

JEE Advanced Questions Based on Most Repeated Concepts of Coordination Compounds

Q: Total number of cis N–Mn–Cl bond angles (that is, Mn–N and Mn–Cl bonds in cis positions) present in a molecule of cis-[Mn(en)₂Cl₂] complex is _____ (en = NH₂CH₂CH₂NH₂)

Q: The number of geometric isomers possible for the complex [CoL₂Cl₂]⁻ (L=H₂NCH₂CH₂O⁻) is:

Q: Among the complex ions, [Co(NH₂.CH₂.CH₂.NH₂)₂Cl₂]⁺, [CrCl₂(C₂O₄)₂]³⁻, [Fe(H₂O)₄(OH)₂]⁺, [Fe(NH₃)₂(CN)₄]⁻, [Co(NH₂⁻CH₂⁻NH₂)₂(NH₃)Cl]²⁺ and [Co(NH₃)₄(H₂O)Cl]²⁺, the number of complex ion(s) that show(s) cis-trans isomerism is:

Q: EDTA⁴⁻ is ethylenediamine tetraacetate ion. The total number of N–CO–O bond angles in [Co(EDTA)]⁻¹ complex ion is

Q: The pair(s) of coordination complexes/ions exhibiting the same kind of isomerism is/are

- A. [Cr(NH₃)₅Cl]Cl₂ and [Cr(NH₃)₄Cl₂]Cl
- B. [Co(NH₃)₄Cl₂]⁺ and [Pt(NH₃)₂(H₂O)Cl]⁺
- C. [CoBr₂Cl₂]²⁻ and [PtBr₂Cl₂]²⁻
- D. [Pt(NH₃)₃(NO₃)]Cl and [Pt(NH₃)₃Cl]Br

Q: The geometries of the ammonia complexes of Ni²⁺, Pt²⁺ and Zn²⁺, respectively, are

- A. octahedral, square planar and tetrahedral
- B. square planar, octahedral and tetrahedral
- C. tetrahedral, square planar and octahedral
- D. octahedral, tetrahedral and square planar

Q: Consider the following complex ions, P, Q and R.

P = [FeF₆]³⁻, Q = [V(H₂O)₆]²⁺ and R = [Fe(H₂O)₆]²⁺

The correct order of the complex ions, according to their spin-only magnetic moment values (in B.M.) is

- A. R < Q < P

- B. $Q < R < P$
C. $R < P < Q$
D. $Q < P < R$

Q: Among the species given below, the total number of diamagnetic species is _____. H atom, NO_2 monomer, O^{2-} (superoxide), dimeric sulphur in vapour phase, Mn_3O_4 , $(\text{NH}_4)_2[\text{FeCl}_4]$, $(\text{NH}_4)_2[\text{NiCl}_4]$, K_2MnO_4 , K_2CrO_4 .

Q: For the octahedral complexes of Fe^{3+} in SCN^- (thiocyanato-S) and in CN^- ligand environments, the difference between the spin-only magnetic moments in Bohr magnetons (when approximated to the nearest integer) is _____. [Atomic number of Fe = 26]