

1

The correct order of the stoichiometries of AgCl formed when AgNO<sub>3</sub> in excess is treated with the complexes: CoCl<sub>3</sub>.6NH<sub>3</sub>, CoCl<sub>3</sub>.5NH<sub>3</sub>, CoCl<sub>3</sub>.4NH<sub>3</sub> respectively is

[NEET - 2017]

**A** 3AgCl, 1AgCl, 2AgCl



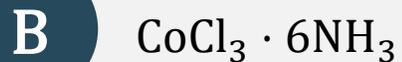
3AgCl, 2AgCl, 1AgCl

**C** 2AgCl, 3AgCl, 2AgCl

**D** 1AgCl, 3AgCl, 2AgCl

2 Cobalt(III) chloride forms several octahedral complexes with ammonia. Which of the following will not give test for chloride ions with silver nitrate at 25°C?

[NEET - 2015]



3 An excess of  $\text{AgNO}_3$  is added to 100 mL of a 0.01 M solution of dichlorotetraaquachromium(III) chloride. The number of moles of  $\text{AgCl}$  precipitated would be

[NEET - 2013]

A 0.003

B 0.01

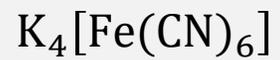
C 0.001

D 0.002

4

Which of the following will exhibit maximum ionic conductivity?

[NEET - 2001]



**B**



**C**



**D**



5

A coordination complex compound of cobalt has the molecular formula containing five ammonia molecules, one nitro group and two chlorine atoms for one cobalt atom. One mole of this compound produces three moles ions in an aqueous solution. On reacting this solution with excess of  $\text{AgNO}_3$  solution, we get two moles of  $\text{AgCl}$  precipitate. The ionic formula for this complex would be

[NEET - 1998]



B



C

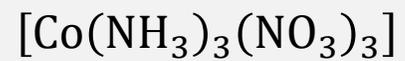
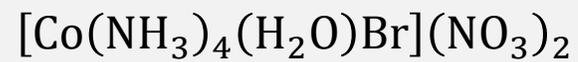
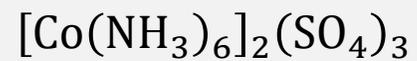


D



6 Which complex compound is most stable?

[NEET - 2023]



7 Ethylene diaminetetraacetate (EDTA) ion is

[NEET - 2021]

**A** tridentate ligand with three "N" donor atoms



hexadentate ligand with four "O" and two "N" donor atoms

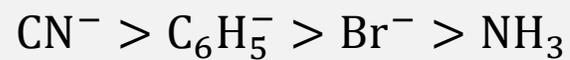
**C** unidentate ligand

**D** bidentate ligand with two "N" donor atoms

8

The correct increasing order of trans-effect of the following species is

[NEET - 2016]



9

The sum of coordination number and oxidation number of the metal  $M$  in the complex  $[M(en)_2(C_2O_4)]Cl$  (where  $en$  is ethylenediamine) is

[NEET - 2015]

A

6

B

7

C

8



9

10

The anion of acetylacetonone (acac) forms  $\text{Co}(\text{acac})_3$  chelate with  $\text{Co}^{3+}$ . The rings of the chelate are

[NEET - 2013]

A

five membered

B

four membered



six membered

D

three membered

11

Which of the following statements is true?

[NEET - 2002]

A

Silicon exhibits 4 coordination number in its compound



Bond energy of  $F_2$  is less than  $Cl_2$

C

Mn (III) oxidation state is more stable than Mn(II) in aqueous state

D

Elements of 15<sup>th</sup> gp shows only +3 and +5 oxidation states.

12

Coordination number of Ni in  $[\text{Ni}_2(\text{C}_2\text{O}_4)_3]^{4-}$  is

[NEET - 2001]

A

3



6

C

4

D

2

13

The coordination number and oxidation state of Cr in  $K_3[Cr(C_2O_4)_3]$  are respectively

[NEET - 1995]

**A** 3 and +3

**B** 3 and 0

 **C** 6 and +3

**D** 4 and +2

14 Which of the following ligands is expected to be bidentate?

[NEET - 1994]

A  $\text{CH}_3\text{NH}_2$

B  $\text{CH}_3\text{C} \equiv \text{N}$

C Br

$\text{C}_2\text{O}_4^{2-}$

15 Homoleptic complex from the following complexes is

[NEET - 2023]

**A** Pentaamminecarbonatocobalt(III) chloride

**B** Triamminetriaquachromium(III) chloride

 **C** Potassium trioxalatoaluminate(III)

**D** Diamminechloridonitrito-N-platinum(II)

16 The IUPAC name of the complex  $[\text{Ag}(\text{H}_2\text{O})_2][\text{Ag}(\text{CN})_2]$  is

[NEET - 2022]

**A** dicyanosilver(II) diaquaargentate(II)

**B** diaquasilver(II)dicyanidoargentate(II)

**C** dicyanosilver(I) diaquaargentate(I)



diaquasilver(I)dicyanidoargentate(I)

17

The name of complex ion,  $[\text{Fe}(\text{CN})_6]^{3-}$  is

[NEET - 2015]

A

hexacyanitoferrate(III) ion

B

tricyanoferrate(III) ion



hexacyanidoferrate(III) ion

D

hexacyanoiron(III) ion

18

The correct IUPAC name for  $[\text{CrF}_2(\text{en})_2]\text{Cl}$  is

[NEET - 2013]

A

chlorodifluoridoethylenediaminechromium (III)  
chloride



difluoridobis(ethylenediamine)chromium (III)  
chloride

C

difluorobis-(ethylenediamine)chromium (III)  
chloride

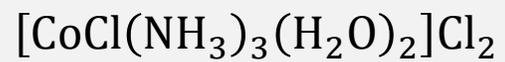
D

chlorodifluoridobis(ethylenediamine) chromium(III)

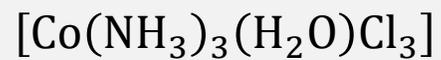
19

The hypothetical complex chlorodiaquatriammine cobalt(III) chloride can be represented as

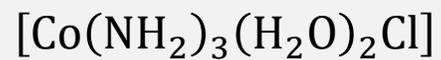
[NEET - 2002]



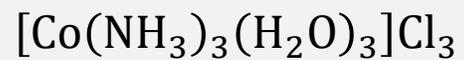
B



C



D



20

IUPAC name of  $[\text{Pt}(\text{NH}_3)_3(\text{Br})(\text{NO}_2)\text{Cl}]\text{Cl}$  is

[NEET - 1998]



triamminebromochloronitroplatinum(IV) chloride



B triamminebromonitrochloroplatinum(IV) chloride



C triamminechlorobromonitroplatinum(IV) chloride



D triamminenitrochlorobromoplatinum(IV) chloride

21

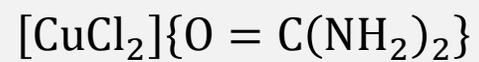
The formula of dichlorobis(urea)copper(II) is

[NEET - 1997]

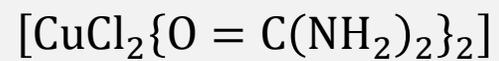
A



B



C



22 The type of isomerism shown by the complex  $[\text{CoCl}_2(\text{en})_2]$  is

[NEET - 2018]



geometrical isomerism

B

coordination isomerism

C

ionization isomerism

D

linkage isomerism

23

Number of possible isomers for the complex  $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Cl}$  will be (en = ethylenediamine)

[NEET - 2015]

A

1



3

C

4

D

2

24

The complexes  $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{CN})_6]$  and  $[\text{Cr}(\text{NH}_3)_6][\text{Co}(\text{CN})_6]$  are the examples of which type of isomerism?

[NEET - 2011]

A

Linkage isomerism

B

Ionization isomerism



Coordination isomerism

D

Geometrical isomerism

25

The complex,  $[\text{Pt}(py)(\text{NH}_3)\text{BrCl}]$  will have how many geometrical isomers?

[NEET - 2011]



3



4



0



2

26

The existence of two different coloured complexes with the composition of  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$  is due to

[NEET - 2010]

A

linkage isomerism



geometrical isomerism

C

coordination isomerism

D

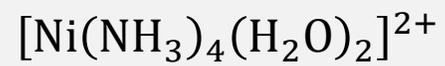
ionization isomerism

27

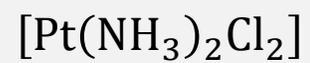
Which one of the following complexes is not expected to exhibit isomerism?

[NEET - 2010]

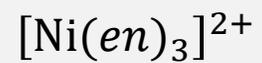
A



B

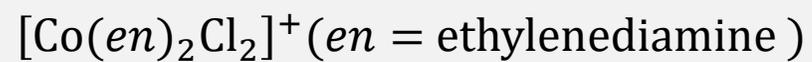
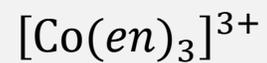
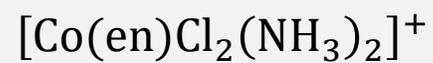
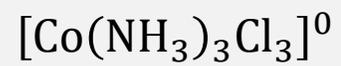


D



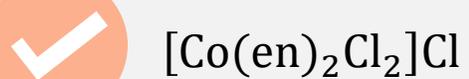
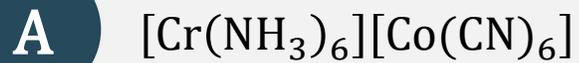
28 Which of the following does not show optical isomerism?

[NEET - 2009]



29 Which of the following will give a pair of enantiomorphs?  
(*en* =  $\text{NH}_2\text{CH}_2\text{CH}_2\text{NH}_2$ )

[NEET - 2007]



30

$[\text{Co}(\text{NH}_3)_4(\text{NO}_2)_2]\text{Cl}$  exhibits

[NEET - 2006]

A

linkage isomerism, geometrical isomerism and optical isomerism

B

linkage isomerism, ionization isomerism and optical isomerism



linkage isomerism, ionization isomerism and geometrical isomerism

D

ionization isomerism, geometrical isomerism and optical isomerism

31

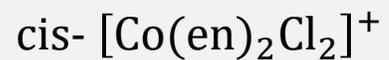
Which one of the following is expected to exhibit optical isomerism? (en = ethylenediamine)

[NEET - 2005]

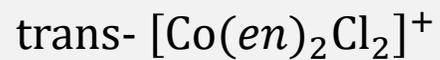
A



B



D



32

Which of the following coordination compounds would exhibit optical isomerism?

[NEET - 2004]

A

Pentaamminenitrocobalt(III) iodide

B

Diamminedichloroplatinum(II)

C

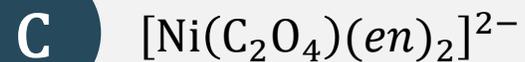
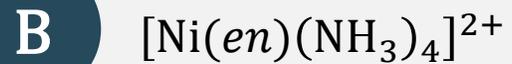
trans-Dicyanobis(ethylenediamine)  
chromium(III) chloride



tris-(Ethylenediamine)cobalt(III) bromide

33 Which of the following will give maximum number of isomers?

[NEET - 2001]



34

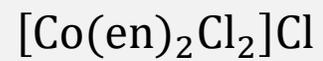
Which complex compound will give four isomers?

[NEET - 2000]

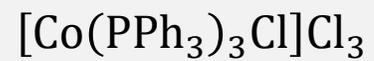
A



B



D



35

The total number of possible isomers for the complex compound  $[\text{Cu}^{\text{II}}(\text{NH}_3)_4][\text{Pt}^{\text{II}}\text{Cl}_4]$  are

[NEET - 1998]

A

5

B

6

C

3



4

36

The number of geometrical isomers of the complex  $[\text{Co}(\text{NO}_2)_3(\text{NH}_3)_3]$  is

[NEET - 1997]

A

4

B

0



2

D

3

37 The number of geometrical isomers for  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$  is

[NEET - 1995]

A 3

B 4

C 1

2

38

The order of energy absorbed which is responsible for the colour of complexes

(A)  $[\text{Ni}(\text{H}_2\text{O})_2(\text{en})_2]^{2+}$  (B)  $[\text{Ni}(\text{H}_2\text{O})_4(\text{en})]^{2+}$  and (C)  $[\text{Ni}(\text{en})_3]^{2+}$  is

[NEET - 2022]

**A** (A) > (B) > (C)

**B** (C) > (B) > (A)

 (C) > (A) > (B)

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

39

Match List-I with List-II

List - I		List - II	
(A)	$[\text{Fe}(\text{CN})_6]^{3-}$	(i)	5.92 BM
(B)	$[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$	(ii)	0 BM
(C)	$[\text{Fe}(\text{CN})_6]^{4-}$	(iii)	4.90 BM
(D)	$[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$	(iv)	1.73 BM

Choose the correct answer from the options given below.

[NEET - 2021]



(A) - (iv), (B) - (i), (C) - (ii), (D) - (iii)

**B**

(A) - (iv), (B) - (ii), (C) - (i), (D) - (iii)

**C**

(A) - (ii), (B) - (iv), (C) - (iii), (D) - (i)

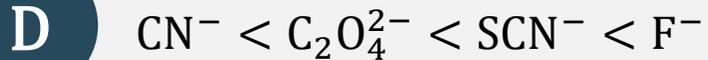
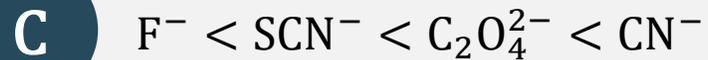
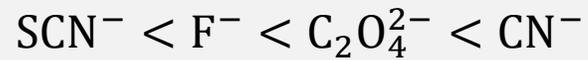
**D**

(A) - (i), (B) - (iii), (C) - (iv), (D) - (ii)

40

Which of the following is the correct order of increasing field strength of ligands to form coordination compounds?

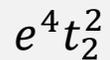
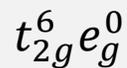
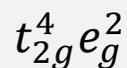
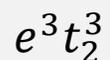
[NEET - 2020]



41

What is the correct electronic configuration of the central atom in  $K_4[Fe(CN)_6]$  based on crystal field theory?

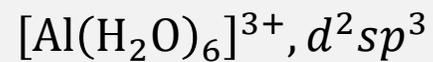
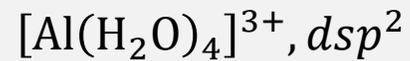
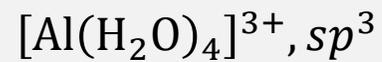
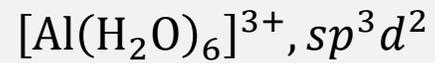
[NEET - 2019]

**A****B****D**

42

Aluminium chloride in acidified aqueous solution forms a complex 'A', in which hybridisation state of Al is 'B'. What are 'A' and 'B', respectively?

[NEET - 2019]



43

The crystal field stabilisation energy (CFSE) for  $[\text{CoCl}_6]^{4-}$  is  $18000 \text{ cm}^{-1}$ . The CFSE for  $[\text{CoCl}_4]^{2-}$  will be

[NEET - 2019]

**A** $6000 \text{ cm}^{-1}$ **B** $16000 \text{ cm}^{-1}$ **C** $18000 \text{ cm}^{-1}$  $8000 \text{ cm}^{-1}$

44

The geometry and magnetic behaviour of the complex  $[\text{Ni}(\text{CO})_4]$  are

[NEET - 2018]

A

square planar geometry and diamagnetic



tetrahedral geometry and diamagnetic

C

square planar geometry and paramagnetic

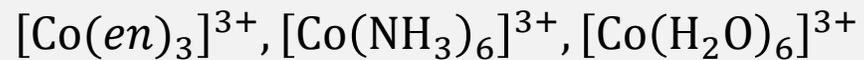
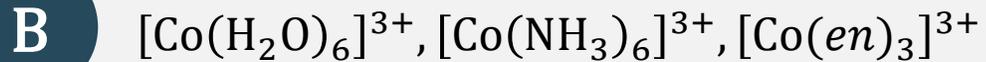
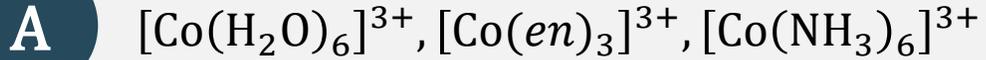
D

tetrahedral geometry and paramagnetic

45

Correct increasing order for the wavelengths of absorption in the visible region for the complexes of  $\text{Co}^{3+}$  is

[NEET - 2017]



46 Pick out the correct statement with respect to  $[\text{Mn}(\text{CN})_6]^{3-}$ .

[NEET - 2017]

**A** It is  $sp^3d^2$  hybridised and tetrahedral



It is  $d^2sp^3$  hybridised and octahedral

**C** It is  $dsp^2$  hybridised and square planar

**D** It is  $sp^3d^2$  hybridised and octahedral

47 Jahn-Teller effect is not observed in high spin complexes of

[NEET - 2016]

A  $d^7$

$d^8$

C  $d^4$

D  $d^9$

48

The hybridization involved in complex  $[\text{Ni}(\text{CN})_4]^{2-}$  is  
(At. No. Ni = 28)

[NEET - 2015]

**A**  $sp^3$

**B**  $d^2sp^2$

**C**  $d^2sp^3$

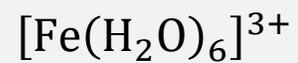
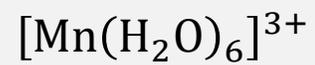
  $dsp^2$

49

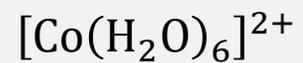
Among the following complexes the one which shows zero crystal field stabilization energy (CFSE) is

[NEET - 2014]

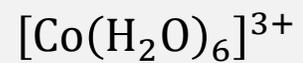
A



C



D



50

A magnetic moment at 1.73 BM will be shown by one among of the following

[NEET - 2013]

**A**  $\text{TiCl}_4$

**B**  $[\text{CoCl}_6]^{4-}$

 **C**  $[\text{Cu}(\text{NH}_3)_4]^{2+}$

**D**  $[\text{Ni}(\text{CN})_4]^{2-}$

51

Crystal field splitting energy for high spin  $d^4$  octahedral complex is

[NEET - 2013]

A

$-1.2 \Delta_0$



$-0.6 \Delta_0$

C

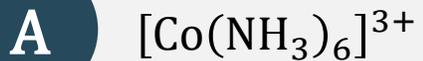
$-0.8 \Delta_0$

D

$-1.6 \Delta_0$

52 Which among the following is a paramagnetic complex?

[NEET - 2013]



53

Which is diamagnetic?

[NEET - 2013]

A



C



D



54

Which one of the following is an outer orbital complex and exhibits paramagnetic behaviour?

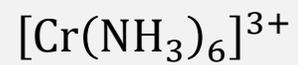
[NEET - 2012]



B



C



D



55

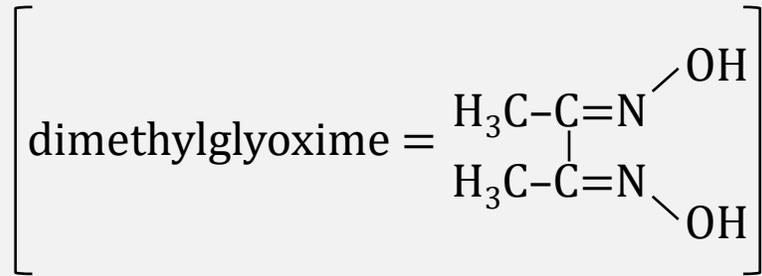
Low spin complex of  $d^6$ -cation in an octahedral field will have the following energy ( $\Delta_o$  = crystal field splitting energy in an octahedral field,  $P$  = Electron pairing energy)

[NEET - 2012]

- A**  $\frac{-12}{5}\Delta_o + P$
- B**  $\frac{-12}{5}\Delta_o + 3P$
- C**  $\frac{-2}{5}\Delta_o + 2P$
- D**  $\frac{-2}{5}\Delta_o + P$

56

Red precipitate is obtained when ethanol solution of dimethylglyoxime is added to ammoniacal Ni(II). Which of the following statements is not true?



[NEET - 2012]

A

Red complex has a square planar geometry

B

Complex has symmetrical H-bonding



Red complex has a tetrahedral geometry

D

Dimethylglyoxime functions as bidentate ligand

57 Of the following complex ions, which is diamagnetic in nature?

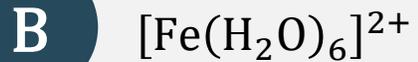
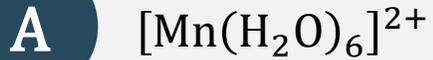
[NEET - 2011]



58 The  $d$ -electron configurations of  $\text{Cr}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{2+}$  and  $\text{Co}^{2+}$  are  $d^4$ ,  $d^5$ ,  $d^6$  and  $d^7$  respectively. Which one of the following will exhibit minimum paramagnetic behaviour?

(At. nos. Cr = 24, Mn = 25, Fe = 26, Co = 27)

[NEET - 2011]



59

Which of the following complex compounds will exhibit highest paramagnetic behaviour?

(At. No. Ti = 22, Cr = 24, Co = 27, Zn = 30 )

[NEET - 2011]

**A****C****D**

60

Which of the following complex ions is not expected to absorb visible light?

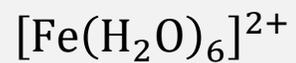
[NEET - 2010]



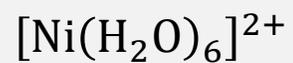
B



C



D



61

Crystal field stabilization energy for high spin  $d^4$  octahedral complex is

[NEET - 2010]

**A**  $-1.8 \Delta_o$

**B**  $-1.6 \Delta_o + P$

**C**  $-1.2 \Delta_o$

  $-0.6 \Delta_o$

62

Out of  $\text{TiF}_6^{2-}$ ,  $\text{CoF}_6^{3-}$ ,  $\text{Cu}_2\text{Cl}_2$  and  $\text{NiCl}_4^{2-}$  (Z of Ti = 22, Co = 27, Cu = 29, Ni = 28) the colourless species are

[NEET - 2009]

**A**  $\text{Cu}_2\text{Cl}_2$  and  $\text{NiCl}_4^{2-}$



$\text{TiF}_6^{2-}$  and  $\text{Cu}_2\text{Cl}_2$

**C**  $\text{CoF}_6^{3-}$  and  $\text{NiCl}_4^{2-}$

**D**  $\text{TiF}_6^{2-}$  and  $\text{CoF}_6^{3-}$

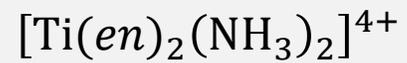
63

Which of the following complex ions is expected to absorb visible light?

[At. nos. Zn = 30, Sc = 21, Ti = 22, Cr = 24]

[NEET - 2009]

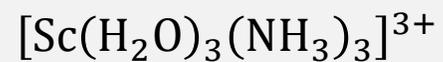
A



C



D



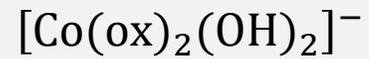
64

Which of the following complexes exhibits the highest paramagnetic behaviour?

where *gly* = glycine, *en* = ethylenediamine and *bpy* = bipyridyl moities.

(At. nos. Ti = 22, V = 23, Fe = 26, Co = 27)

[NEET - 2008]



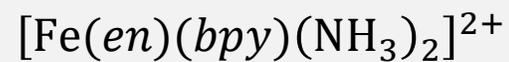
**B**



**C**



**D**

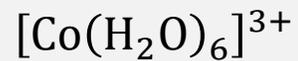
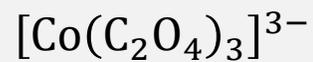


65

In which of the following coordination entities the magnitude of  $\Delta_o$  (CFSE in octahedral field) will be maximum?

(At. No. Co = 27)

[NEET - 2008]

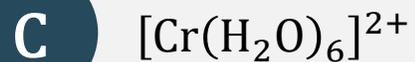
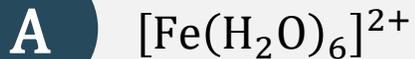


66

The  $d$  electron configurations of  $\text{Cr}^{2+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Fe}^{2+}$  and  $\text{Ni}^{2+}$  are  $3d^4$ ,  $3d^5$ ,  $3d^6$  and  $3d^8$  respectively. Which one of the following aqua complexes will exhibit the minimum paramagnetic behaviour?

(At. No. Cr = 24, Mn = 25, Fe = 26, Ni = 28)

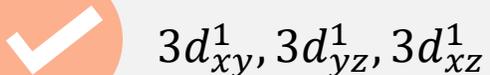
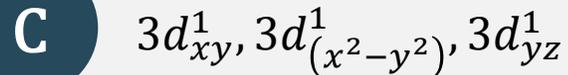
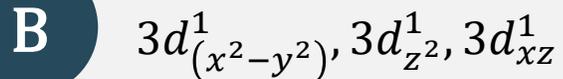
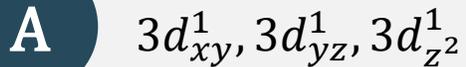
[NEET - 2007]



67

$[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$  (At. no. of Cr = 24) has a magnetic moment of 3.83 B.M. The correct distribution of 3d electrons in the chromium of the complex is

[NEET - 2006]

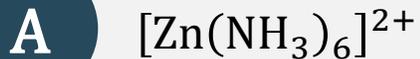


68

Which one of the following is an inner orbital complex as well as diamagnetic in behaviour?

(Atomic number: Zn = 30, Cr = 24, Co = 27, Ni = 28 )

[NEET - 2005]



69

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  
[Atomic number of Ni = 28]

[NEET - 2004]

A

 $sp^3, dsp^2, dsp^2$  $sp^3, dsp^2, sp^3$ 

C

 $sp^3, sp^3, dsp^2$ 

D

 $dsp^2, sp^3, sp^3$

70  $\text{CN}^-$  is a strong field ligand. This is due to the fact that

[NEET - 2004]

- A** it carries negative charge
-  **B** it is a pseudohalide
- C** it can accept electrons from metal species
- D** it forms high spin complexes with metal species

71

Considering  $\text{H}_2\text{O}$  as a weak field ligand, the number of unpaired electrons in  $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$  will be  
(atomic number of Mn = 25)

[NEET - 2004]

**A** three

 **B** five

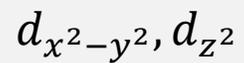
**C** two

**D** four

72

In an octahedral structure, the pair of  $d$  orbitals involved in  $d^2sp^3$  hybridisation is

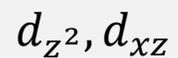
[NEET - 2004]



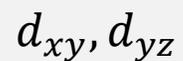
B



C



D



73

The number of unpaired electrons in the complex ion  $[\text{CoF}_6]^{3-}$  is  
(Atomic no. : Co = 27)

[NEET - 2003]

A 2

B 3

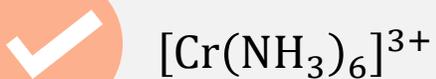
C 4

D zero

74

Atomic number of Cr and Fe are respectively 24 and 26, which of the following is paramagnetic with the spin of electron?

[NEET - 2002]



75

Which statement is incorrect?

[NEET - 2021]



$\text{Ni}(\text{CO})_4$  - tetrahedral, paramagnetic

B

$[\text{Ni}(\text{CN})_4]^{2-}$  - square planar, diamagnetic

C

$\text{Ni}(\text{CO})_4$  - tetrahedral, diamagnetic

D

$[\text{NiCl}_4]^{2-}$  - tetrahedral, paramagnetic

76

Iron carbonyl,  $\text{Fe}(\text{CO})_5$  is

[NEET - 2018]

A

tetranuclear



mononuclear

C

trinuclear

D

dinuclear

77 An example of a sigma bonded organometallic compound is

[NEET - 2017]



Grignard's reagent

B

ferrocene

C

cobaltocene

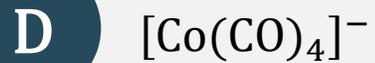
D

ruthenocene

78

Which of the following has longest C – O bond length? (Free C – O bond length in CO is 1.128 Å)

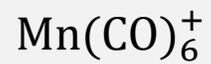
[NEET - 2016]



79

Which of the following carbonyls will have the strongest C – O bond?

[NEET - 2011]



B



C

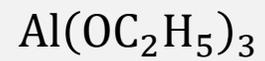


D



80 Which of the following does not have a metal carbon bond?

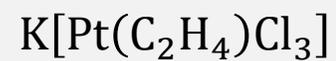
[NEET - 2004]



**B**



**C**



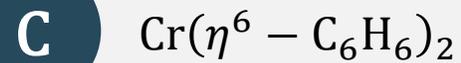
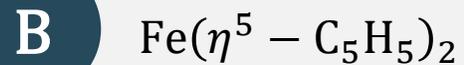
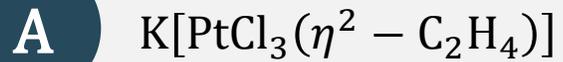
**D**



81

Among the following which is not the  $\pi$ -bonded organometallic compound?

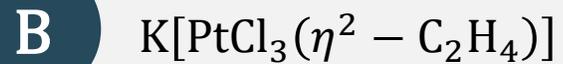
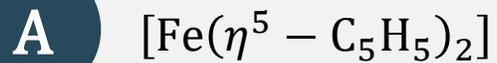
[NEET - 2003]



82

Which of the following organometallic compounds is  $\sigma$  and  $\pi$ -bonded?

[NEET - 2001]



83

Shape of  $\text{Fe}(\text{CO})_5$  is

[NEET - 2000]

A

octahedral

B

square planar



trigonal bipyramidal

D

square pyramidal

84

In metal carbonyl having general formula  $M(\text{CO})_x$  where  $M$  = metal,  $x = 4$  and the metal is bonded to

[NEET - 1995]

**A** carbon and oxygen

**B**  $\text{C} \equiv \text{O}$

**C** oxygen



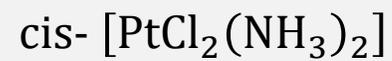
carbon

85

Which of the following complexes is used to be as an anticancer agent?

[NEET - 2014]

A



C



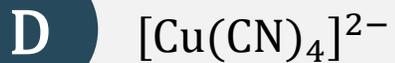
D



86

Copper sulphate dissolves in excess of KCN to give

[NEET - 2006]

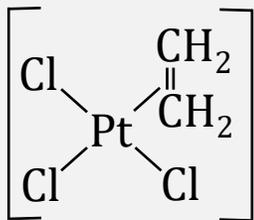


87

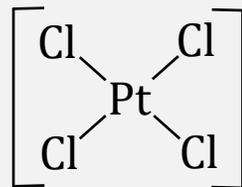
Which of the following is considered to be an anticancer species?

[NEET - 2023]

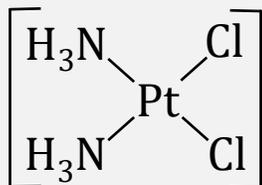
A



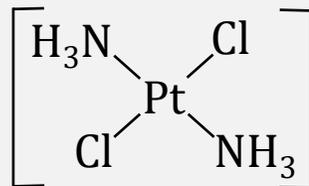
B



✓



D



88

In the silver plating of copper,  $K[Ag(CN)_2]$  is used instead of  $AgNO_3$ . The reason is

[NEET - 2002]

A

a thin layer of Ag is formed on Cu

B

more voltage is required

C

$Ag^+$  ions are completely removed from solution

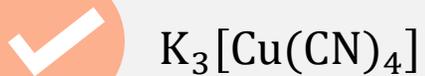


less availability of  $Ag^+$  ions, as Cu cannot displace Ag from  $[Ag(CN)_2]^-$  ion

89

$\text{CuSO}_4$  when reacts with KCN forms  $\text{CuCN}$ , which is insoluble in water. It is soluble in excess of KCN, due to formation of the following complex

[NEET - 2002]



90

Hypo is used in photography to

[NEET - 1988]

A

reduce AgBr grains to metallic silver

B

convert metallic silver to silver salt



remove undecomposed silver bromide as a soluble complex

D

remove reduced silver