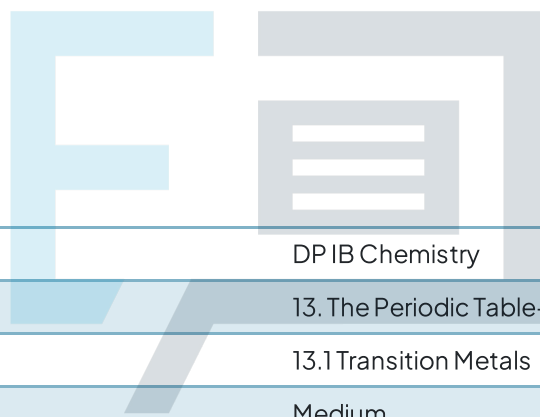




13.1 Transition Metals

Question Paper



Course	DP IB Chemistry
Section	13. The Periodic Table- Transition Metals (HL only)
Topic	13.1 Transition Metals
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for DP IB Chemistry HL
Students of other boards may also find this useful

Question 1

In which complexes does iron have an oxidation state of +3?

- I. $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$
- II. $[\text{Fe}(\text{H}_2\text{O})_5(\text{CN})]^{2+}$
- III. $[\text{Fe}(\text{CN})_6]^{3-}$

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

[1 mark]

Question 2

Which complex is likely to be colourless?

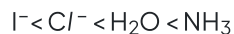
- A. $[\text{Zn}(\text{H}_2\text{O})_6]\text{Cl}_2$
- B. $[\text{NH}_4]_2[\text{Fe}(\text{H}_2\text{O})_6][\text{SO}_4]_2$
- C. $\text{K}_3[\text{Co}(\text{CN})_6]$
- D. $[\text{Ni}(\text{NH}_3)_6][\text{BF}_4]_2$

[1 mark]

Exam Papers Practice

Question 3

Part of the spectrochemical series is shown.



Which statement can be correctly deduced from the series?

- A. H_2O increases the p-d separation more than Cl^-
- B. H_2O increases the d-d separation more than Cl^-
- C. A complex with NH_3 is more likely to be blue than that with Cl^-
- D. Complexes with water are always blue

[1 mark]

Question 4

Ammonia is a stronger ligand than water. Which statement is correct when concentrated aqueous ammonia solution is added to dilute aqueous copper(II) sulfate solution?

- A. The d-orbitals in the copper ion split.
- B. There is a smaller splitting of the d-orbitals.
- C. Ammonia replaces water as a ligand.
- D. The colour of the solution fades.

[1 mark]

Question 5

Cobalt forms the complex $[\text{Co}(\text{NH}_3)_5\text{Cl}]^{2+}$. Which statements are correct for this complex?

- I. The cobalt ion acts as a Lewis acid.
- II. The cobalt ion has an oxidation state of +2.
- III. There are 90° bond angles between the cobalt ion and the ligands.

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

[1 mark]

Exam Papers Practice