

# Coordination Compounds

NEET previous year questions · Chemistry

12 questions from the official papers: NEET 2026 (3), Re-NEET 2026 (6), NEET 2020 (3). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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## 1. NEET 2026 · Q53

Match List I (Complex) with List II (Type of isomerism):

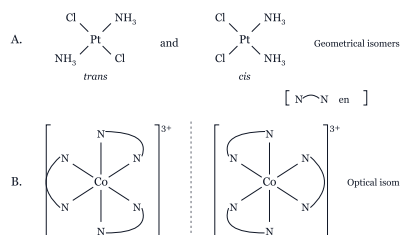
| List I                                                | List II          |
|-------------------------------------------------------|------------------|
| a) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$            | i) Optical       |
| b) $[\text{Co}(\text{en})_3]^{3+}$                    | ii) Solvate      |
| c) $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$ | iii) Geometrical |
| d) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$     | iv) Linkage      |

(1) A-III, B-I, C-II, D-IV      (2) A-I, B-III, C-II, D-IV

(3) A-II, B-IV, C-III, D-I      (4) A-III, B-I, C-IV, D-II

**Answer (4)**

**Sol.**  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  shows cis/trans (geometrical) isomerism (III);  $[\text{Co}(\text{en})_3]^{3+}$  is a tris-chelate that is chiral, showing optical isomerism (I);  $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$  shows linkage isomerism through the ambidentate  $\text{NO}_2^-/\text{ONO}^-$  ligand (IV); and  $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$  shows solvate (hydrate) isomerism (II). Hence A-III, B-I, C-IV, D-II.



## 2. NEET 2026 · Q63

Which one of the following is an ambidentate ligand?

- (1) Ethane-1,2-diamine
- (2) Ethylenediaminetetraacetate ion
- (3) Thiocyanate
- (4) Oxalate

**Answer (3)**

**Sol.** An ambidentate ligand has two different donor atoms and can bind through either one. Thiocyanate ( $\text{SCN}^-$ ) can coordinate through sulphur ( $-\text{SCN}$ ) or nitrogen ( $-\text{NCS}$ ), so it is ambidentate. Ethane-1,2-diamine and oxalate are bidentate chelating ligands and ethylenediaminetetraacetate ion (EDTA) is hexadentate,

but each of their donor sets is fixed, so they are not ambidentate.

## 3. NEET 2026 · Q68

Match List I (Complex/ion) with List II (Shape/geometry) and choose the correct answer.

| List I                                       | List II                  |
|----------------------------------------------|--------------------------|
| P) $[\text{Pt}(\text{Cl}_2)(\text{NH}_3)_2]$ | I) Octahedral            |
| Q) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$   | II) Trigonal bipyramidal |
| R) $[\text{NiCl}_4]^{2-}$                    | III) Square planar       |
| S) $[\text{Fe}(\text{CO})_5]$                | IV) Tetrahedral          |

(1) P-III, Q-IV, R-I, S-II      (2) P-III, Q-I, R-IV, S-II

(3) P-IV, Q-I, R-III, S-II      (4) P-I, Q-III, R-IV, S-II

**Answer (2)**

**Sol.**  $[\text{PtCl}_2(\text{NH}_3)_2]$  uses  $\text{dsp}^2$  hybridisation at  $\text{Pt}^{2+} \rightarrow$  square planar (III);  $[\text{Co}(\text{NH}_3)_6]^{3+}$  is  $\text{d}^2\text{sp}^3 \rightarrow$  octahedral (I);  $[\text{NiCl}_4]^{2-}$  has  $\text{sp}^3$   $\text{Ni}^{2+}$  with weak-field  $\text{Cl}^- \rightarrow$  tetrahedral (IV);  $[\text{Fe}(\text{CO})_5]$  is  $\text{sp}^3\text{d}/\text{dsp}^3 \rightarrow$  trigonal bipyramidal (II). This gives P-III, Q-I, R-IV, S-II.

## 4. Re-NEET 2026 · Q47

Given below are two statements. (Given :  $\text{oxH}_2 = \text{HOOC} - \text{COOH}$ )

Statement I:  $[\text{Fe}(\text{ox})_3]^{3-}$  is chiral.

Statement II:  $\text{trans}-[\text{Cr}(\text{H}_2\text{O})_2(\text{ox})_2]^-$  is chiral.

In light of the above statements, choose the most appropriate answer from the options given below:

- (1) Both Statement-I and Statement-II are correct
- (2) Both Statement-I and Statement-II are incorrect
- (3) Statement-I is correct but Statement-II is incorrect
- (4) Statement-I is incorrect but Statement-II is correct

**Answer (3)**

**Sol.** A tris-chelate of type  $[\text{M}(\text{AA})_3]$  has no plane or centre of symmetry and exists as the non-superimposable delta and lambda propeller forms, so  $[\text{Fe}(\text{ox})_3]^{3-}$  is indeed chiral.

For the bis-chelate  $[\text{Cr}(\text{H}_2\text{O})_2(\text{ox})_2]^-$ , only the CIS isomer is chiral; the TRANS isomer, with the two aqua ligands on opposite sides, possesses a plane of symmetry and is therefore achiral. Statement-II names the wrong isomer. NCERT Class 12, Coordination Compounds (isomerism).

5. Re-NEET 2026 · Q58

According to crystal field theory, the correct order of ligands with respect to their decreasing order of field strength is

- (1)  $\text{CO} > \text{NH}_3 > \text{H}_2\text{O} > \text{Cl}^-$  (2)  $\text{CO} > \text{H}_2\text{O} > \text{NH}_3 > \text{Cl}^-$   
 (3)  $\text{Cl}^- > \text{H}_2\text{O} > \text{NH}_3 > \text{CO}$  (4)  $\text{Cl}^- > \text{NH}_3 > \text{H}_2\text{O} > \text{CO}$

Answer (1)

**Sol.** The spectrochemical series orders ligands by the size of the crystal field splitting they produce. Carbon monoxide is the strongest field ligand in this set because it accepts electron density into its  $\pi^*$  orbitals; ammonia follows as a stronger sigma donor than water; and chloride, being a weak-field pi donor, is the weakest. The accepted sequence is  $\text{CO} > \text{CN}^- > \text{NH}_3 > \text{H}_2\text{O} > \text{F}^- > \text{Cl}^-$ . NCERT Class 12, Coordination Compounds (crystal field theory).

6. Re-NEET 2026 · Q66

Among the species given below, the spin-only magnetic moment is highest for (Given: Atomic number of Ti = 22, Mn = 25, Fe = 26 and Co = 27)

- (1)  $[\text{Mn}(\text{CN})_6]^{3-}$  (2)  $[\text{Fe}(\text{CN})_6]^{3-}$   
 (3)  $[\text{Co}(\text{NH}_3)_6]^{3+}$  (4)  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$

Answer (1)

**Sol.** All four are octahedral with strong-field or moderate-field ligands, so the electrons pair up in  $t_{2g}$  before entering  $e_g$ . Counting d electrons:  $\text{Mn}^{3+}$  is  $d^4$ , giving low-spin  $t_{2g}^4$  with TWO unpaired electrons;  $\text{Fe}^{3+}$  is  $d^5$ , giving  $t_{2g}^5$  with one;  $\text{Co}^{3+}$  is  $d^6$ , giving  $t_{2g}^6$  with none;  $\text{Ti}^{3+}$  is  $d^1$  with one. Since  $\mu = \sqrt{n(n+2)}$  rises with n, the manganese complex has the highest moment at about 2.83 Bohr magneton (BM). NCERT Class 12, Coordination Compounds.

7. Re-NEET 2026 · Q68

The formula of tetraammineaquachloridocobalt(III) chloride is

- (1)  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2] \times \text{H}_2\text{O}$  (2)  $[\text{Co}(\text{NH}_3)_4]\text{Cl}_3 \times \text{H}_2\text{O}$   
 (3)  $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{Cl}$  (4)  $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})\text{Cl}]\text{Cl}_2$

Answer (4)

**Sol.** The name lists the coordination sphere first: four ammine, one aqua and one chlorido ligand around cobalt(III). Charge balance inside the brackets gives  $+3 + 0 + 0 - 1 = +2$ , so two chloride counter-ions are needed outside to neutralise the complex cation. The word 'chloride' at the end names those counter-ions, not a

ligand. NCERT Class 12, Coordination Compounds (IUPAC nomenclature).

8. Re-NEET 2026 · Q78

The complex which has facial and meridional isomers is (Given : py = pyridine and en =  $\text{H}_2\text{N} - \text{CH}_2 - \text{CH}_2 - \text{NH}_2$ )

- (1)  $[\text{Cr}(\text{py})_3(\text{Cl})_3]$  (2)  $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$   
 (3)  $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{3+}$  (4)  $[\text{Ni}(\text{en})_2(\text{H}_2\text{O})_2]^{2+}$

Answer (1)

**Sol.** Facial and meridional isomerism is specific to octahedral complexes of the type  $[\text{Ma}_3\text{b}_3]$ . In the fac isomer the three identical ligands occupy one triangular face; in the mer isomer they lie in a plane through the metal.  $[\text{Cr}(\text{py})_3\text{Cl}_3]$  has exactly this 3:3 arrangement. NCERT Class 12, Coordination Compounds (geometrical isomerism).

9. Re-NEET 2026 · Q87

A 1 : 3 electrolyte in an aqueous solution is

- (1)  $[\text{CoCl}_2(\text{NH}_3)_4]\text{Cl}$  (2)  $[\text{CoCl}(\text{NH}_3)_5]\text{Cl}_2$   
 (3)  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  (4)  $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$

Answer (3)

**Sol.** Only the ions OUTSIDE the coordination sphere are released in solution; ligands bound to the metal stay put.  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  has all six ammonia molecules coordinated and three chlorides as counter-ions, so it dissociates into one complex cation and three chloride ions - a 1 : 3 electrolyte. NCERT Class 12, Coordination Compounds (Werner's theory, primary and secondary valence).

10. NEET 2020 · Q98

Which of the following is the correct order of increasing field strength of ligands to form coordination compounds?

- (1)  $\text{SCN}^- < \text{F}^- < \text{CN}^- < \text{C}_2\text{O}_4^{2-}$   
 (2)  $\text{F}^- < \text{SCN}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$   
 (3)  $\text{CN}^- < \text{C}_2\text{O}_4^{2-} < \text{SCN}^- < \text{F}^-$   
 (4)  $\text{SCN}^- < \text{F}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$

Answer (4)

**Sol.** In the spectrochemical series relevant here, ligand field strength rises as  $\text{SCN}^- < \text{F}^- < \text{C}_2\text{O}_4^{2-} < \text{CN}^-$ . Chapter: Coordination Compounds.

11. NEET 2020 · Q99

The calculated spin-only magnetic moment of  $\text{Cr}^{2+}$  ion is

- (1) 4.90 BM (2) 5.92 BM (3) 2.84 BM (4) 3.87 BM

Answer (1)

**Sol.** The spin-only magnetic moment  $\mu$  is given by  $\mu = \sqrt{n(n+2)} \text{ BM}$ , where n is the number of unpaired electrons. For  $\text{Cr}^{2+}$ , the electronic configuration is  $3d^4$ , with 4 unpaired electrons. Substituting  $n = 4$ ,  $\mu =$

$$\sqrt{4(4+2)} = \sqrt{24} \approx 4.90 \text{ BM. Chapter: Coordination Compounds.}$$

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**12. NEET 2020 · Q122**

Urea reacts with water to form A, which decomposes to form B. When B is passed through  $\text{Cu}^{2+}(\text{aq})$ , a deep-blue solution C is formed. What is the formula of C?

- (1)  $[\text{Cu}(\text{NH}_3)_4]^{2+}$                       (2)  $\text{Cu}(\text{OH})_2$   
(3)  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$                       (4)  $\text{CuSO}_4$

**Answer (1)**

**Sol.** Urea hydrolysis ultimately releases  $\text{NH}_3$ . Excess ammonia coordinates  $\text{Cu}^{2+}$  to form the deep-blue tetraamminecopper(II) ion  $[\text{Cu}(\text{NH}_3)_4]^{2+}$ . Chapter: Coordination Compounds.

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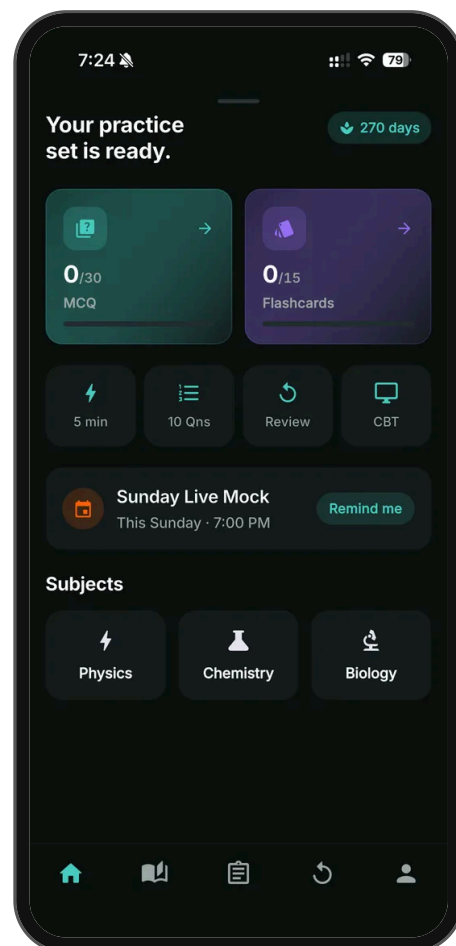
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