

- (c) $[\text{Ni}(\text{NH}_3)_4]^{2+}$ (d) $[\text{Ni}(\text{CN})_4]^{2-}$
(e) $[\text{Fe}(\text{CN})_6]^{4-}$ (Kerala PET 2011)
35. Amongst $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{NiCl}_4]^{2-}$
(a) $[\text{Ni}(\text{CO})_4]$ and $[\text{NiCl}_4]^{2-}$ are diamagnetic and $[\text{Ni}(\text{CN})_4]^{2-}$ is paramagnetic
(b) $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CN})_4]^{2-}$ are diamagnetic and $[\text{Ni}(\text{CO})_4]$ is paramagnetic
(c) $[\text{Ni}(\text{CO})_4]$ and $[\text{Ni}(\text{CN})_4]^{2-}$ are diamagnetic and $[\text{NiCl}_4]^{2-}$ is paramagnetic
(d) $[\text{Ni}(\text{CO})_4]$ is diamagnetic and $[\text{NiCl}_4]^{2-}$ and $[\text{Ni}(\text{CN})_4]^{2-}$ are paramagnetic.
36. Among $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{NiCl}_4]^{2-}$ species, the hybridisation states at the Ni atom are, respectively
(a) sp^3 , dsp^2 , dsp^2 (b) sp^3 , dsp^2 , sp^3
(c) sp^3 , sp^3 , dsp^2 (d) dsp^2 , sp^3 , sp^3
(Atomic number of Ni = 28) (IIT 2008, AMU Engg. 2011)
37. The hybridization involved in the complex $[\text{Ni}(\text{CN})_4]^{2-}$ is (At. No. of Ni = 28)
(a) d^2sp^2 (b) d^2sp^3
(c) dsp^2 (d) sp^3 (RE-AIPMT 2015)
38. Which of the following complexes are not correctly matched with the hybridisation of their central metal ion ?
(i) $[\text{Ni}(\text{CO})_4]$ sp^3 (ii) $[\text{Ni}(\text{CN})_4]^{2-}$ sp^3
(iii) $[\text{CoF}_6]^{3-}$ d^2sp^3 (iv) $[\text{Fe}(\text{CN})_6]^{3-}$ sp^3d^2
Select the correct answer using the codes given below :
(a) (i) and (ii) (b) (i) and (iii)
(c) (ii) and (iv) (d) (i), (iii) and (iv)
(e) (ii), (iii) and (iv)
39. Which of the following complex exhibits the highest paramagnetic behaviour ?
(a) $[\text{V}(\text{gly})_2(\text{OH})_2(\text{NH}_3)_2]^+$
(b) $[\text{Fe}(\text{en})(\text{bpy})(\text{NH}_3)_2]^{2+}$
(c) $[\text{Co}(\text{OX})_2(\text{OH})_2]^{2-}$ (d) $[\text{Ti}(\text{NH}_3)_6]^{3+}$
where gly = glycine, en = ethylene diamine and bpy = bipyridyl moieties (At Nos. Ti = 22, V = 23, Fe = 26, Co = 27) (AIPMT 2008)
40. The pair having the same magnetic moment is [At. No. Cr = 24, Mn = 25, Fe = 26, Co = 27]
(a) $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{CoCl}_4]^{2-}$
(b) $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
(c) $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$ and $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$
(d) $[\text{CoCl}_4]^{2-}$ and $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$ (JEE Main 2016)
41. Among $[\text{Ni}(\text{CO})_4]$, $[\text{NiCl}_4]^{2-}$, $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$, $\text{Na}_3[\text{CoF}_6]$, Na_2O_2 and CsO_2 , the total number of paramagnetic compounds is
(a) 2 (b) 3
(c) 4 (d) 5 (JEE Advanced 2016)
42. Hybridization, shape and magnetic moment of $\text{K}_3[\text{Co}(\text{CO})_3]$ is
(a) d^2sp^3 , octahedral, 4.9 B.M.
(b) sp^3d^2 , octahedral, 4.9 B.M.
(c) dsp^2 , square planar, 4.9 B.M.
(d) sp^3 , tetrahedral, 4.9 B.M. (Odisha JEE 2008)
43. Which one of the following is an outer orbital complex and exhibits paramagnetic behaviour?
(a) $[\text{Ni}(\text{NH}_3)_6]^{2+}$ (b) $[\text{Zn}(\text{NH}_3)_6]^{2+}$
(c) $[\text{Cr}(\text{NH}_3)_6]^{3+}$ (d) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (AIPMT Prelim 2012)
44. Consider the following complex ions, P, Q and R.
 $\text{P} = [\text{FeF}_6]^{3-}$, $\text{Q} = [\text{V}(\text{H}_2\text{O})_6]^{2+}$ and $\text{R} = [\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
The correct order of the complex ions, according to their spin only magnetic moment (in B.M.) is
(a) $\text{R} < \text{Q} < \text{P}$ (b) $\text{Q} < \text{R} < \text{P}$
(c) $\text{R} < \text{P} < \text{Q}$ (d) $\text{Q} < \text{P} < \text{R}$ (JEE Advanced 2013)
45. The spin only magnetic moment value (in Bohr magneton units) of $\text{Cr}(\text{CO})_6$ is
(a) 0 (b) 2.84
(c) 4.90 (d) 5.92 (IIT 2009)
46. A magnetic moment of 1.73 BM will be shown by one among the following :
(a) $[\text{Cu}(\text{NH}_3)_4]^{2+}$ (b) $[\text{Ni}(\text{CN})_4]^{2-}$
(c) TiCl_4 (d) $[\text{CoCl}_6]^{4-}$ (AIPMT 2013)
47. Which one of the following is wrongly matched ?
(a) $[\text{Cu}(\text{NH}_3)_4]^{2+}$ – square planar
(b) $[\text{Ni}(\text{CO})_4]$ – neutral ligand
(c) $[\text{Fe}(\text{CN})_6]^{3-}$ – sp^3d^2
(d) $[\text{Co}(\text{en})_3]^{3+}$ – follows EAN rule (Karnataka CET 2010)
48. Geometrical shapes of the complexes formed by the reaction of Ni^{2+} with Cl^- , CN^- and H_2O , respectively, are