PART 1 - CHEMISTRY

Topic : Coordination compounds

SECTION–1 : (Maximum Marks : 6)

- 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	: +3	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) $[Co(CN)_6]^{3-} < [Co(NH_3)_6]^{3+} < [Co(NH_3)_5(H_2O)]^{3+} < [Co(NH_3)_5(Cl)]^{2+}$

(B) $[Co(NH_3)_5(Cl)]^{2+} < [Co(NH_3)_5(H_2O)]^{3+} < [Co(NH_3)_6]^{3+} < [Co(CN)_6]^{3-}$

(C) $[Co(CN)_6]^{3-} < [Co(NH_3)_5(Cl)]^{2+} < [Co(NH_3)_5(H_2O)]^{3+} < [Co(NH_3)_6]^{3+}$

(D) $[Co(NH_3)_6]^{3+} < [Co(CN)_6]^{3-} < [Co(NH_3)_5(Cl)]^{2+} < [Co(NH_3)_5(H_2O)]^{3+}$

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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 = $H_2NCH_2CH_2NH_2$] [JEE Advanced 2024 Paper 1]

(A) Set-I: $[Ni(CO)_4]$ and $[PdCl_2(PPh_3)_2]$
Set-II: $[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5(SO_4)]Cl$

(B) Set-I: $[Co(en)(NH_3)_2Cl_2]$ and $[PdCl_2(PPh_3)_2]$
Set-II: $[Co(NH_3)_6][Cr(CN)_6]$ and $[Cr(NH_3)_6][Co(CN)_6]$

(C) Set-I: $[Co(NH_3)_3(NO_2)_3]$ and $[Co(en)_2Cl_2]$
Set-II: $[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5(SO_4)]Cl$

(D) Set-I: $[Cr(NH_3)_5Cl]Cl_2$ and $[Co(en)(NH_3)_2Cl_2]$
Set-II: $[Cr(H_2O)_6]Cl_3$ and $[Cr(H_2O)_5Cl]Cl_2 \cdot H_2O$

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Space for Rough Work

SECTION–2 : (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, −.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]

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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]

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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]

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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]

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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]

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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]

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Space for Rough Work

JEE ADVANCED COORDINATION COMPOUNDS — PYQS

Test Pattern : **JEE (Advanced)**

ANSWER KEY

SECTION–1

Ques.	1	2																										
Ans.	**A**	**C**																										

SECTION–2

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