)

4. Give reasons :

(i) Actinoids show variable oxidation states.

(ii) Zr and Hf have almost identical radii.

 [Watch Video Solution](#)

5. Give two consequences of lanthanoid contraction.

 [Watch Video Solution](#)

6. Give reason :

a) Cerium (Ce) exhibits +4 oxidation state.

b) Actinoid contraction is greater from element to element than lanthanoid contraction.

 [Watch Video Solution](#)

7. What are inner-transition elements ? Decide which of the following atomic numbers are the numbers of the inner-transition elements : 29, 59, 74, 95, 102, 104.

 [Watch Video Solution](#)

8. What are alloys ? Name an important alloy which contains some of the lanthanoid metals. Mention its uses.

 [Watch Video Solution](#)

9. The chemistry of the actinoid elements is not so smooth as that of the lanthanoids. Justify this statements by giving some examples from the oxidation state of these elements.

 [Watch Video Solution](#)

10. Which is the last element of the series of the actinoids ? Write the electronic configuration of this elements. Comment on the possible oxidation state of this element.

 [Watch Video Solution](#)

11. Use Hund's rule to derive the electronic configuration of Ce^{3+} ion, and calculate its magnetic moment on the basis of 'spin only formula

 [Watch Video Solution](#)

12. Name the members of the lanthanoid series which exhibit +4 oxidation states and those which exhibit +2 oxidation states. Try to correlate this type of behaviour with the electronic configuration of these elements.

 [Watch Video Solution](#)

13. Write the electronic configuration of the elements with the atomic numbers 61, 91, 101 and 109.

 [Watch Video Solution](#)

14. Give any 2 general characteristics of actinoids.

 [Watch Video Solution](#)

15. Given the chemical properties of lanthanoides.

 [Watch Video Solution](#)

Topic 2 F Block Element Lanthanoids And Actinoids Long Answer Types Questions

1. Compare the chemistry with that of the lanthanoids with special reference to (i) electronic configuration (ii) atomic and ionic sizes (iii) oxidation state (iv) chemical reactivity .

 [Watch Video Solution](#)

2. Give examples and suggest reasons for the following features of the transition metal chemistry.

(i) The lowest oxide of transition metal is basic, the highest is amphoteric / acidic.

(ii) A transition metal exhibits highest oxidation state in oxides and fluorides.

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



[Watch Video Solution](#)



Watch Video Solution

3. How would you account for the following:

(i) Among lanthanoids, Ln (III) compounds are predominant. However, occasionally in solutions or in solid compounds, +2 and +4 ions are also obtained.

(ii) The $E_{M^{2+}/M}^0$ for copper is positive (0.34 V). Copper is the only metal in the first series of transition elements showing this behaviour.

(iii) The metallic radii of the third (5d) series of transition metals are nearly the same as those of the corresponding members of the second series.



Watch Video Solution

4. How would you account for the following:

(i) Among lanthanoids, Ln (III) compounds are predominant. However, occasionally in solutions or in solid compounds, +2 and +4 ions are also obtained.

(ii) The $E_{M^{2+}/M}^0$ for copper is positive (0.34 V). Copper is the only metal in the first series of transition elements showing this behaviour.

(iii) The metallic radii of the third (5d) series of transition metals are nearly the same as those of the corresponding members of the second series.

 [Watch Video Solution](#)

5. Compare the chemistry with that of the lanthanoids with special reference to (i) electronic configuration (ii) atomic and ionic sizes (iii) oxidation state (iv) chemical reactivity .

 [Watch Video Solution](#)

6. Give some uses of (application) of d- and f-block elements.

 [Watch Video Solution](#)