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 leastenthalpy of atomisation iscomplexes among K2 [NiCl4], [Zn(H2O)6]C12,K3[Mn(CN)6] and [Cu(PPh3)3I]. (in nearest integer) Here n is equal to the number of diamagnetic

Inorganic Chemistry Questions

The number of paramagnetic metal complex species among [Co(NH3)6]3+, [Co(C2O4)3]3-,[MnCl6]3-,[Mn(CN)6]3-,[CoF6]3,[Fe(CN)6]3-and [FeF6]3- with same number of unpaired electronsis

Inorganic Chemistry Questions

The complex that shows Facial - Meridional isomerism is :

[Co(en)2Cl2]+
[Co(NH3) 3Cl3]
[Co(NH3) 4Cl2]+
[Co(en)3] 3+

Inorganic Chemistry Questions

One mole of the octahedral complex compound Co(NH3)5Cl3 gives 3 moles of ions on dissolution inwater. One mole of the same complex reacts with excess of AgNO3 solution to yield two moles of AgCl(s)The structure of the complex is:

Inorganic Chemistry Questions

The number of unpaired electrons responsible for the paramagnetic nature of the following complexspecies are respectively :[Fe(CN)6]3-,[FeF6]3-,[CoF6]3-,[Mn(CN)6]3-

Inorganic Chemistry Questions

The homoleptic and octahedral complex of Co^{2+} and H_2O has unparied electrons(s) in the t2g set of orbitals.

Inorganic Chemistry Questions

The theory that can completely\/properly explain the nature of bonding in $[Ni(CO)_4]$ 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, Del_0 will be equal to zero?

K3 [Fe(SCN)6]
[Fe(en)3]Cl3
[Fe(NH3) 6]Br2
K4 [Fe(CN)6]

Inorganic Chemistry Questions

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

Options:

A. [Co(NH3)4]2+<[Co(NH3)6]2+<[Co(NH3)6]3+<[Co(en)3]3+

B. [Co(NH3)4]2+<[Co(NH3)6]2+<[Co(en)3]3+<[Co(NH3)6]3+

C. [Co(NH3)6]2+<[Co(NH3)6]3+<[Co(NH3)4]2+<[Co(en)3]3+

D. [Co(en)3]3+<[Co(NH3)6]3+<[Co(NH3)6]2+<[Co(NH3)4]2+

Inorganic Chemistry Questions

The correct increasing order of stability of the complexes based on Del0 value is :

I. [Mn(CN)6]3- II. [Co(CN)6]4- III. [Fe(CN)6]4- IV. [Fe(CN)6]3-

Inorganic Chemistry Questions

The d-orbital electronic configuration of the complex among [Co(en)3]3+, [CoF6]3-, [Mn(H2O)6]2+ and[Zn(H2O)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:

A. $[FeF_6]^{4-}$

B. $[Mn(SCN)_6]^{4-}$

C. $[Co(NH_3)_6]^{3+}$

D. $[Fe(CN)_6]^{4-}$

Inorganic Chemistry Questions

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

(A) $[Fe(CN)_5NO]^{2-}$

(B) $[CoF_6]^{3-}$

(C) $[Fe(CN)_6]^{4-}$

(D) $[Co(NH_3)_6]^{3+}$

(E) $[Cr(H_2O)_6]^{2+}$

Inorganic Chemistry Questions

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

$$\mathrm{FeCl_3 + KOH + H_2C_2O_4 \rightarrow\ A}$$

Inorganic Chemistry Questions

Number of stereoisomers possible for the complexes, [CrCl3(py)3] and [CrC12(ox)2]3- are respectively(py = pyridine,ox = oxalate)

Inorganic Chemistry Questions

Number of complexes which show optical isomerism among the following is

cis $-[Cr(ox)_2Cl_2]^{3-}$, $[Co(en)_3]^{3+}$

cis $-[Pt(en)_2Cl_2]^{2+}$, cis $-[Co(en)_2Cl_2]^{+}$

trans $-[Pt(en)_2Cl_2]^{2+}$, trans $-[Cr(ox)_2Cl_2]^{3-}$

[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. $C_2O_4^{2-}$, NO_2^-, NCS^-

B. $EDTA^{4-}$, NCS^-, $C_2O_4^{2-}$

C. NO_2^-, $C_2O_4^{2-}$, $EDTA^{4-}$

D. $C_2O_4^{2-}$, ethylene diamine, H_2O

Inorganic Chemistry Questions

From the magnetic behaviour of $[NiCl_4]^{2-}$ (paramagnetic) and $[Ni(CO)_4]$ (diamagnetic), correct geometry and oxidation state.

JEE Main 2025 (Online) 22nd January Morning Shift

Options:

A. $[NiCl_4]^{2-}$: Ni(0), tetrahedral$[Ni(CO)_4]$: Ni(0), square planar

B. $[NiCl_4]^{2-}$: Ni^{II}, tetrahedral $[Ni(CO)_4]$: Ni(0), tetrahedral

C. $[NiCl_4]^{2-}$: Ni^{II}, tetrahedral $[Ni(CO)_4]$: Ni^{II}, square planar

D. $[NiCl_4]^{2-}$: Ni^{II}, square planar $[Ni(CO)_4]$: Ni(0), square planar

Inorganic Chemistry Questions

(A) $[CoF_6]^{3-}$	(I) d^2sp^3
(B) $[NiCl_4]^{2-}$	(II) sp^3
(C) $[Co(NH_3)_6]^{3+}$	(III) sp^3d^2
(D) $[Ni(CN)_4]^{2-}$	(IV) dsp^2

Inorganic Chemistry Questions

The type of hybridization and the magnetic property of $[MnCl_6]^{3-}$ 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

$[Co(NH_3)_6]^{3+}$, SF_6, $[CrF_6]^{3-}$, $[CoF_6]^{3-}$, $[Mn(CN)_6]^{3-}$, and $[MnCl_6]^{3-}$

Inorganic Chemistry Questions

Consider the following reactions

$$K_2Cr_2O_7 \xrightarrow[-H_2O]{KOH} [\,A] \xrightarrow[-H_2O]{H_2SO_4} [\,B] + K_2SO_4$$

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:

A. $S_2O_7^{2-}$

B. $S_2O_8^{2-}$

C. SO_3^{2-}

D. SO_4^{2-}

Inorganic Chemistry Questions

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

(A) Eu^{2+}

(B) Gd^{3+}

(C) Eu^{3+}

(D) Tb^{3+}

(E) Sm^{2+}

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

$CrCl_3 \cdot xNH_3$ can exist as a complex. 0.1 molal aqueous solution of this complex shows a depression in freezing point of $0.558^\circ C$. 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. $[Cr(NH_3)_5Cl]Cl_2$

B. $[Cr(NH_3)_4Cl_2]Cl$

C. $[Cr(NH_3)_6]Cl_3$

D. $[Cr(NH_3)_3Cl_3]$

Inorganic Chemistry Questions

(A) $[Co(en)_2Cl_2]Cl$	(I) 3, 6
(B) $[Pt(NH_3)_2Cl(NO_2)]$	(II) 3, 4
(C) Hg $[Co(SCN)_4]$	(III) 2, 6
(D) $[Mg\ (EDTA)]^{2-}$	(IV) 2, 4

Inorganic Chemistry Questions

' X ' is the number of electrons in t2g orbitals of the most stable complex ion among[Fe(NH3)6]3+,[FeCl6]3, [Fe(C2O4)3]3-and [Fe(H2O)6]3+. The nature of oxide of vanadium of the type V2Ox 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
$NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$

B. The reducing ability of the hydrides increases in the order
$NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

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
$NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

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:

A. $H_2S_2O_3$

B. $H_2S_2O_6$

C. $H_2S_2O_7$

D. $H_2S_2O_8$

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): IE_1 = 800, IE_2 = 2427, IE_3 = 3658, IE_4 = 25024, 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] $5f^{14}$ $6d^{1}$ $7s^{2}$

(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?