

CHEMISTRY · JEE MAIN

Coordination Compounds

Chapter-wise previous year questions, with answer key

120

PYQS

2020-2025

PAPERS

7

TOPICS

Ligands and Coordination Number

IUPAC Nomenclature

Isomerism in Coordination Compounds

Crystal Field Theory

Werner's Theory and Terminology

Valence Bond Theory

Stability of Complexes

- 1 Attempt each question on paper first — they're grouped by topic, newest papers first.
- 2 Check yourself against the answer key at the end.
- 3 Got one wrong? Tap "Step-by-step solution" under it for the full working.

Stuck on a question?

Every question has a free step-by-step solution on PrepWiser — tap "Step-by-step solution" under it.

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Q1 JEE Main 2025 · 29 Jan · Shift 2

Identify the homoleptic complexes with odd number of d electrons in the central metal :

- (A) $[\text{FeO}_4]^{2-}$
- (B) $[\text{Fe}(\text{CN})_6]^{3-}$
- (C) $[\text{Fe}(\text{CN})_5\text{NO}]^{2-}$
- (D) $[\text{CoCl}_4]^{2-}$
- (E) $[\text{Co}(\text{H}_2\text{O})_3\text{F}_3]$

Choose the **correct** answer from the options given below :

- (A) (C) and (E) only
- (B) (A), (B) and (D) only
- (C) (B) and (D) only
- (D) (A), (C) and (E) only

[Step-by-step solution ► prepwiser.in/questions/FhVM7fd6LK](https://www.prepwiser.in/questions/FhVM7fd6LK)

Q2 JEE Main 2024 · 9 Apr · Shift 1

Number of ambidentate ligands among the following is _____.



Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/FrQj4RfOib](https://www.prepwiser.in/questions/FrQj4RfOib)

Q3 JEE Main 2024 · 9 Apr · Shift 2

The coordination environment of Ca^{2+} ion in its complex with EDTA^{4-} is :

- (A) trigonal prismatic
- (B) octahedral
- (C) square planar
- (D) tetrahedral

[Step-by-step solution ► prepwiser.in/questions/mQhFGwT0rP](https://www.prepwiser.in/questions/mQhFGwT0rP)

Q4 JEE Main 2024 · 8 Apr · Shift 1

Given below are two statements:

Statement I: $\text{N}(\text{CH}_3)_3$ and $\text{P}(\text{CH}_3)_3$ can act as ligands to form transition metal complexes.

Statement II: As N and P are from same group, the nature of bonding of $\text{N}(\text{CH}_3)_3$ and $\text{P}(\text{CH}_3)_3$ is always same with transition metals.

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

- (A) Both Statement I and Statement II are incorrect.
- (B) Both Statement I and Statement II are correct.
- (C) Statement I is incorrect but Statement II is correct.
- (D) Statement I is correct but Statement II is incorrect.

[Step-by-step solution ► prepwiser.in/questions/DPY97MIhh3](https://www.prepwiser.in/questions/DPY97MIhh3)

Q5 JEE Main 2024 · 1 Feb · Shift 1

Which of the following complex is homoleptic?

- (A) $[\text{Ni}(\text{NH}_3)_2\text{Cl}_2]$
- (B) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$
- (C) $[\text{Fe}(\text{NH}_3)_4\text{Cl}_2]^+$
- (D) $[\text{Ni}(\text{CN})_4]^{2-}$

[Step-by-step solution ► prepwiser.in/questions/fly8cU-PA2](https://www.prepwiser.in/questions/fly8cU-PA2)

Q6 JEE Main 2024 · 30 Jan · Shift 1

Choose the correct statements from the following :

- (A) Ethane-1, 2-diamine is a chelating ligand.
- (B) Metallic aluminium is produced by electrolysis of aluminium oxide in presence of cryolite.
- (C) Cyanide ion is used as ligand for leaching of silver.
- (D) Phosphine act as a ligand in Wilkinson catalyst.
- (E) The stability constants of Ca^{2+} and Mg^{2+} are similar with EDTA complexes.

Choose the correct answer from the options given below :

- (A) (B), (C), (E) only
- (B) (A), (D), (E) only
- (C) (C), (D), (E) only
- (D) (A), (B), (C) only

[Step-by-step solution ► prepwiser.in/questions/SL9dY4xvOs](https://www.prepwiser.in/questions/SL9dY4xvOs)

Q7 JEE Main 2023 · 15 Apr · Shift 1

The volume (in mL) of 0.1M AgNO_3 required for complete precipitation of chloride ions present in 20mL of 0.01M solution of $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2$ as silver chloride is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/m0OjWKlaG6](https://www.prepwiser.in/questions/m0OjWKlaG6)

Q8 JEE Main 2023 · 13 Apr · Shift 1

The mismatched combinations are

- A. Chlorophyll - Co
- B. Water hardness - EDTA
- C. Photography — $[\text{Ag}(\text{CN})_2]^-$
- D. Wilkinson catalyst — $[(\text{Ph}_3\text{P})_3\text{RhCl}]$
- E. Chelating ligand - D-Penicillamine

Choose the correct answer from the options given below :

- (A) A and E Only
- (B) D and E Only
- (C) A and C Only
- (D) A, C, and E Only

[Step-by-step solution ► prepwiser.in/questions/kJRTYhnyy1](https://www.prepwiser.in/questions/kJRTYhnyy1)

Q9 JEE Main 2023 · 11 Apr · Shift 1

The set which does not have ambidentate ligand(s) is :

- (A) $\text{C}_2\text{O}_4^{2-}$, NO_2^- , NCS^-
- (B) $\text{C}_2\text{O}_4^{2-}$, ethylene diammine, H_2O
- (C) NO_2^- , $\text{C}_2\text{O}_4^{2-}$, EDTA^{4-}
- (D) EDTA^{4-} , NCS^- , $\text{C}_2\text{O}_4^{2-}$

[Step-by-step solution ► prepwiser.in/questions/s8EyCtI87S](https://www.prepwiser.in/questions/s8EyCtI87S)

Q10 JEE Main 2023 · 6 Apr · Shift 1

Number of ambidentate ligands in a representative metal complex $[M(en)(SCN)_4]$ is _____.

[en = ethylenediamine]

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Lg0J36kX3W](https://www.prepwiser.in/questions/Lg0J36kX3W)

Q11 JEE Main 2023 · 6 Apr · Shift 2

Given below are two statements: one is labelled as "Assertion A" and the other is labelled as "Reason R"

Assertion A : In the complex $Ni(CO)_4$ and $Fe(CO)_5$, the metals have zero oxidation state.

Reason R : Low oxidation states are found when a complex has ligands capable of π -donor character in addition to the σ -bonding.

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

- (A) A is not correct but R is correct
(B) A is correct but R is not correct
(C) Both A and R are correct but R is NOT the correct explanation of A
(D) Both A and R are correct and R is the correct explanation of A

[Step-by-step solution ► prepwiser.in/questions/Ut_tY5RNLq](https://www.prepwiser.in/questions/Ut_tY5RNLq)

Q12 JEE Main 2023 · 1 Feb · Shift 1

A solution of $FeCl_3$ when treated with $K_4[Fe(CN)_6]$ gives a prussian blue precipitate due to the formation of :

- (A) $Fe[Fe(CN)_6]$ (B) $Fe_4[Fe(CN)_6]_3$
(C) $Fe_3[Fe(CN)_6]_2$ (D) $K[Fe_2(CN)_6]$

[Step-by-step solution ► prepwiser.in/questions/zIbqVQQA3E](https://www.prepwiser.in/questions/zIbqVQQA3E)

Q13 JEE Main 2023 · 29 Jan · Shift 2

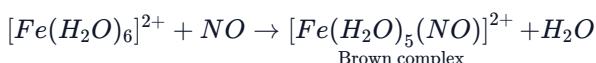
The denticity of the ligand present in the Fehling's reagent is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/U-WpN-eaM1](https://www.prepwiser.in/questions/U-WpN-eaM1)

Q14 JEE Main 2022 · 30 Jun · Shift 1

In the following brown complex, the oxidation state of iron is + _____.



Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/a2mn9KcjkZ](https://www.prepwiser.in/questions/a2mn9KcjkZ)

Q15 JEE Main 2021 · 27 Aug · Shift 1

1 mol of an octahedral metal complex with formula $MCl_3 \cdot 2L$ on reaction with excess of $AgNO_3$ gives 1 mol of $AgCl$. The denticity of Ligand L is _____. (Integer answer)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/DbSHCLcKWY](https://www.prepwiser.in/questions/DbSHCLcKWY)

Q16 JEE Main 2021 · 16 Mar · Shift 1

The equivalents of ethylene diamine required to replace the neutral ligands from the coordination sphere of the trans-complex of $CoCl_3 \cdot 4NH_3$ is _____. (Round off to the Nearest Integer).

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/xSVVecVbrW](https://www.prepwiser.in/questions/xSVVecVbrW)

Q17 JEE Main 2024 · 6 Apr · Shift 2

The correct IUPAC name of $[\text{PtBr}_2(\text{PMe}_3)_2]$ is :

- (A) bis(trimethylphosphine)dibromoplatinum(II)
- (B) dibromodi(trimethylphosphine)platinum(II)
- (C) dibromobis(trimethylphosphine)platinum(II)
- (D) bis[bromo(trimethylphosphine)]platinum(II)

Step-by-step solution ► [prepwisser.in/questions/IICzHXzZOi](https://www.prepwisser.in/questions/IICzHXzZOi)

Q18 JEE Main 2024 · 1 Feb · Shift 2

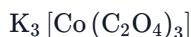
$[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$ are respectively known as :

- (A) Inner orbital Complex, Spin paired Complex
- (B) Spin paired Complex, Spin free Complex
- (C) Spin free Complex, Spin paired Complex
- (D) Outer orbital Complex, Inner orbital Complex

Step-by-step solution ► [prepwisser.in/questions/M6sLw3pX3h](https://www.prepwisser.in/questions/M6sLw3pX3h)

Q19 JEE Main 2023 · 6 Apr · Shift 2

The IUPAC name of



is:-

- (A) Potassium tris(oxalato)cobalt(III)
- (B) Potassium tris(oxalato)cobaltate(III)
- (C) Potassium trioxalatocobaltate(III)
- (D) Potassium trioxalatocobalt(III)

Step-by-step solution ► [prepwisser.in/questions/B6ujaB20VG](https://www.prepwisser.in/questions/B6ujaB20VG)

Q20 JEE Main 2020 · 9 Jan · Shift 1

Complex X of composition $\text{Cr}(\text{H}_2\text{O})_6\text{Cl}_n$ has a spin only magnetic moment of 3.83 BM. It reacts with AgNO_3 and shows geometrical isomerism. The IUPAC nomenclature of X is :

- (A) Hexaaqua chromium (III) chloride
- (B) Tetraaquadichlorido chromium(IV) chloride dihydrate
- (C) Tetraaquadichlorido chromium (III) chloride dihydrate
- (D) Dichloridotetraqua chromium (IV) chloride dihydrate

Step-by-step solution ► [prepwisser.in/questions/DMNsej9GIA](https://www.prepwisser.in/questions/DMNsej9GIA)

Q21 JEE Main 2020 · 7 Jan · Shift 1

The IUPAC name of complex $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NH}_2\text{CH}_3)]\text{Cl}$ is:

- (A) Diamminechlorido (methanamine) platinum(II)chloride.
- (B) Biasmmine (methanamine)chlorido platinum(II)chloride.
- (C) Diamminechlorido (amminomethane) platinum(II) chloride.
- (D) Diammine (methanamine) chlorido platinum(II)Chloride.

Step-by-step solution ► [prepwisser.in/questions/rYpj5_4qRC](https://www.prepwisser.in/questions/rYpj5_4qRC)

Q22 JEE Main 2025 · 7 Apr · Shift 1

An octahedral complex having molecular composition $\text{Co} \cdot 5\text{NH}_3 \cdot \text{Cl}^2 \cdot \text{SO}_4$ has two isomers A and B. The solution of A gives a white precipitate with AgNO_3 solution and the solution of B gives white precipitate with BaCl_2 solution. The type of isomerism exhibited by the complex is,

- (A) Co-ordinate isomerism (B) Ionisation isomerism
(C) Geometrical isomerism (D) Linkage isomerism

[Step-by-step solution ► prepwiser.in/questions/8XIW5QIA2q](https://www.prepwiser.in/questions/8XIW5QIA2q)

Q23 JEE Main 2025 · 24 Jan · Shift 1

One mole of the octahedral complex compound $\text{Co}(\text{NH}_3)_5\text{Cl}_3$ gives 3 moles of ions on dissolution in water. One mole of the same complex reacts with excess of AgNO_3 solution to yield two moles of $\text{AgCl}_{(s)}$. The structure of the complex is:

- (A) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
(B) $[\text{Co}(\text{NH}_3)_4\text{Cl}]\text{Cl}_2 \cdot \text{NH}_3$
(C) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3] \cdot 2\text{NH}_3$
(D) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl} \cdot \text{NH}_3$

[Step-by-step solution ► prepwiser.in/questions/D8A-izxruv](https://www.prepwiser.in/questions/D8A-izxruv)

Q24 JEE Main 2025 · 23 Jan · Shift 1

The complex that shows Facial - Meridional isomerism is :

- (A) $[\text{Co}(\text{en})_2\text{Cl}_2]^+$
(B) $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$
(C) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$
(D) $[\text{Co}(\text{en})_3]^{3+}$

[Step-by-step solution ► prepwiser.in/questions/sTnGspaNa3](https://www.prepwiser.in/questions/sTnGspaNa3)

Q25 JEE Main 2024 · 9 Apr · Shift 1

Given below are two statements : one is labelled as Assertion (A) and the other is labelled as Reason (R).

Assertion (A): The total number of geometrical isomers shown by $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ complex ion is three.

Reason (R): $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ complex ion has an octahedral geometry.

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

- (A) (A) is correct but (R) is not correct
(B) (A) is not correct but (R) is correct
(C) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
(D) Both (A) and (R) are correct and (R) is the correct explanation of (A)

[Step-by-step solution ► prepwiser.in/questions/taPPfoQX6v](https://www.prepwiser.in/questions/taPPfoQX6v)

Q26 JEE Main 2024 · 5 Apr · Shift 2

The metal atom present in the complex MABXL (where A, B, X and L are unidentate ligands and M is metal) involves sp^3 hybridization. The number of geometrical isomers exhibited by the complex is :

- (A) 0 (B) 2
(C) 3 (D) 4

[Step-by-step solution ► prepwiser.in/questions/sTWDQYe5_K](https://www.prepwiser.in/questions/sTWDQYe5_K)

Q27 JEE Main 2024 · 30 Jan · Shift 2

Number of complexes which show optical isomerism among the following is _____.



Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/3UVBm02y2g](https://www.prepwiser.in/questions/3UVBm02y2g)

Q28 JEE Main 2023 · 11 Apr · Shift 2

If Ni^{2+} is replaced by Pt^{2+} in the complex $[\text{NiCl}_2\text{Br}_2]^{2-}$, which of the following properties are expected to get changed ?

- A. Geometry
- B. Geometrical isomerism
- C. Optical isomerism
- D. Magnetic properties

(A) A and D

(B) A, B and D

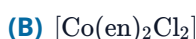
(C) A, B and C

(D) B and C

[Step-by-step solution ► prepwiser.in/questions/2ZgpGveYCG](https://www.prepwiser.in/questions/2ZgpGveYCG)

Q29 JEE Main 2023 · 11 Apr · Shift 1

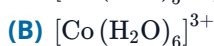
Which of the following complex has a possibility to exist as meridional isomer?



[Step-by-step solution ► prepwiser.in/questions/3aN45ahzRS](https://www.prepwiser.in/questions/3aN45ahzRS)

Q30 JEE Main 2023 · 1 Feb · Shift 2

The complex cation which has two isomers is :



[Step-by-step solution ► prepwiser.in/questions/NgjUIcCw6e](https://www.prepwiser.in/questions/NgjUIcCw6e)

Q31 JEE Main 2022 · 28 Jun · Shift 2

(a) $\text{CoCl}_3.4\text{NH}_3$, (b) $\text{CoCl}_3.5\text{NH}_3$, (c) $\text{CoCl}_3.6\text{NH}_3$ and (d) $\text{CoCl}(\text{NO}_3)_2.5\text{NH}_3$.

Number of complex(es) which will exist in cis-trans form is/are _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/UwzKnHC9mQ](https://www.prepwiser.in/questions/UwzKnHC9mQ)

Q32 JEE Main 2021 · 26 Aug · Shift 2

Indicate the complex/complex ion which did not show any geometrical isomerism :

- (A) $[\text{CoCl}_2(\text{en})_2]$
- (B) $[\text{Co}(\text{CN})_5(\text{NC})]^{3-}$
- (C) $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$
- (D) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$

[Step-by-step solution ► prepwisar.in/questions/ENYpPY2xb6](https://www.prepwisar.in/questions/ENYpPY2xb6)

Q33 JEE Main 2021 · 17 Mar · Shift 2

Match List - I with List - II :

List - I

List - II

- | | |
|--|-------------------------------|
| (a) $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$ | (i) Linkage isomerism |
| (b) $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$ | (ii) Solvate isomerism |
| (c) $[\text{Cr}(\text{H}_2\text{O})_6\text{Cl}_3]$ | (iii) Co-ordination isomerism |
| (d) <i>cis</i> - $[\text{CrCl}_2(\text{ox})_2]^{3-}$ | (iv) Optical isomerism |

Choose the correct answer from the options given below :

- | | |
|--|--|
| (A) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv) | (B) (a)-(iii), (b)-(i), (c)-(ii), (d)-(iv) |
| (C) (a)-(ii), (b)-(i), (c)-(iii), (d)-(iv) | (D) (a)-(iv), (b)-(ii), (c)-(iii), (d)-(i) |

[Step-by-step solution ► prepwisar.in/questions/4QrckmAIPy](https://www.prepwisar.in/questions/4QrckmAIPy)

Q34 JEE Main 2020 · 5 Sep · Shift 2

Consider the complex ions,

trans- $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ (A) and

cis- $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ (B).

The correct statement regarding them is :

- (A) both (A) and (B) can be optically active.
- (B) both (A) and (B) can not be optically active.
- (C) (A) can not be optically active, but (B) can be optically active.
- (D) (A) can be optically active, but (B) can not be optically active.

[Step-by-step solution ► prepwisar.in/questions/JJXegC9iI_](https://www.prepwisar.in/questions/JJXegC9iI_)

Q35 JEE Main 2020 · 8 Jan · Shift 1

The complex that can show fac- and mer-isomers is :

- (A) $[\text{CoCl}_2(\text{en})_2]$
- (B) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
- (C) $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)_3]$
- (D) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$

[Step-by-step solution ► prepwisar.in/questions/_2lTrG7btq](https://www.prepwisar.in/questions/_2lTrG7btq)

Q36 JEE Main 2025 · 7 Apr · Shift 2

The number of unpaired electrons responsible for the paramagnetic nature of the following complex species are respectively :

**(A)** 1, 5, 4, 2**(B)** 1, 4, 4, 2**(C)** 1, 5, 5, 2**(D)** 1, 1, 4, 2

[Step-by-step solution ► prepwisar.in/questions/GLSrZ2cmYy](https://www.prepwisar.in/questions/GLSrZ2cmYy)

Q37 JEE Main 2025 · 7 Apr · Shift 2

The number of paramagnetic metal complex species among $[\text{Co}(\text{NH}_3)_6]^{3+}$, $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$, $[\text{MnCl}_6]^{3-}$, $[\text{Mn}(\text{CN})_6]^{3-}$, $[\text{CoF}_6]^{3-}$, $[\text{Fe}(\text{CN})_6]^{3-}$ and $[\text{FeF}_6]^{3-}$ with same number of unpaired electrons is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/UYXAo2ZlIfj](https://www.prepwisar.in/questions/UYXAo2ZlIfj)

Q38 JEE Main 2025 · 3 Apr · Shift 1

The correct order of the complexes $[\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+}$ (A), $[\text{Co}(\text{NH}_3)_6]^{3+}$ (B), $[\text{Co}(\text{CN})_6]^{3-}$ (C) and $[\text{CoCl}(\text{NH}_3)_5]^{2+}$ (D) in terms of wavelength of light absorbed is

(A) $D > C > B > A$ **(B)** $C > B > A > D$ **(C)** $D > A > B > C$ **(D)** $C > B > D > A$

[Step-by-step solution ► prepwisar.in/questions/sP8lF2BU2E](https://www.prepwisar.in/questions/sP8lF2BU2E)

Q39 JEE Main 2025 · 2 Apr · Shift 2

The spin-only magnetic moment value of M^{n+} ion formed among Ni, Zn, Mn and Cu that has the least enthalpy of atomisation is _____. (in nearest integer) Here n is equal to the number of diamagnetic complexes among $\text{K}_2[\text{NiCl}_4]$, $[\text{Zn}(\text{H}_2\text{O})_6]\text{Cl}_2$, $\text{K}_3[\text{Mn}(\text{CN})_6]$ and $[\text{Cu}(\text{PPh}_3)_3]\text{I}$

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/rLr9x3EIfw](https://www.prepwisar.in/questions/rLr9x3EIfw)

Q40 JEE Main 2025 · 2 Apr · Shift 2

The d-orbital electronic configuration of the complex among $[\text{Co}(\text{en})_3]^{3+}$, $[\text{CoF}_6]^{3-}$, $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$ that has the highest CFSE is :

(A) $t_{2g}^6 e_g^0$ **(B)** $t_{2g}^3 e_g^2$ **(C)** $t_{2g}^4 e_g^2$ **(D)** $t_{2g}^6 e_g^4$

[Step-by-step solution ► prepwisar.in/questions/kUpX6KPX5P](https://www.prepwisar.in/questions/kUpX6KPX5P)

Q41 JEE Main 2025 · 2 Apr · Shift 1

Given below are two statements :

Statement (I) : In octahedral complexes, when $\Delta_0 < P$ high spin complexes are formed. When $\Delta_0 > P$ low spin complexes are formed.

Statement (II) : In tetrahedral complexes because of $\Delta_t < P$, low spin complexes are rarely formed.

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

- (A) Both Statement I and Statement II are incorrect
 (B) Statement I is correct but Statement II is incorrect
 (C) Statement I is incorrect but Statement II is correct
 (D) Both Statement I and Statement II are correct

Step-by-step solution ► [prepwiser.in/questions/QE0JcRpAnv](https://www.prepwiser.in/questions/QE0JcRpAnv)

Q42 JEE Main 2025 · 24 Jan · Shift 2

The conditions and consequence that favours the $t_{2g}^3 e_g^1$ configuration in a metal complex are :

- (A) strong field ligand, low spin complex
 (B) strong field ligand, high spin complex
 (C) weak field ligand, high spin complex
 (D) weak field ligand, low spin complex

Step-by-step solution ► [prepwiser.in/questions/83fjij6j2H](https://www.prepwiser.in/questions/83fjij6j2H)

Q43 JEE Main 2025 · 22 Jan · Shift 2

The correct order of the following complexes in terms of their crystal field stabilization energies is :

- (A) $[\text{Co}(\text{NH}_3)_4]^{2+} < [\text{Co}(\text{NH}_3)_6]^{2+} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{en})_3]^{3+}$
 (B) $[\text{Co}(\text{NH}_3)_4]^{2+} < [\text{Co}(\text{NH}_3)_6]^{2+} < [\text{Co}(\text{en})_3]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+}$
 (C) $[\text{Co}(\text{NH}_3)_6]^{2+} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{NH}_3)_4]^{2+} < [\text{Co}(\text{en})_3]^{3+}$
 (D) $[\text{Co}(\text{en})_3]^{3+} < [\text{Co}(\text{NH}_3)_6]^{3+} < [\text{Co}(\text{NH}_3)_6]^{2+} < [\text{Co}(\text{NH}_3)_4]^{2+}$

Step-by-step solution ► [prepwiser.in/questions/CnzMHjqGK0](https://www.prepwiser.in/questions/CnzMHjqGK0)

Q44 JEE Main 2025 · 22 Jan · Shift 2

Identify the homoleptic complex(es) that is/are low spin.

- (A) $[\text{Fe}(\text{CN})_5\text{NO}]^{2-}$
 (B) $[\text{CoF}_6]^{3-}$
 (C) $[\text{Fe}(\text{CN})_6]^{4-}$
 (D) $[\text{Co}(\text{NH}_3)_6]^{3+}$
 (E) $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$

Choose the correct answer from the options given below :

- (A) (C) and (D) only
 (B) (C) only
 (C) (A) and (C) only
 (D) (B) and (E) only

Step-by-step solution ► [prepwiser.in/questions/5qAFjheVXF](https://www.prepwiser.in/questions/5qAFjheVXF)

Q45 JEE Main 2024 · 8 Apr · Shift 1

Number of Complexes with even number of electrons in t_{2g} orbitals is -



- (A) 3
 (B) 2
 (C) 1
 (D) 5

Step-by-step solution ► [prepwiser.in/questions/LgatBjxkjl](https://www.prepwiser.in/questions/LgatBjxkjl)

Q46 JEE Main 2024 · 8 Apr · Shift 2

Total number of unpaired electrons in the complex ions $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{NiCl}_4]^{2-}$ is _____.

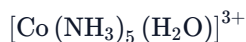
Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/9WrvPYmLIS](https://www.prepwiser.in/questions/9WrvPYmLIS)

Q47 JEE Main 2024 · 6 Apr · Shift 1

Consider the following complexes

(A) $[\text{CoCl}(\text{NH}_3)_5]^{2+}$, (B) $[\text{Co}(\text{CN})_6]^{3-}$, (C)



, (D) $[\text{Cu}(\text{H}_2\text{O})_4]^{2+}$

The correct order of A, B, C and D in terms of wavenumber of light absorbed is :

(A) $D < A < C < B$

(B) $B < C < A < D$

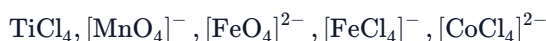
(C) $C < D < A < B$

(D) $A < C < B < D$

[Step-by-step solution ► prepwiser.in/questions/T8n1G4ovYW](https://www.prepwiser.in/questions/T8n1G4ovYW)

Q48 JEE Main 2024 · 5 Apr · Shift 2

The number of complexes from the following with no electrons in the t_2 orbital is _____.



(A) 4

(B) 2

(C) 3

(D) 1

[Step-by-step solution ► prepwiser.in/questions/VcgDAJlmyP](https://www.prepwiser.in/questions/VcgDAJlmyP)

Q49 JEE Main 2024 · 5 Apr · Shift 1

The correct order of ligands arranged in increasing field strength.

(A) $\text{F}^{-} < \text{Br}^{-} < \text{I}^{-} < \text{NH}_3$

(B) $\text{H}_2\text{O} < ^-\text{OH} < \text{CN}^{-} < \text{NH}_3$

(C) $\text{Br}^{-} < \text{F}^{-} < \text{H}_2\text{O} < \text{NH}_3$

(D) $\text{Cl}^{-} < ^-\text{OH} < \text{Br}^{-} < \text{CN}^{-}$

[Step-by-step solution ► prepwiser.in/questions/ozX-95MrPc](https://www.prepwiser.in/questions/ozX-95MrPc)

Q50 JEE Main 2024 · 4 Apr · Shift 1

The correct sequence of ligands in the order of decreasing field strength is :

(A) $\text{NCS}^{-} > \text{EDTA}^{4-} > \text{CN}^{-} > \text{CO}$

(B) $\text{CO} > \text{H}_2\text{O} > \text{F}^{-} > \text{S}^{2-}$

(C) $\text{S}^{2-} > ^-\text{OH} > \text{EDTA}^{4-} > \text{CO}$

(D) $^-\text{OH} > \text{F}^{-} > \text{NH}_3 > \text{CN}^{-}$

[Step-by-step solution ► prepwiser.in/questions/a4oNKkkI4o](https://www.prepwiser.in/questions/a4oNKkkI4o)

Q51 JEE Main 2024 · 4 Apr · Shift 2

The number of unpaired d-electrons in $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ is _____.

(A) 0

(B) 2

(C) 1

(D) 4

[Step-by-step solution ► prepwiser.in/questions/ib9umqh7E9](https://www.prepwiser.in/questions/ib9umqh7E9)

Q52 JEE Main 2024 · 4 Apr · Shift 2

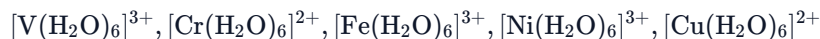
If an iron (III) complex with the formula $[\text{Fe}(\text{NH}_3)_x(\text{CN})_y]^-$ has no electron in its e_g orbital, then the value of $x + y$ is

- (A) 6 (B) 4
(C) 3 (D) 5

[Step-by-step solution ► prepwisar.in/questions/CKD29E6Pvc](https://www.prepwisar.in/questions/CKD29E6Pvc)

Q53 JEE Main 2024 · 4 Apr · Shift 1

Number of complexes from the following with even number of unpaired "d" electrons is _____



[Given atomic numbers: V = 23, Cr = 24, Fe = 26, Ni = 28, Cu = 29]

- (A) 1 (B) 5
(C) 2 (D) 4

[Step-by-step solution ► prepwisar.in/questions/7Ss5Fe050U](https://www.prepwisar.in/questions/7Ss5Fe050U)

Q54 JEE Main 2024 · 1 Feb · Shift 1

Given below are two statements :

Statement (I) : A solution of $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ is green in colour.

Statement (II) : A solution of $[\text{Ni}(\text{CN})_4]^{2-}$ is colourless.

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

- (A) Statement I is incorrect but Statement II is correct
(B) Both Statement I and Statement II are correct
(C) Both Statement I and Statement II are incorrect
(D) Statement I is correct but Statement II is incorrect

[Step-by-step solution ► prepwisar.in/questions/Fttp-4b34L](https://www.prepwisar.in/questions/Fttp-4b34L)

Q55 JEE Main 2023 · 15 Apr · Shift 1

The homoleptic and octahedral complex of Co^{2+} and H_2O has _____ unpaired electron(s) in the t_{2g} set of orbitals.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisar.in/questions/DywUyfiIBx](https://www.prepwisar.in/questions/DywUyfiIBx)

Q56 JEE Main 2023 · 15 Apr · Shift 1

The complex with highest magnitude of crystal field splitting energy (Δ_0) is :

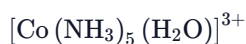
- (A) $[\text{Fe}(\text{OH}_2)_6]^{3+}$
(B) $[\text{Mn}(\text{OH}_2)_6]^{3+}$
(C) $[\text{Cr}(\text{OH}_2)_6]^{3+}$
(D) $[\text{Ti}(\text{OH}_2)_6]^{3+}$

[Step-by-step solution ► prepwisar.in/questions/HanTBCDwUA](https://www.prepwisar.in/questions/HanTBCDwUA)

Q57 JEE Main 2023 · 11 Apr · Shift 2

Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : $[\text{CoCl}(\text{NH}_3)_5]^{2+}$ absorbs at lower wavelength of light with respect to



Reason R : It is because the wavelength of the light absorbed depends on the oxidation state of the metal ion.

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

- (A) A is false but R is true
(B) Both A and R are true but R is NOT the correct explanation of A
(C) Both A and R are true and R is the correct explanation of A
(D) A is true but R is false

[Step-by-step solution ► prepwisser.in/questions/6W8p4n0o9h](https://www.prepwisser.in/questions/6W8p4n0o9h)

Q58 JEE Main 2023 · 11 Apr · Shift 2

The magnetic moment is measured in Bohr Magnetron (BM).

Spin only magnetic moment of Fe in $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ and $[\text{Fe}(\text{CN})_6]^{3-}$ complexes respectively is :

- (A) 3.87 B.M. and 1.732 B.M. (B) 5.92 B.M. and 1.732 B.M.
(C) 6.92 B.M. in both (D) 4.89 B.M. and 6.92 B.M.

[Step-by-step solution ► prepwisser.in/questions/M_ASaPEk39](https://www.prepwisser.in/questions/M_ASaPEk39)

Q59 JEE Main 2023 · 11 Apr · Shift 1

The ratio of spin-only magnetic moment values

$$\mu_{\text{eff}}[\text{Cr}(\text{CN})_6]^{3-} / \mu_{\text{eff}}[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$$

is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwisser.in/questions/vuWJEH1nOY](https://www.prepwisser.in/questions/vuWJEH1nOY)

Q60 JEE Main 2023 · 10 Apr · Shift 1

The octahedral diamagnetic low spin complex among the following is :

- (A) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (B) $[\text{NiCl}_4]^{2-}$
(C) $[\text{CoCl}_6]^{3-}$ (D) $[\text{CoF}_6]^{3-}$

[Step-by-step solution ► prepwisser.in/questions/-mTsnzpLQ1](https://www.prepwisser.in/questions/-mTsnzpLQ1)

Q61 JEE Main 2023 · 10 Apr · Shift 2

The correct order of the number of unpaired electrons in the given complexes is

- A. $[\text{Fe}(\text{CN})_6]^{3-}$
B. $[\text{FeF}_6]^{3-}$
C. $[\text{CoF}_6]^{3-}$
D. $[\text{Cr}(\text{oxalate})_3]^{3-}$
E. $[\text{Ni}(\text{CO})_4]$

Choose the correct answer from the options given below:

- (A) $E < A < B < D < C$
(B) $A < E < D < C < B$
(C) $A < E < C < B < D$
(D) $E < A < D < C < B$

[Step-by-step solution ► prepwisser.in/questions/VZ0h_vFmBB](https://www.prepwisser.in/questions/VZ0h_vFmBB)

Q62 JEE Main 2023 · 8 Apr · Shift 1

The correct order of spin only magnetic moments for the following complex ions is

- (A) $[\text{Fe}(\text{CN})_6]^{3-} < [\text{CoF}_6]^{3-} < [\text{MnBr}_4]^{2-} < [\text{Mn}(\text{CN})_6]^{3-}$
- (B) $[\text{MnBr}_4]^{2-} < [\text{CoF}_6]^{3-} < [\text{Fe}(\text{CN})_6]^{3-} < [\text{Mn}(\text{CN})_6]^{3-}$
- (C) $[\text{Fe}(\text{CN})_6]^{3-} < [\text{Mn}(\text{CN})_6]^{3-} < [\text{CoF}_6]^{3-} < [\text{MnBr}_4]^{2-}$
- (D) $[\text{CoF}_6]^{3-} < [\text{MnBr}_4]^{2-} < [\text{Fe}(\text{CN})_6]^{3-} < [\text{Mn}(\text{CN})_6]^{3-}$

[Step-by-step solution ► prepwiser.in/questions/ICAvhsCCIC](https://www.prepwiser.in/questions/ICAvhsCCIC)

Q63 JEE Main 2023 · 8 Apr · Shift 1

Which of the following complex is octahedral, diamagnetic and the most stable?

- (A) $\text{Na}_3[\text{CoCl}_6]$
- (B) $[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_2$
- (C) $\text{K}_3[\text{Co}(\text{CN})_6]$
- (D) $[\text{Ni}(\text{NH}_3)_6]\text{Cl}_2$

[Step-by-step solution ► prepwiser.in/questions/f3DvfbVeCa](https://www.prepwiser.in/questions/f3DvfbVeCa)

Q64 JEE Main 2023 · 1 Feb · Shift 1

Which of the following complex will show largest splitting of d-orbitals?

- (A) $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$
- (B) $[\text{Fe}(\text{CN})_6]^{3-}$
- (C) $[\text{Fe}(\text{NH}_3)_6]^{3+}$
- (D) $[\text{FeF}_6]^{3-}$

[Step-by-step solution ► prepwiser.in/questions/aILEcWUMU_](https://www.prepwiser.in/questions/aILEcWUMU_)

Q65 JEE Main 2023 · 31 Jan · Shift 2

If the CFSE of $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ is -96.0kJ/mol , this complex will absorb maximum at wavelength _____ nm. (nearest integer)

Assume Planck's constant (h) = $6.4 \times 10^{-34}\text{Js}$, Speed of light (c) = $3.0 \times 10^8\text{m/s}$ and Avogadro's

Constant (N_A) = $6 \times 10^{23}/\text{mol}$

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/_qMranVZRv](https://www.prepwiser.in/questions/_qMranVZRv)

Q66 JEE Main 2023 · 30 Jan · Shift 1

Which of the following is correct order of ligand field strength?

- (A) $\text{S}^{2-} < \text{C}_2\text{O}_4^{2-} < \text{NH}_3 < \text{en} < \text{CO}$
- (B) $\text{CO} < \text{en} < \text{NH}_3 < \text{C}_2\text{O}_4^{2-} < \text{S}^{2-}$
- (C) $\text{S}^{2-} < \text{NH}_3 < \text{en} < \text{CO} < \text{C}_2\text{O}_4^{2-}$
- (D) $\text{NH}_3 < \text{en} < \text{CO} < \text{S}^{2-} < \text{C}_2\text{O}_4^{2-}$

[Step-by-step solution ► prepwiser.in/questions/wFVH-c1p6t](https://www.prepwiser.in/questions/wFVH-c1p6t)

Q67 JEE Main 2023 · 29 Jan · Shift 2

Correct order of spin only magnetic moment of the following complex ions is :

(Given At.no. Fe : 26, Co : 27)

- (A) $[\text{CoF}_6]^{3-} > [\text{FeF}_6]^{3-} > [\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$
(B) $[\text{FeF}_6]^{3-} > [\text{Co}(\text{C}_2\text{O}_4)_3]^{3-} > [\text{CoF}_6]^{3-}$
(C) $[\text{FeF}_6]^{3-} > [\text{CoF}_6]^{3-} > [\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$
(D) $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-} > [\text{CoF}_6]^{3-} > [\text{FeF}_6]^{3-}$

[Step-by-step solution ► prepwiser.in/questions/aVC9eI0t5d](https://www.prepwiser.in/questions/aVC9eI0t5d)

Q68 JEE Main 2023 · 25 Jan · Shift 1

The number of paramagnetic species from the following is _____.



Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/HDAaj_zYKL](https://www.prepwiser.in/questions/HDAaj_zYKL)

Q69 JEE Main 2023 · 24 Jan · Shift 2

Which of the following cannot be explained by crystal field theory?

- (A) The order of spectrochemical series
(B) Stability of metal complexes
(C) Magnetic properties of transition metal complexes
(D) Colour of metal complexes

[Step-by-step solution ► prepwiser.in/questions/NFNJbcyvFZ](https://www.prepwiser.in/questions/NFNJbcyvFZ)

Q70 JEE Main 2022 · 29 Jul · Shift 1

$[\text{Fe}(\text{CN})_6]^{3-}$ should be an inner orbital complex. Ignoring the pairing energy, the value of crystal field stabilization energy for this complex is (–) _____ Δ_0 . (Nearest integer)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/fpxhfBz3sD](https://www.prepwiser.in/questions/fpxhfBz3sD)

Q71 JEE Main 2022 · 29 Jul · Shift 2

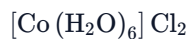
Octahedral complexes of copper(II) undergo structural distortion (Jahn-Teller). Which one of the given copper (II) complexes will show the maximum structural distortion? (en - ethylenediamine; $\text{H}_2\text{N}-\text{CH}_2-\text{CH}_2-\text{NH}_2$)

- (A) $[\text{Cu}(\text{H}_2\text{O})_6] \text{SO}_4$
(B) $[\text{Cu}(\text{en})(\text{H}_2\text{O})_4] \text{SO}_4$
(C) $\text{cis}-[\text{Cu}(\text{en})_2\text{Cl}_2]$
(D) $\text{trans}-[\text{Cu}(\text{en})_2\text{Cl}_2]$

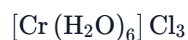
[Step-by-step solution ► prepwiser.in/questions/OUcmTu-LIX](https://www.prepwiser.in/questions/OUcmTu-LIX)

Q72 JEE Main 2022 · 26 Jul · Shift 1

The difference between spin only magnetic moment values of



and



is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/IQOfgrAnC7](https://www.prepwiser.in/questions/IQOfgrAnC7)

Q73 JEE Main 2022 · 26 Jul · Shift 2

The metal complex that is diamagnetic is (Atomic number: Fe, 26; Cu, 29)



[Step-by-step solution ► prepwiser.in/questions/Zey4g_PjPm](https://www.prepwiser.in/questions/Zey4g_PjPm)

Q74 JEE Main 2022 · 25 Jul · Shift 2

The correct order of energy of absorption for the following metal complexes is :



[Step-by-step solution ► prepwiser.in/questions/6vSxIfVFWO](https://www.prepwiser.in/questions/6vSxIfVFWO)

Q75 JEE Main 2022 · 28 Jun · Shift 2



Among the given complexes, number of paramagnetic complexes is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/fdJV9SG3yP](https://www.prepwiser.in/questions/fdJV9SG3yP)

Q76 JEE Main 2022 · 27 Jun · Shift 2

Arrange the following coordination compounds in the increasing order of magnetic moments. (Atomic numbers : Mn = 25; Fe = 26)

- A. $[\text{FeF}_6]^{3-}$
- B. $[\text{Fe}(\text{CN})_6]^{3-}$
- C. $[\text{MnCl}_6]^{3-}$ (high spin)
- D. $[\text{Mn}(\text{CN})_6]^{3-}$

Choose the correct answer from the options given below :

- (A) $A < B < D < C$
- (B) $B < D < C < A$
- (C) $A < C < D < B$
- (D) $B < D < A < C$

[Step-by-step solution ► prepwiser.in/questions/0Xq1Xu9Ejw](https://www.prepwiser.in/questions/0Xq1Xu9Ejw)

Q77 JEE Main 2022 · 27 Jun · Shift 1

Which of the following will have maximum stabilization due to crystal field?

- (A) $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$
- (B) $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$
- (C) $[\text{Co}(\text{CN})_6]^{3-}$
- (D) $[\text{Cu}(\text{NH}_3)_4]^{2+}$

[Step-by-step solution ► prepwiser.in/questions/vustap06rD](https://www.prepwiser.in/questions/vustap06rD)

Q78 JEE Main 2022 · 26 Jun · Shift 2

Reaction of $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ with excess ammonia and in the presence of oxygen results into a diamagnetic product. Number of electrons present in t_{2g} -orbitals of the product is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/MjWYIDIdqO](https://www.prepwiser.in/questions/MjWYIDIdqO)

Q79 JEE Main 2022 · 26 Jun · Shift 1

The spin-only magnetic moment value of an octahedral complex among $\text{CoCl}_3 \cdot 4\text{NH}_3$, $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$ and $\text{PtCl}_4 \cdot 2\text{HCl}$, which upon reaction with excess of AgNO_3 gives 2 moles of AgCl is _____ B.M. (Nearest integer)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/iAGy8fVGly](https://www.prepwiser.in/questions/iAGy8fVGly)

Q80 JEE Main 2022 · 25 Jun · Shift 1

If $[\text{Cu}(\text{H}_2\text{O})_4]^{2+}$ absorbs a light of wavelength 600 nm for d-d transition, then the value of octahedral crystal field splitting energy for $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$ will be _____ $\times 10^{-21}$ J. [Nearest Integer]

(Given : $h = 6.63 \times 10^{-34}$ Js and $c = 3.08 \times 10^8$ ms $^{-1}$)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/Kc0mCiviBA](https://www.prepwiser.in/questions/Kc0mCiviBA)

Q81 JEE Main 2022 · 25 Jun · Shift 2

Amongst $\text{FeCl}_3 \cdot 3\text{H}_2\text{O}$, $\text{K}_3[\text{Fe}(\text{CN})_6]$ and $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$, the spin-only magnetic moment value of the inner-orbital complex that absorbs light at shortest wavelength is _____ B.M. [nearest integer]

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/Z68VtAHv27](https://www.prepwiser.in/questions/Z68VtAHv27)

Q82 JEE Main 2022 · 24 Jun · Shift 2

Transition metal complex with highest value of crystal field splitting (Δ_0) will be :

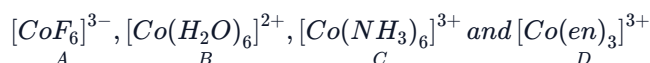
- (A) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
- (B) $[\text{Mo}(\text{H}_2\text{O})_6]^{3+}$
- (C) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$
- (D) $[\text{Os}(\text{H}_2\text{O})_6]^{3+}$

[Step-by-step solution](#) ► [prepwiser.in/questions/WTwopf7-we](https://www.prepwiser.in/questions/WTwopf7-we)

Q83 JEE Main 2021 · 26 Aug · Shift 2

Arrange the following Cobalt complexes in the order of increasing Crystal Field Stabilization Energy (CFSE) value.

Complexes :



Choose the correct option :

- (A) $A < B < C < D$
- (B) $B < A < C < D$
- (C) $B < C < D < A$
- (D) $C < D < B < A$

[Step-by-step solution](#) ► [prepwiser.in/questions/UFmgr1MAPo](https://www.prepwiser.in/questions/UFmgr1MAPo)

Q84 JEE Main 2021 · 22 Jul · Shift 2

The total number of unpaired electrons present in $[\text{Co}(\text{NH}_3)_6]\text{Cl}_2$ and $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ is :

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/F8MIQTexB8](https://www.prepwiser.in/questions/F8MIQTexB8)

Q85 JEE Main 2021 · 18 Mar · Shift 1

The total number of unpaired electrons present in the complex $\text{K}_3[\text{Cr}(\text{oxalate})_3]$ is _____.

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/83qS95mH5v](https://www.prepwiser.in/questions/83qS95mH5v)

Q86 JEE Main 2021 · 16 Mar · Shift 2

$[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ absorbs light of wavelength 498 nm during a d – d transition. The octahedral splitting energy for the above complex is _____ $\times 10^{-19}$ J. (Round off to the Nearest Integer). $h = 6.626 \times 10^{-34}$ Js; $c = 3 \times 10^8 \text{ ms}^{-1}$

Numerical answer — enter the value.

[Step-by-step solution](#) ► [prepwiser.in/questions/-EP55Kkj61](https://www.prepwiser.in/questions/-EP55Kkj61)

Q87 JEE Main 2020 · 5 Sep · Shift 2

Considering that $\Delta_0 > P$, the magnetic moment (in BM) of $[\text{Ru}(\text{H}_2\text{O})_6]^{2+}$ would be _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/K-1TDeuqd8](https://www.prepwiser.in/questions/K-1TDeuqd8)

Q88 JEE Main 2020 · 4 Sep · Shift 2

The one that can exhibit highest paramagnetic behaviour among the following is :

gly = glycinato; bpy = 2, 2'-bipyridine

(A) $[\text{Fe}(\text{en})(\text{bpy})(\text{NH}_3)_2]^{2+}$

(B) $[\text{Pd}(\text{gly})_2]$

(C) $[\text{Co}(\text{OX})_2(\text{OH})_2]^-$ ($\Delta_0 > P$)

(D) $[\text{Ti}(\text{NH}_3)_6]^{3+}$

[Step-by-step solution ► prepwiser.in/questions/B50a-IDFtj](https://www.prepwiser.in/questions/B50a-IDFtj)

Q89 JEE Main 2020 · 2 Sep · Shift 1

For octahedral Mn(II) and tetrahedral Ni(II) complexes, consider the following statements:

(I) both the complexes can be high spin.

(II) Ni(II) complex can very rarely be low spin.

(III) with strong field ligands, Mn(II) complexes can be low spin.

(IV) aqueous solution of Mn(II) ions is yellow in colour.

The **correct** statements are :

(A) (I), (III) and (IV) only

(B) (I) and (II) only

(C) (II), (III) and (IV) only

(D) (I), (II) and (III) only

[Step-by-step solution ► prepwiser.in/questions/Jgt0BdFahW](https://www.prepwiser.in/questions/Jgt0BdFahW)

Q90 JEE Main 2020 · 9 Jan · Shift 1

$[\text{Pd}(\text{F})(\text{Cl})(\text{Br})(\text{I})]^{2-}$ has n number of geometrical isomers. Then, the spin-only magnetic moment and crystal field stabilisation energy [CFSE] of $[\text{Fe}(\text{CN})_6]^{n-6}$, respectively, are:

[Note : Ignore the pairing energy]

(A) 1.73 BM and $-2.0 \Delta_0$

(B) 5.92 BM and 0

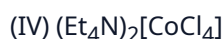
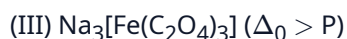
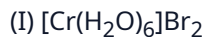
(C) 2.84 BM and $-1.6 \Delta_0$

(D) 0 BM and $-2.4 \Delta_0$

[Step-by-step solution ► prepwiser.in/questions/QFgeCaGyb6](https://www.prepwiser.in/questions/QFgeCaGyb6)

Q91 JEE Main 2020 · 9 Jan · Shift 2

The correct order of the spin-only magnetic moments of the following complexes is :



(A) (III) > (I) > (II) > (IV)

(B) (II) $\approx$ (I) > (IV) > (III)

(C) (III) > (I) > (IV) > (II)

(D) (I) > (IV) > (III) > (II)

[Step-by-step solution ► prepwisar.in/questions/cB_PLjyA9K](https://www.prepwisar.in/questions/cB_PLjyA9K)

Q92 JEE Main 2020 · 7 Jan · Shift 2

Among the statements(a)-(d) the incorrect ones are :

(a) Octahedral CO(III) complexes with strong fields ligands have very high magnetic moments.

(b) When $\Delta_0 < P$, the d-electron configuration of Co(III) in an octahedral complex is $t_{eg}^4 e_g^2$

(c) Wavelength of light absorbed by $[\text{Co}(\text{en})_3]^{3+}$ is lower than that of $[\text{CoF}_6]^{3-}$

(d) If the Δ_0 for an octahedral complex of CO(III) is $18,000 \text{ cm}^{-1}$, the Δ_t for its tetrahedral complex with the same ligand be $16,000 \text{ cm}^{-1}$

(A) (a) and (b) only

(B) (b) and (c) only

(C) (c) and (d) only

(D) (a) and (d) only

[Step-by-step solution ► prepwisar.in/questions/3AEFaK-dRy](https://www.prepwisar.in/questions/3AEFaK-dRy)

Werner's Theory and Terminology · 14 PYQs

Q93 JEE Main 2025 · 7 Apr · Shift 2

'X' is the number of acidic oxides among VO_2 , V_2O_3 , CrO_3 , V_2O_5 and Mn_2O_7 . The primary valency of cobalt in $[\text{Co}(\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2)_3]_2(\text{SO}_4)_3$ is Y. The value of X + Y is _____.

(A) 3

(B) 4

(C) 2

(D) 5

[Step-by-step solution ► prepwisar.in/questions/5nNak32oLG](https://www.prepwisar.in/questions/5nNak32oLG)

Match List - I with List - II.

List - I (Complex)	List - II (Primary valency and Secondary valency)
(A) $[\text{Co(en)}_2\text{Cl}_2]\text{Cl}$	(I) 3, 6
(B) $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NO}_2)]$	(II) 3, 4
(C) $\text{Hg} [\text{Co}(\text{SCN})_4]$	(III) 2, 6
(D) $[\text{Mg} (\text{EDTA})]^{2-}$	(IV) 2, 4

Choose the **correct** answer from the options given below :

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

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

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

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

[Step-by-step solution ► prepwiser.in/questions/jjdKwuiyoN](https://www.prepwiser.in/questions/jjdKwuiyoN)

$\text{CrCl}_3 \cdot x\text{NH}_3$ can exist as a complex. 0.1 molal aqueous solution of this complex shows a depression in freezing point of 0.558°C . Assuming 100% ionisation of this complex and coordination number of Cr is 6, the complex will be (Given $K_f = 1.86\text{Kkgmol}^{-1}$)

(A) $[\text{Cr} (\text{NH}_3)_5 \text{Cl}] \text{Cl}_2$ (B) $[\text{Cr} (\text{NH}_3)_4 \text{Cl}_2] \text{Cl}$ (C) $[\text{Cr} (\text{NH}_3)_6] \text{Cl}_3$ (D) $[\text{Cr} (\text{NH}_3)_3 \text{Cl}_3]$ [Step-by-step solution ► prepwiser.in/questions/7LaItbKlra](https://www.prepwiser.in/questions/7LaItbKlra)

From the magnetic behaviour of $[\text{NiCl}_4]^{2-}$ (paramagnetic) and $[\text{Ni}(\text{CO})_4]$ (diamagnetic), choose the correct geometry and oxidation state.

(A) $[\text{NiCl}_4]^{2-}$: Ni(0), tetrahedral $[\text{Ni}(\text{CO})_4]$: Ni(0), square planar(B) $[\text{NiCl}_4]^{2-}$: Ni^{II} , tetrahedral $[\text{Ni}(\text{CO})_4]$: Ni(0), tetrahedral(C) $[\text{NiCl}_4]^{2-}$: Ni^{II} , tetrahedral $[\text{Ni}(\text{CO})_4]$: Ni^{II} , square planar(D) $[\text{NiCl}_4]^{2-}$: Ni^{II} , square planar $[\text{Ni}(\text{CO})_4]$: Ni(0), square planar[Step-by-step solution ► prepwiser.in/questions/EsKbvFvX7w](https://www.prepwiser.in/questions/EsKbvFvX7w)

An octahedral complex with the formula $\text{CoCl}_3 \cdot n\text{NH}_3$ upon reaction with excess of AgNO_3 solution gives 2 moles of AgCl . Consider the oxidation state of Co in the complex is 'x'. The value of " $x + n$ " is _____.

(A) 6

(B) 5

(C) 3

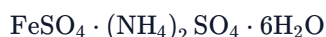
(D) 8

[Step-by-step solution ► prepwiser.in/questions/pw9LERPVCS](https://www.prepwiser.in/questions/pw9LERPVCS)

Q98 JEE Main 2023 · 1 Feb · Shift 1

Which of the following are the example of double salt?

A.



B. $\text{CuSO}_4 \cdot 4\text{NH}_3 \cdot \text{H}_2\text{O}$

C.



D. $\text{Fe}(\text{CN})_2 \cdot 4\text{KCN}$

Choose the correct answer :

(A) A, B and D only

(B) B and D only

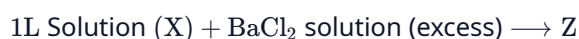
(C) A and B only

(D) A and C only

[Step-by-step solution ► prepwiser.in/questions/Eqvr6MBGXR](https://www.prepwiser.in/questions/Eqvr6MBGXR)

Q99 JEE Main 2023 · 30 Jan · Shift 2

1L, 0.02M solution of $[\text{Co}(\text{NH}_3)_5 \text{SO}_4] \text{Br}$ is mixed with 1L, 0.02M solution of $[\text{Co}(\text{NH}_3)_5 \text{Br}] \text{SO}_4$. The resulting solution is divided into two equal parts (X) and treated with excess of AgNO_3 solution and BaCl_2 solution respectively as shown below:



The number of moles of Y and Z respectively are

(A) 0.01, 0.01

(B) 0.01, 0.02

(C) 0.02, 0.01

(D) 0.02, 0.02

[Step-by-step solution ► prepwiser.in/questions/Y_1cM8YE2j](https://www.prepwiser.in/questions/Y_1cM8YE2j)

Q100 JEE Main 2023 · 25 Jan · Shift 2

Total number of moles of AgCl precipitated on addition of excess of AgNO_3 to one mole each of the following complexes $[\text{Co}(\text{NH}_3)_4 \text{Cl}_2] \text{Cl}$, $[\text{Ni}(\text{H}_2\text{O})_6] \text{Cl}_2$, $[\text{Pt}(\text{NH}_3)_2 \text{Cl}_2]$ and $[\text{Pd}(\text{NH}_3)_4] \text{Cl}_2$ is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/tVIYAzC27r](https://www.prepwiser.in/questions/tVIYAzC27r)

Q101 JEE Main 2023 · 24 Jan · Shift 1

The primary and secondary valencies of cobalt respectively in $[\text{Co}(\text{NH}_3)_5 \text{Cl}] \text{Cl}_2$ are :

(A) 2 and 8

(B) 2 and 6

(C) 3 and 5

(D) 3 and 6

[Step-by-step solution ► prepwiser.in/questions/YZIkZukFKp](https://www.prepwiser.in/questions/YZIkZukFKp)

Q102 JEE Main 2022 · 27 Jul · Shift 1

The conductivity of a solution of complex with formula $\text{CoCl}_3 (\text{NH}_3)_4$ corresponds to 1 : 1 electrolyte, then the primary valency of central metal ion is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/QG0N7cpLcb](https://www.prepwiser.in/questions/QG0N7cpLcb)

Q103 JEE Main 2022 · 29 Jun · Shift 2

For the reaction given below :



If two equivalents of AgCl precipitate out, then the value of x will be _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/AM5Aefido-](https://www.prepwiser.in/questions/AM5Aefido-)

Q104 JEE Main 2021 · 27 Jul · Shift 2

3 moles of metal complex with formula $\text{Co(en)}_2\text{Cl}_3$ gives 3 moles of silver chloride on treatment with excess of silver nitrate. The secondary valency of Co in the complex is _____.

(Round off to the nearest integer)

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/eE9vAuRaqP](https://www.prepwiser.in/questions/eE9vAuRaqP)

Q105 JEE Main 2021 · 18 Mar · Shift 2

The secondary valency and the number of hydrogen bonded water molecule(s) in $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, respectively, are :

(A) 5 and 1

(B) 4 and 1

(C) 6 and 5

(D) 6 and 4

[Step-by-step solution ► prepwiser.in/questions/ISrYQBiWuk](https://www.prepwiser.in/questions/ISrYQBiWuk)

Q106 JEE Main 2020 · 3 Sep · Shift 2

Complex A has a composition of $\text{H}_{12}\text{O}_6\text{Cl}_3\text{Cr}$. If the complex on treatment with conc. H_2SO_4 loses 13.5% of its original mass, the correct molecular formula of A is :

[Given: atomic mass of Cr = 52 amu and Cl = 35 amu]

(A) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$

(B) $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$

(C) $[\text{Cr}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$

(D) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$

[Step-by-step solution ► prepwiser.in/questions/ubbbqw7MHVZ](https://www.prepwiser.in/questions/ubbbqw7MHVZ)

Valence Bond Theory · 8 PYQs

Q107 JEE Main 2025 · 8 Apr · Shift 2

The number of species from the following that are involved in sp^3d^2 hybridization is :

$[\text{Co}(\text{NH}_3)_6]^{3+}$, SF_6 , $[\text{CrF}_6]^{3-}$, $[\text{CoF}_6]^{3-}$, $[\text{Mn}(\text{CN})_6]^{3-}$, and $[\text{MnCl}_6]^{3-}$

(A) 4

(B) 3

(C) 5

(D) 6

[Step-by-step solution ► prepwiser.in/questions/ipmv67zWKQ](https://www.prepwiser.in/questions/ipmv67zWKQ)

Q108 JEE Main 2025 · 7 Apr · Shift 1

The number of paramagnetic complexes among $[\text{FeF}_6]^{3-}$, $[\text{Fe}(\text{CN})_6]^{3-}$, $[\text{Mn}(\text{CN})_6]^{3-}$, $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$, $[\text{MnCl}_6]^{3-}$, and $[\text{CoF}_6]^{3-}$, which involved d^2sp^3 hybridization is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/aRe1dqvvF1](https://www.prepwiser.in/questions/aRe1dqvvF1)

Q109 JEE Main 2025 · 2 Apr · Shift 2

The type of hybridization and the magnetic property of $[\text{MnCl}_6]^{3-}$ are,

- (A) sp^3d^2 , paramagnetic with four unpaired electrons.
- (B) d^2sp^3 , paramagnetic with four unpaired electrons.
- (C) sp^3d^2 , paramagnetic with two unpaired electrons.
- (D) d^2sp^3 , paramagnetic with two unpaired electrons.

[Step-by-step solution ► prepwiser.in/questions/INfnnAu4hh](https://www.prepwiser.in/questions/INfnnAu4hh)

Q110 JEE Main 2023 · 24 Jan · Shift 2

The hybridization and magnetic behaviour of cobalt ion in $[\text{Co}(\text{NH}_3)_6]^{3+}$ complex, respectively is :

- (A) sp^3d^2 and paramagnetic
- (B) sp^3d^2 and diamagnetic
- (C) d^2sp^3 and diamagnetic
- (D) d^2sp^3 and paramagnetic

[Step-by-step solution ► prepwiser.in/questions/bxqb8-BJ-y](https://www.prepwiser.in/questions/bxqb8-BJ-y)

Q111 JEE Main 2022 · 28 Jun · Shift 1

Given below are two statements :

Statement I : $[\text{Ni}(\text{CN})_4]^{2-}$ is square planar and diamagnetic complex, with dsp^2 hybridization for Ni but $[\text{Ni}(\text{CO})_4]$ is tetrahedral, paramagnetic and with sp^3 -hybridization for Ni.

Statement II : $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CO})_4]$ both have same d-electron configuration have same geometry and are paramagnetic.

In light the above statements, choose the correct answer from the options given below :

- (A) Both Statement I and Statement II are true.
- (B) Both Statement I and Statement II are false.
- (C) Statement I is correct but Statement II is false.
- (D) Statement I is false but Statement II is correct.

[Step-by-step solution ► prepwiser.in/questions/H2kZxrHRvt](https://www.prepwiser.in/questions/H2kZxrHRvt)

Q112 JEE Main 2022 · 28 Jun · Shift 1

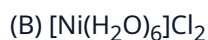
Number of complexes which will exhibit synergic bonding amongst, $[\text{Cr}(\text{CO})_6]$, $[\text{Mn}(\text{CO})_5]$ and $[\text{Mn}_2(\text{CO})_{10}]$ is _____.

Numerical answer — enter the value.

[Step-by-step solution ► prepwiser.in/questions/20kvHnhvlz](https://www.prepwiser.in/questions/20kvHnhvlz)

Q113 JEE Main 2020 · 8 Jan · Shift 2

The correct order of the calculated spin-only magnetic moments of complexes (A) to (D) is:



(A) $(C) < (D) < (B) < (A)$

(B) $(C) \approx (D) < (B) < (A)$

(C) $(A) \approx (C) \approx (D) < (B)$

(D) $(A) \approx (C) < (B) \approx (D)$

[Step-by-step solution ► prepwisser.in/questions/HJN6W-aqS](https://www.prepwisser.in/questions/HJN6W-aqS)

Q114 JEE Main 2020 · 7 Jan · Shift 1

The theory that can completely/properly explain the nature of bonding in $[\text{Ni}(\text{Co})_4]$ is :

(A) Wemer's theory

(B) Valence bond theory

(C) Crystal field theory

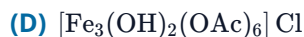
(D) Molecular orbital theory

[Step-by-step solution ► prepwisser.in/questions/R72JVDJqqi](https://www.prepwisser.in/questions/R72JVDJqqi)

Stability of Complexes · 6 PYQs

Q115 JEE Main 2023 · 11 Apr · Shift 1

The complex that dissolves in water is :



[Step-by-step solution ► prepwisser.in/questions/sPNjk_BG8C](https://www.prepwisser.in/questions/sPNjk_BG8C)

Q116 JEE Main 2023 · 30 Jan · Shift 1

To inhibit the growth of tumours, identify the compounds used from the following :

A. EDTA

B. Coordination Compounds of Pt

C. D - Penicillamine

D. Cis - Platin

Choose the correct answer from the option given below :

(A) A and B Only

(B) C and D Only

(C) B and D Only

(D) A and C Only

[Step-by-step solution ► prepwisser.in/questions/SieY1jdMxo](https://www.prepwisser.in/questions/SieY1jdMxo)

Q117 JEE Main 2022 · 27 Jul · Shift 2

Low oxidation state of metals in their complexes are common when ligands :

(A) have good π -accepting character

(B) have good σ -donor character

(C) are having good π -donating ability

(D) are having poor σ -donating ability

[Step-by-step solution ► prepwisser.in/questions/204B3-VqMd](https://www.prepwisser.in/questions/204B3-VqMd)

Q118 JEE Main 2022 · 25 Jun · Shift 1

White precipitate of AgCl dissolves in aqueous ammonia solution due to formation of :

- (A) $[\text{Ag}(\text{NH}_3)_4]\text{Cl}_2$
- (B) $[\text{Ag}(\text{Cl})_2(\text{NH}_3)_2]$
- (C) $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$
- (D) $[\text{Ag}(\text{NH}_3)\text{Cl}]\text{Cl}$

[Step-by-step solution ► prepwiser.in/questions/NA2qSue3IW](https://www.prepwiser.in/questions/NA2qSue3IW)

Q119 JEE Main 2021 · 25 Jul · Shift 2

Which one of the following metal complexes is most stable?

- (A) $[\text{Co}(\text{en})(\text{NH}_3)_4]\text{Cl}_2$
- (B) $[\text{Co}(\text{en})_3]\text{Cl}_2$
- (C) $[\text{Co}(\text{en})_2(\text{NH}_3)_2]\text{Cl}_2$
- (D) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_2$

[Step-by-step solution ► prepwiser.in/questions/N2qCbsKFhb](https://www.prepwiser.in/questions/N2qCbsKFhb)

Q120 JEE Main 2021 · 18 Mar · Shift 1

Match List - I with List - II

List - I

List - II

- | | |
|-----------------------|----------------|
| (a) Chlorophyll | (i) Ruthenium |
| (b) Vitamin- B_{12} | (ii) Platinum |
| (c) Anticancer drug | (iii) Cobalt |
| (d) Grubbs catalyst | (iv) Magnesium |

Choose the most appropriate answer from the options given below :

- (A) (a) - (iii), (b) - (ii), (c) - (iv), (d) - (i)
- (B) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)
- (C) (a) - (iv), (b) - (iii), (c) - (i), (d) - (ii)
- (D) (a) - (iv), (b) - (ii), (c) - (iii), (d) - (i)

[Step-by-step solution ► prepwiser.in/questions/WSWe44sL_n](https://www.prepwiser.in/questions/WSWe44sL_n)

Answer key — Coordination Compounds

Numbers match the question numbers above. For full working, open the solution link under each question.

1	C	2	3	3	B	4	D	5	D	6	D	7	4	8	C
9	B	10	4	11	B	12	B	13	4	14	1	15	2	16	2
17	C	18	B	19	C	20	C	21	A	22	B	23	A	24	B
25	B	26	A	27	4	28	B	29	D	30	C	31	1	32	B
33	B	34	C	35	C	36	A	37	2	38	C	39	0	40	A
41	D	42	C	43	A	44	A	45	A	46	2	47	A	48	C
49	C	50	B	51	A	52	A	53	C	54	B	55	1	56	C
57	A	58	B	59	1	60	A	61	D	62	C	63	C	64	B
65	480	66	A	67	C	68	4	69	A	70	2	71	A	72	0
73	A	74	A	75	2	76	B	77	C	78	6	79	3	80	766
81	2	82	D	83	B	84	3	85	3	86	4	87	0	88	C
89	D	90	A	91	D	92	D	93	D	94	C	95	A	96	B
97	D	98	D	99	A	100	5	101	D	102	3	103	5	104	6
105	B	106	B	107	B	108	2	109	A	110	C	111	B	112	3
113	C	114	D	115	D	116	C	117	A	118	C	119	B	120	B

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