

d and f-BLOCK ELEMENTS**CHAPTER-8****TEST-A****SOLVED****Time: 1 hr.****Max. Marks: 30****SECTION-A****Tick the correct option:**

- Each of the following statement is correct except [1]
 - The density increases from titanium to copper in the 3d series
 - Chromium (III) is more stable than chromium (VI) ion
 - Zinc is the only transition element which form diamagnetic compounds in the +2 oxidation state
 - Cerium is the only lanthanoid known to exhibit +4 oxidation state.
- Bottles containing potassium permanganate appears brown from the neck. This is due to the fact that [1]
 - Potassium permanganate decompose on exposure to light to give potassium manganate
 - Potassium permanganate decompose to give manganese (II) ion.
 - Potassium permanganate disproportionate to give potassium manganate and manganese (III) oxide.
 - Potassium permanganate undergo intramolecular redox reaction to give potassium manganate, manganese dioxide and oxygen.
- Which of the following oxomatal anion is known to exist only in acidic medium? [1]
 - CrO_4^{2-}
 - $\text{Cr}_2\text{O}_7^{2-}$
 - MnO_4^-
 - all of these

Assertion-Reason type Questions:

- If assertion and reason both are correct and reason is the correct explanation of assertion.
 - If assertion and reason both are correct and reason is not the correct explanation of assertion.
 - If assertion is correct and reason is wrong.
 - If assertion is wrong and reason is correct.
- Assertion: In the 3d series, $E_{M^+/M}^\circ$ is positive only for copper. [1]
Reason: Cu^{2+} ion has a low hydration enthalpy.
 - Assertion: Zirconium and hafnium have very similar physical and chemical properties. [1]
Reason: Elements in the same group of the periodic table shows similar physical and chemical properties.

One word /One Sentence type Questions.

6. Which transition metal does not show variable oxidation state? What is its stable oxidation state? [1]
7. Give the composition of misch metal. What is its use? [1]

SECTION-B

8. Account for the following: [2]
- The decrease in size is more pronounced in actinoid series than in lanthanoid series.
 - Actinoids shows much more number of oxidation states than lanthanoids.
9. (i) In the series $_{21}\text{Sc}$ to $_{30}\text{Zn}$, the enthalpy of atomisation of zinc is the lowest. Why? [2]
- (ii) With the same d^4 configuration, Cr^{2+} ion is reducing while Mn^{3+} ion is oxidising. Explain.
10. Give reason: [2]
- Zn, Cd and Hg are volatile metals.
 - There occurs much more frequent metal-metal bonding in compounds of heavy transition metals of 5d series.
11. A black solid (A) on fusion with the oxygen and potassium hydroxide gives a green colour solution (B). On acidification (B) disproportionate to give back (A) and a pink colour solution (C). What are the compounds (A), (B) and (C)? Write all relevant chemical equations involved. [3]
12. Complete the following equation: [3]
- $\text{Cr}_2\text{O}_7^{2-} + \text{H}_2\text{S} + \text{H}^+ \rightarrow$
 - $\text{MnO}_4^- + \text{H}_2\text{C}_2\text{O}_4 + \text{H}^+ \rightarrow$
 - $\text{Cr}_2\text{O}_7^{2-} + \text{I}^- + \text{H}^+ \rightarrow$
13. Account for the following: [3]
- Transition metals and their compounds are used as a good catalyst.
 - Co^{2+} appears to be stable in aqueous medium but gets oxidised to Co^{3+} in the presence of strong complexing agent.
 - $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ is pale pink in colour while $[\text{Sc}(\text{H}_2\text{O})_6]^{3+}$ is colourless.
14. (i) Arrange the following species in order of increasing magnetic moment: VO^{2+} , VO_2^+ , VO^+ [3]
- (ii) Name the lanthanoid which is known to exist in +4 oxidation state.
- (iii) All Mn–O bonds in permanganate ion, MnO_4^- are equal in length. Explain.
15. (a) Write steps involved in the [2+2+1]
- conversion of chromite ore into sodium chromate
 - formation of $\text{K}_2\text{Cr}_2\text{O}_7$ from sodium chromate solution.
- (b) Give the structure of the dichromate ion, $\text{Cr}_2\text{O}_7^{2-}$. How many equivalent Cr – O bonds present in it?
- (c) Vanadium ($Z = 23$) form an ion which has a magnetic moment of 1.73 BM. What is the symbol of this ion?

