

PART 1 - CHEMISTRY

Topic : Coordination compounds

SECTION-A : (Maximum Marks : 8)

- This section contains **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D). **ONLY ONE** of these four options is the correct answer.
- For each question, choose the option corresponding to the correct answer.
- Answer to each question will be evaluated according to the following marking scheme :
 Full Marks : +4 If **ONLY** the correct option is chosen;
 Zero Marks : 0 If none of the options is chosen (i.e. the question is unanswered);
 Negative Marks : -1 In all other cases.

1. The correct order of the wavelength maxima of the absorption band in the ultraviolet-visible region for the given complexes is [JEE Advanced 2025 Paper 1]

- (A) $[\text{Co}(\text{CN})_6]^{3-} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+} < [\text{Co}(\text{NH}_3)_5(\text{Cl})]^{2+}$
 (B) $[\text{Co}(\text{NH}_3)_5(\text{Cl})]^{2+} < [\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{CN})_6]^{3-}$
 (C) $[\text{Co}(\text{CN})_6]^{3-} < [\text{Co}(\text{NH}_3)_5(\text{Cl})]^{2+} < [\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+}$
 (D) $[\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{CN})_6]^{3-} < [\text{Co}(\text{NH}_3)_5(\text{Cl})]^{2+} < [\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+}$

Scan or tap for the full solution



2. Among the following options, select the option in which each complex in Set-I shows geometrical isomerism and the two complexes in Set-II are ionization isomers of each other.

[en = $\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$]

[JEE Advanced 2024 Paper 1]

- (A) Set-I: $[\text{Ni}(\text{CO})_4]$ and $[\text{PdCl}_2(\text{PPh}_3)_2]$
 Set-II: $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5(\text{SO}_4)]\text{Cl}$
 (B) Set-I: $[\text{Co}(\text{en})(\text{NH}_3)_2\text{Cl}_2]$ and $[\text{PdCl}_2(\text{PPh}_3)_2]$
 Set-II: $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$ and $[\text{Cr}(\text{NH}_3)_6][\text{Co}(\text{CN})_6]$
 (C) Set-I: $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$ and $[\text{Co}(\text{en})_2\text{Cl}_2]$
 Set-II: $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5(\text{SO}_4)]\text{Cl}$
 (D) Set-I: $[\text{Cr}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$ and $[\text{Co}(\text{en})(\text{NH}_3)_2\text{Cl}_2]$
 Set-II: $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ and $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$

Scan or tap for the full solution



Space for Rough Work

SECTION-B : (Maximum Marks : 24)

- This section contains **SIX** questions.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value of the answer (in decimal notation, truncated / rounded-off to the **SECOND DECIMAL PLACE**; e.g. 6.25, 7.00, -0.33, -0.30, 30.27, -127.30) in the place designated to enter the answer.
- Answer to each question will be evaluated according to the following marking scheme :
 Full Marks : +4 If **ONLY** the correct answer is entered;
 Zero Marks : 0 In all other cases.

3. The total number of all possible isomers for the square planar complex with formula $K[M(NCS)(NO_2)(gly)]$ is ____.

(M = metal ion and gly = $NH_2CH_2COO^-$)

[JEE Advanced 2026 Paper 1]

Scan or tap for the full solution



4. Consider that the coordinating atoms of the ligands in $cis-[Co(NH_3)_4Cl_2]Cl$ and $mer-[Co(NH_3)_3Cl_3]$ octahedral complexes are at the vertices of an octahedron. The sum of total number of the triangular faces in both the complexes having one N atom and two Cl atoms at their corners is ____.

[JEE Advanced 2026 Paper 2]

Scan or tap for the full solution



5. The sum of the spin only magnetic moment values (in B.M.) of $[Mn(Br)_6]^{3-}$ and $[Mn(CN)_6]^{3-}$ is ____.

[JEE Advanced 2025 Paper 2]

Scan or tap for the full solution



6. Among $V(CO)_6$, $Cr(CO)_5$, $Cu(CO)_3$, $Mn(CO)_5$, $Fe(CO)_5$, $[Co(CO)_3]^{3-}$, $[Cr(CO)_4]^{4-}$, and $Ir(CO)_3$, the total number of species isoelectronic with $Ni(CO)_4$ is ____.

[Given, atomic number: V = 23, Cr = 24, Mn = 25, Fe = 26, Co = 27, Ni = 28, Cu = 29, Ir = 77]

[JEE Advanced 2024 Paper 1]

Scan or tap for the full solution



7. Among the following complexes, the total number of diamagnetic species is ____.

$[Mn(NH_3)_6]^{3+}$, $[MnCl_6]^{3-}$, $[FeF_6]^{3-}$, $[CoF_6]^{3-}$, $[Fe(NH_3)_6]^{3+}$, and $[Co(en)_3]^{3+}$

[Given, atomic number: Mn = 25, Fe = 26, Co = 27; en = $H_2NCH_2CH_2NH_2$]

[JEE Advanced 2024 Paper 1]

Scan or tap for the full solution



8. Among $[Co(CN)_4]^{4-}$, $[Co(CO)_3(NO)]$, XeF_4 , $[PCl_4]^+$, $[PdCl_4]^{2-}$, $[ICl_4]^-$, $[Cu(CN)_4]^{3-}$ and P_4 the total number of species with tetrahedral geometry is ____.

[JEE Advanced 2024 Paper 2]

Scan or tap for the full solution



Space for Rough Work

Test Pattern : **JEE (Advanced)**

SECTION-A

[illegible]

SECTION-B

Ques.	3	4	5	6	7	8									
Ans.	8	6	7.5 to 7.8	1	1	5									