

Inorganic Chemistry Questions

Total number of molecules/species from following which will be paramagnetic is _

Inorganic Chemistry Questions

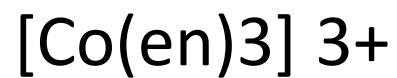
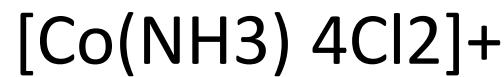
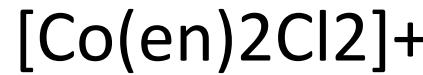
The spin-only magnetic moment value of Mn^{+} ion formed among Ni, Zn, Mn and Cu that has the least enthalpy of atomisation is complexes among $K_2[NiCl_4]$, $[Zn(H_2O)_6]Cl_2$, $K_3[Mn(CN)_6]$ and $[Cu(PPh_3)_3I]$. (in nearest integer)
Here n is equal to the number of diamagnetic

Inorganic Chemistry Questions

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

Inorganic Chemistry Questions

The complex that shows Facial - Meridional isomerism is :



Inorganic Chemistry Questions

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:

Inorganic Chemistry Questions

The number of unpaired electrons responsible for the paramagnetic nature of the following complex species are respectively : $[\text{Fe}(\text{CN})_6]^{3-}$, $[\text{FeF}_6]^{3-}$, $[\text{CoF}_6]^{3-}$, $[\text{Mn}(\text{CN})_6]^{3-}$

Inorganic Chemistry Questions

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

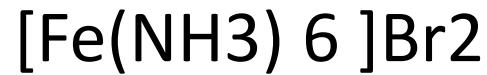
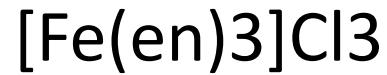
Inorganic Chemistry Questions

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

- A. Werner's theory
- B. Molecular orbital theory
- C. Crystal field theory
- D. Valence bond theory

Inorganic Chemistry Questions

In which of the following complexes the CFSE, ΔE_0 will be equal to zero?



Inorganic Chemistry Questions

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

Options:

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

Inorganic Chemistry Questions

The correct increasing order of stability of the complexes based on Δ_{f0} value is :

- I. $[\text{Mn}(\text{CN})_6]^{3-}$ II. $[\text{Co}(\text{CN})_6]^{4-}$ III. $[\text{Fe}(\text{CN})_6]^{4-}$ IV. $[\text{Fe}(\text{CN})_6]^{3-}$

Inorganic Chemistry Questions

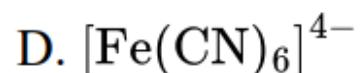
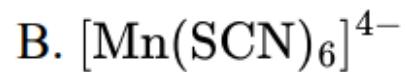
The d-orbital electronic configuration of the complex among $[\text{Co}(\text{en})_3]^{3+}$, $[\text{CoF}_6]^{3-}$, $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$ that has the highest CFSE is :

Inorganic Chemistry Questions

Which one of the following complexes will have $\Delta_o = 0$ and $\mu = 5.96$ B.M?

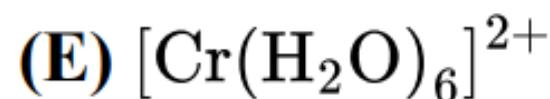
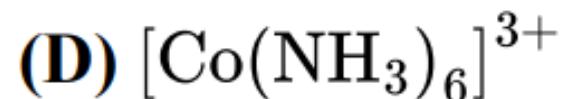
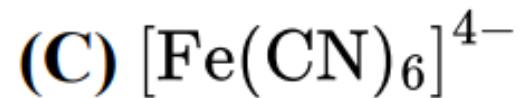
JEE Main 2025 (Online) 4th April Morning Shift

Options:



Inorganic Chemistry Questions

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



Inorganic Chemistry Questions

The number of optical isomers exhibited by the iron complex obtained from the following reaction is

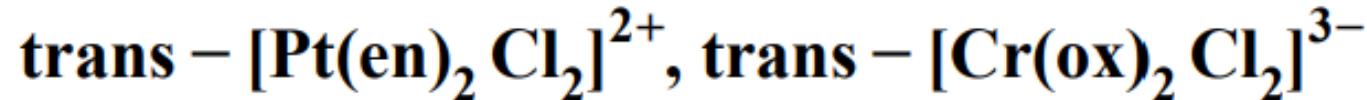
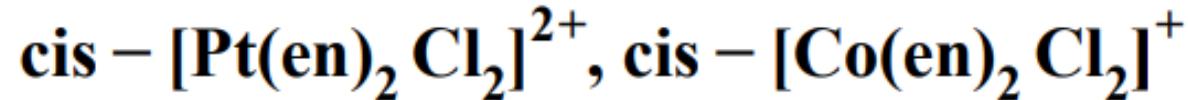
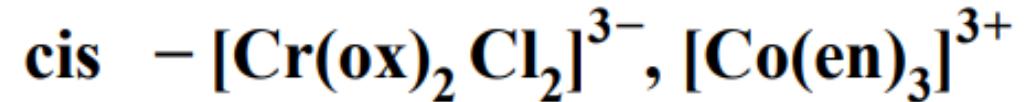


Inorganic Chemistry Questions

Number of stereoisomers possible for the complexes, $[\text{CrCl}_3(\text{py})_3]$ and $[\text{CrC}_2(\text{ox})_2]^{3-}$ are respectively (py = pyridine, ox = oxalate)

Inorganic Chemistry Questions

Number of complexes which show optical isomerism among the following is



[30-Jan-2024 Shift 2]

Inorganic Chemistry Questions

The set which does not have ambidentate ligand (s) is
[11-Apr-2023 shift 1]

Options:

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

Inorganic Chemistry Questions

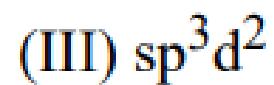
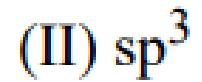
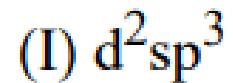
From the magnetic behaviour of $[\text{NiCl}_4]^{2-}$ (paramagnetic) and $[\text{Ni}(\text{CO})_4]$ (diamagnetic), correct geometry and oxidation state.

JEE Main 2025 (Online) 22nd January Morning Shift

Options:

- 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

Inorganic Chemistry Questions



Inorganic Chemistry Questions

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

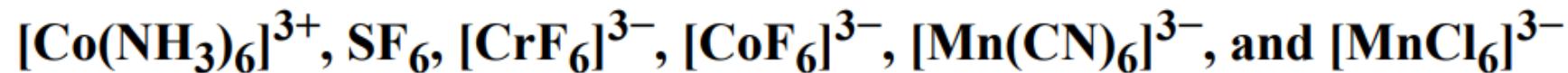
JEE Main 2025 (Online) 2nd April Evening Shift

Options:

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

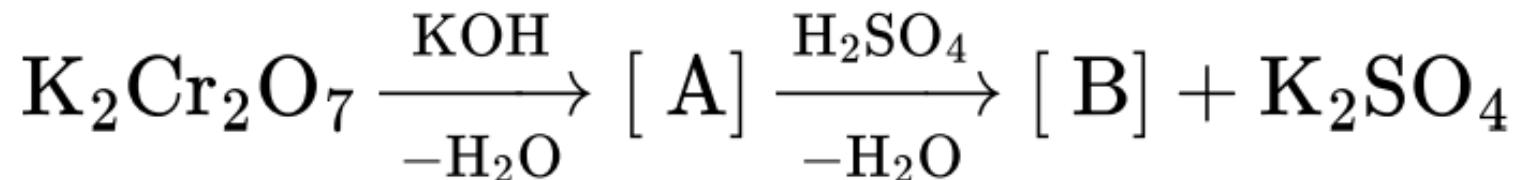
Inorganic Chemistry Questions

The number of species from the following that are involved in sp₃d₂ hybridization is



Inorganic Chemistry Questions

Consider the following reactions



The products [A] and [B], respectively are :

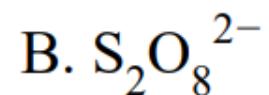
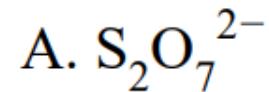
Inorganic Chemistry Questions

Potassium dichromate acts as a strong oxidizing agent in acidic solution. During this process, the oxidation state changes from

Inorganic Chemistry Questions

In neutral or alkaline solution, MnO_4^- oxidises thiosulphate to :
[27-Jul-2022-Shift-2]

Options:



Inorganic Chemistry Questions

Lanthanoid ions with $4f^7$ configuration are :



Inorganic Chemistry Questions

The pair of lanthanides in which both elements have high third - ionization energy is:

[13-Apr-2023 shift 1]

Options:

- A. Dy, Gd
- B. Eu, Gd
- C. Lu, Yb
- D. Eu, Yb

Inorganic Chemistry Questions

Which of the following pair is not isoelectronic species?
(At. no. Sm, 62; Er, 68; Yb, 70; Lu, 71; Eu, 63; Tb, 65; Tm, 69)[28-Jul-2022-Shift-2]

Options:

- A. Sm^{2+} and Er^{3+}
- B. Yb^{2+} and Lu^{3+}
- C. Eu^{2+} and Tb^{4+}
- D. Tb^{2+} and Tm^{4+}

Inorganic Chemistry Questions

The correct order of atomic radii is :

[Jan. 12, 2019 (II)]

Options:

- A. N > Ce > Eu > Ho
- B. Ho > N > Eu > Ce
- C. Ce > Eu > Ho > N
- D. Eu > Ce > Ho > N

Inorganic Chemistry Questions

CrCl₃ · xNH₃ 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 K kg mol⁻¹)

JEE Main 2025 (Online) 23rd January Morning Shift

Options:

- A. [Cr(NH₃)₅Cl]Cl₂
- B. [Cr(NH₃)₄Cl₂]Cl
- C. [Cr(NH₃)₆]Cl₃
- D. [Cr(NH₃)₃Cl₃]

Inorganic Chemistry Questions



(I) 3, 6



(II) 3, 4



(III) 2, 6



(IV) 2, 4

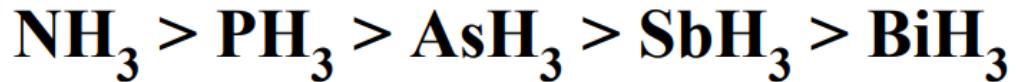
Inorganic Chemistry Questions

' X ' is the number of electrons in t_{2g} orbitals of the most stable complex ion among $[\text{Fe}(\text{NH}_3)_6]^{3+}$, $[\text{FeCl}_6]^{3-}$, $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$ and $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$. The nature of oxide of vanadium of the type V_2O_x is :

Inorganic Chemistry Questions

Choose the correct statements about the hydrides of group 15 elements.

A. The stability of the hydrides decreases in the order

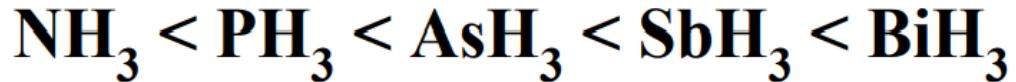


B. The reducing ability of the hydrides increases in the order



C. Among the hydrides, NH_3 is strong reducing agent while BiH_3 is mild reducing agent.

D. The basicity of the hydrides increases in the order



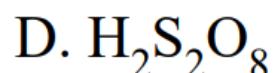
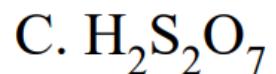
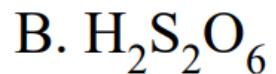
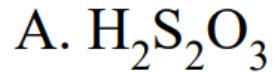
Choose the most appropriate from the option given below:

Inorganic Chemistry Questions

Which of the following oxoacids of sulphur contains "S" in two different oxidation states?

[28-Jun-2022-Shift-2]

Options:



Inorganic Chemistry Questions

Arrange the following species in order of increasing ionic radii and explain the trend: Al^{3+} , Mg^{2+} , Na^+ , F^- , O^{2-} , N^{3-}

Inorganic Chemistry Questions

Arrange the following elements in order of increasing first ionization enthalpy and explain ALL anomalies: Li, Be, B, C, N, O, F

Inorganic Chemistry Questions

Arrange F, Cl, Br, I in order of electron gain enthalpy (most negative to least negative)

Inorganic Chemistry Questions

An element has successive ionization energies (kJ/mol): $\text{IE}_1 = 800$, $\text{IE}_2 = 2427$, $\text{IE}_3 = 3658$, $\text{IE}_4 = 25024$, $\text{IE}_5 = 32824$

Determine:

- (a) Number of valence electrons
- (b) Group number
- (c) Explain the large jump

Inorganic Chemistry Questions

Identify the INCORRECT electronegativity order:

- (a) S < Cl < O < F
- (b) Al < Si < C < N
- (c) Al < Mg < B < N
- (d) Mg < Be < B < N

Inorganic Chemistry Questions

Arrange Al_2O_3 , SiO_2 , P_2O_3 , SO_2 in order of increasing acidic strength

Inorganic Chemistry Questions

Identify the INCORRECT trend in atomic radii:

- (a) Si > P > Cl > F
- (b) Mg > Al > C > O
- (c) Al > B > N > F
- (d) Be > Mg > Al > Si

Inorganic Chemistry Questions

An element E has electronic configuration [Rn] 5f¹⁴ 6d¹ 7s²

- (a) Determine its atomic number
- (b) Name the element (IUPAC nomenclature)
- (c) Identify its block, group, and period
- (d) What type of element is it?