

BOARD-PATTERN PRACTICE PAPER · CBSE CLASS 12

d- and f-Block Elements

Chemistry · Chapter 4 · Matches current CBSE blueprint · Each question PYQ-sourced where indicated

DATE	TOTAL MARKS 30	DURATION 60 min	MARKING As per board	TARGET ≥ 24/30
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GENERAL INSTRUCTIONS

- All questions are compulsory.
- Use of calculator is NOT permitted.
- Atomic numbers are given where required (Sc=21, Ti=22, V=23, Cr=24, Mn=25, Fe=26, Co=27, Ni=28, Cu=29, Zn=30).
- Write balanced chemical equations wherever asked.
- Show oxidation-state changes in redox answers.

Section A — Very Short Answer (1 mark each)

4 MARKS · 6 MIN

- Q1.** Why is Zn not regarded as a typical transition element? [PYQ 2020 Delhi] **[1 mark]**
- Q2.** Write the general electronic configuration of the d-block elements. [PYQ 2018 Outside Delhi] **[1 mark]**
- Q3.** Why is Sc^{3+} colourless? [PYQ 2021 Delhi] **[1 mark]**
- Q4.** Name the most common oxidation state of the lanthanides. [PYQ 2019 Delhi] **[1 mark]**

Section B — Short Answer I (2 marks each)

8 MARKS · 16 MIN

- Q5.** Calculate the spin-only magnetic moment of (i) Fe^{2+} and (ii) Mn^{2+} ions. (Atomic numbers: Fe=26, Mn=25) [PYQ 2019 Delhi] **[2 marks]**
- Q6.** Why do transition elements exhibit variable oxidation states? Illustrate with one example. [PYQ 2018 Delhi] **[2 marks]**
- Q7.** Account for the following: (i) Transition metals form coloured ions. (ii) Transition metals are good catalysts. [PYQ 2023 Delhi] **[2 marks]**
- Q8.** Give two differences between lanthanides and actinides. [PYQ 2024 Outside Delhi] **[2 marks]**

Section C — Short Answer II (3 marks each)

12 MARKS · 26 MIN

- Q9.** What is lanthanide contraction? State its cause and any two consequences. [PYQ 2022 Delhi] **[3 marks]**
- Q10.** Write the ionic half-reactions for the reduction of MnO_4^- in (i) acidic, (ii) neutral, and (iii) strongly alkaline medium, with the oxidation-state change of Mn in each. [PYQ 2020 Delhi] **[3 marks]**
- Q11.** Describe the preparation of potassium dichromate from chromite ore, giving balanced equations for the main steps. [PYQ 2019 Outside Delhi] **[3 marks]**
- Q12.** Account for the following: (i) $E^\circ(\text{Mn}^{3+}/\text{Mn}^{2+})$ is much more positive than $E^\circ(\text{Cr}^{3+}/\text{Cr}^{2+})$. (ii) The highest oxidation state of a transition metal is shown in its oxide or fluoride. (iii) Transition metals form a large number of interstitial compounds. [PYQ 2023 Delhi] **[3 marks]**

Section D — Long Answer (6 marks)

6 MARKS · 12 MIN

- Q13.** (a) Explain why (i) the melting points of transition metals first rise and then fall across a series, and (ii) the enthalpies of atomisation are high for transition metals. (3 marks) (b) Calculate the spin-only magnetic moments of Cr^{3+} ($Z=24$), Co^{2+} ($Z=27$) and Cu^{2+} ($Z=29$) and state whether each is paramagnetic. (3 marks) [PYQ 2018 Delhi] **[6 marks]**

Marking scheme & model answers — see companion Answer Key PDF · all PYQs traceable to actual CBSE papers · readyforboards.com · +91 70330 05444