AIPMT 2006

1. Copper sulphate dissolves in excess of KCN to give

(1) $Cu(CN)_2$ (2) CuCN

(3) $[Cu(CN)_4]^{3-}$ (4) $[Cu(CN)_4]^{2-}$

2. $[Co(NH_3)_4(NO_2)_2]Cl$ exhibits

(1) linkage isomerism, geometrical isomerism and optical isomerism

(2) linkage isomerism, ionization isomerism and optical isomerism

(3) linkage isomerism, ionization isomerism and geometrical isomerism

(4) ionization isomerism, geometrical isomerism and optical isomerism

AIPMT 2007

3. Which of the following will give a pair of enantiomers

(1) $[Cr(NH_3)_6][Co(CN)_6]$

(2) $[Co(en)_2Cl_2]Cl$

(3) $[Pt(NH_3)_4][PtCl_6]$

(4) $[Co(NH_3)_4Cl_2]NO_2$

4. The d electron configurations of Cr^{2+}, Mn^{2+}, Fe^{2+} and 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

(1) $[Fe(H_2O)_6]^{2+}$ (2) $[Ni(H_2O)_6]^{2+}$

(3) $[Cr(H_2O)_6]^{2+}$ (4) $[Mn(H_2O)_6]^{2+}$

AIPMT 2008

5. Which of the following complexes exhibits the highest paramagnetic behaviour ?

Where gly = glycine, en = ethylenediamine and bpy = bipyridyl (At. No. Ti = 22, V = 23, Fe = 26, Co = 27)

(1) $[Co(OX)_2(H_2O)_2]^-$

(2) $[Ti(NH_3)_6]^{3+}$

(3) $[V(gly)_2(OH)_2(NH_3)_2]^+$

(4) $[Fe(en)(bpy)(NH_3)_2]^{2+}$

6. In which of the following coordination entities the magnitude of Δo (CFSE in octahedral field) will be maximum ?

(1) $[Co(CN)_6]^{3-}$ (2) $[Co(C_2O_4)_3]^{3-}$

(3) $[Co(H_2O)_6]^{3+}$ (4) $[Co(NH_3)_6]^{3+}$

AIPMT 2009

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

(1) $[Zn(NH_3)_6]^{2+}$

(2) $[Sc(H_2O)_3(NH_3)_3]^{3+}$

(3) $[Ti(en)_2(NH_3)_2]^{4+}$

(4) $[Cr(NH_3)_6]^{3+}$

8. Out of TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and $NiCl_4^{2-}$ colourless species are :

(1) CoF_6^{3-} and $NiCl_4^{2-}$ (2) TiF_6^{2-} and CoF_6^{2-}

(3) Cu_2Cl_2 and $NiCl_4^{2-}$ (4) TiF_6^{2-} and Cu_2Cl_2

9. Which of the following does not show optical isomerism?

(1) $[Co(en)_3]^{3+}$

(2) $[Co(en)_2Cl_2]^+$

(3) $[Co(NH_3)_3Cl_3]^0$

(4) $[Co(en)Cl_2(NH_3)_2]^+$

10. Which one of the following complexes is **not** expected to exhibit isomerism :-

(1) $[Pt(NH_3)_2Cl_2]$

(2) $[NiCl_4]^{2-}$

(3) $[Ni(en)_3]^{2+}$

(4) $[Ni(NH_3)_4(H_2O)_2]^{2+}$

AIPMT 2010

11. Which of the following complex ion is not expected to absorb visible light ?

(1) $[Ni(H_2O)_6]^{2+}$ (2) $[Ni(CN)_4]^{2-}$

(3) $[Cr(NH_3)_6]^{3+}$ (4) $[Fe(H_2O)_6]^{2+}$

12. The existence of two different coloured complexes with the composition of $[Co(NH_3)_4Cl_2]^+$ is due to:-

(1) Ionization isomerism

(2) Linkage isomerism

(3) Geometrical isomerism

(4) Coordination isomerism

13. Crystal field stabilization energy for high spin d^4 octahedral complex is :-

(1) $-0.6\ \Delta_0$ (2) $-1.8\ \Delta_0$

(3) $-1.6\ \Delta_0 + P$ (4) $-1.2\ \Delta_0$

AIPMT Pre. 2011

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

(1) $[NiCl_4]^{2-}$ (2) $[Ni(CN)_4]^{2-}$

(3) $[CuCl_4]^{2-}$ (4) $[CoF_6]^{3-}$

15. The complex $[Co(NH_3)_6][Cr(CN)_6]$ and $[Cr(NH_3)_6][Co(CN)_6]$ are the examples of which type of isomerism ?

(1) Linkage isomerism

(2) Ionization isomerism

(3) Coordination isomersim

(4) Geometrical isomerism

16. The complex $[Pt(Py)(NH_3)BrCl]$ will have how many geometrical isomers ?

(1) 3 (2) 4 (3) 0 (4) 2

AIPMT Mains 2011

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

(1) $[Fe(CO)_5]$ (2) $[Mn(CO)_6]^+$

(3) $[Cr(CO)_6]$ (4) $[V(CO)_6]^-$

18. Which of the following complex compounds will exhibit highest paramagnetic behaviour :-
(At. No. Ti = 22, Cr = 24, Co = 27, Zn = 30)

(1) $[Zn(NH_3)_6]^{2+}$ (2) $[Ti(NH_3)_6]^{3+}$

(3) $[Cr(NH_3)_6]^{3+}$ (4) $[Co(NH_3)_6]^{3+}$

AIPMT Pre. 2012

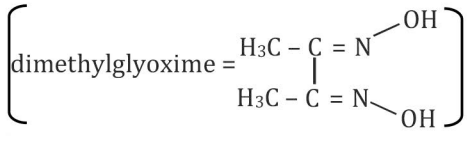
19. Which one of the following is an outer orbital complex and exhibits paramagnetic behaviour?

(1) $[Cr(NH_3)_6]^{3+}$ (2) $[Co(NH_3)_6]^{3+}$

(3) $[Ni(NH_3)_6]^{2+}$ (4) $[Zn(NH_3)_6]^{2+}$

AIPMT Mains 2012

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

dimethylglyoxime = 

(1) Red complex has a tetrahedral geometry.

(2) Dimethylglyoxime functions as bidentate ligand.

(3) Red complex has a square planar geometry.

(4) Complex has symmetrical H-bonding.

21. Low spin complex of d^6–cation in an octahedral field will have the following energy:-
(Δ_0 = Crystal field splitting energy in an octahedral field, P = Electron pairing energy)

(1) $\frac{-2}{5}\ \Delta_0 + 2P$ (2) $\frac{-2}{5}\ \Delta_0 + P$

(3) $\frac{-12}{5}\ \Delta_0 + P$ (4) $\frac{-12}{5}\ \Delta_0 + 3P$

NEET-UG 2013

22. A magnetic moment of 1.73 BM will be shown by one among the following :-

(1) $[CoCl_6]^{4-}$ (2) $[Cu(NH_3)_4]^{2+}$

(3) $[Ni(CN)_4]^{2-}$ (4) $TiCl_4$

AIPMT 2014

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

(1) mer-$[Co(NH_3)_3Cl_3]$ (2) cis-$[PtCl_2(NH_3)_2]$

(3) cis-$K_2[PtCl_2Br_2]$ (4) Na_2CoCl_4

AIPMT 2015

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

(1) $CoCl_3 \cdot 4NH_3$ (2) $CoCl_3 \cdot 5NH_3$

(3) $CoCl_3 \cdot 6NH_3$ (4) $CoCl_3 \cdot 3NH_3$

25. Which of these statements about $[Co(CN)_6]^{3-}$ is true:-

(1) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a low-spin configuration.

(2) $[Co(CN)_6]^{3-}$ has four unpaired electrons and will be in a high spin configuration.

(3) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a high-spin configuration.

(4) $[Co(CN)_6]^{3-}$ has no unpaired electrons and will be in a low-spin configuration.

Re-AIPMT 2015

26. The name of complex ion, $[Fe(CN)_6]^{3-}$ is :-
(1) Tricyanoferrate (III) ion
(2) Hexacyanidoferrate (III) ion
(3) Hexacyanoiron (III) ion
(4) Hexacyanitoferrate (III) ion

27. The hybridization involved in complex $[Ni(CN)_4]^{2-}$ is (At.No. Ni = 28)
(1) d^2sp^2 (2) d^2sp^3 (3) dsp^2 (4) sp^3

28. 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:-
(1) 7 (2) 8 (3) 9 (4) 6

29. Number of possible isomers for the complex $[Co(en)_2Cl_2]$ Cl will be : (en = ethylenediamine)
(1) 3 (2) 4 (3) 2 (4) 1

NEET-I 2016

30. Which of the following has longest C–O bond length? (Free C–O bond length in CO is 1.128Å).
(1) $Ni(CO)_4$ (2) $[Co(CO)_4]^-$
(3) $[Fe(CO)_4]^{2-}$ (4) $[Mn(CO)_6]^+$

NEET(UG) 2017

31. An example of a sigma bonded organometallic compound is :
(1) Grignard's reagent (2) Ferrocene
(3) Cobaltocene (4) Ruthenocene

32. Pick out the correct statement with respect to $[Mn(CN)_6]^{3-}$:-
(1) It is sp^3d^2 hybridised and tetrahedral
(2) It is d^2sp^3 hybridised and octahedral
(3) It is dsp^2 hybridised and square planar
(4) It is sp^3d^2 hybridised and octahedral

33. Correct increasing order for the wavelengths of absorption in the visible region the complexes of Co^{3+} is :-
(1) $[Co(H_2O)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$
(2) $[Co(H_2O)_6]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$
(3) $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(H_2O)_6]^{3+}$
(4) $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$

NEET(UG) 2018

34. The type of isomerism shown by the complex $[CoCl_2(en)_2]$ is
(1) Geometrical isomerism
(2) Coordination isomerism
(3) Ionization isomerism
(4) Linkage isomerism

35. The geometry and magnetic behaviour of the complex $[Ni(CO)_4]$ are
(1) Square planar geometry and diamagnetic
(2) Tetrahedral geometry and diamagnetic
(3) Square planar geometry and paramagnetic
(4) Tetrahedral geometry and paramagnetic

36. Iron carbonyl, $Fe(CO)_5$ is
(1) Tetranuclear (2) Mononuclear
(3) Trinuclear (4) Dinuclear

NEET(UG) 2019

37. What is the **correct** electronic configuration of the central atom in $K_4[Fe(CN)_6]$ based on crystal field theory ?
(1) $t_{2g}^4e_g^2$ (2) $t_{2g}^6e_g^0$ (3) $e^3t_2^3$ (4) $e^4t_2^2$

NEET(UG) 2019 (ODISHA)

38. The Crystal Field Stabilisation Energy (CFSE) for $[CoCl_6]^{4-}$ is 18000 cm^{-1}. The CFSE for $[CoCl_4]^{2-}$ will be-
(1) 6000 cm^{-1} (2) 16000 cm^{-1}
(3) 18000 cm^{-1} (4) 8000 cm^{-1}

NEET(UG) 2020

39. Which of the following is the correct order of increasing field strength of ligands to form coordination compounds ?
(1) $CN^- < C_2O_4^{2-} < SCN^- < F^-$
(2) $SCN^- < F^- < C_2O_4^{2-} < CN^-$
(3) $SCN^- < F^- < CN^- < C_2O_4^{2-}$
(4) $F^- < SCN^- < C_2O_4^{2-} < CN^-$

40. Urea reacts with water to form A which will decompose to form B. B when passed through Cu^{2+} (aq), deep blue colour solution C is formed. What is the formula of C from the following ?
(1) $CuCO_3 \cdot Cu(OH)_2$ (2) $CuSO_4$
(3) $[Cu(NH_3)_4]^{2+}$ (4) $Cu(OH)_2$

NEET(UG) 2021

41. Ethylene diaminetetraacetate (EDTA) ion is:

(1) Hexadentate ligand with four "O" and two "N" donor atoms

(2) Unidentate ligand

(3) Bidentate ligand with two "N" donor atoms

(4) Tridentate ligand with three "N" donor atoms

42. Match List-I with List-II

List-I		List-II	
(a)	$[Fe(CN)_6]^{3-}$	(i)	5.92 BM
(b)	$[Fe(H_2O)_6]^{3+}$	(ii)	0 BM
(c)	$[Fe(CN)_6]^{4-}$	(iii)	4.90 BM
(d)	$[Fe(H_2O)_6]^{2+}$	(iv)	1.73 BM

Choose the **correct** answer from the options given below

(1) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)

(2) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)

(3) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

(4) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	**3**	**3**	**2**	**2**	**2**	**1**	**4**	**4**	**3**	**2**	**2**	**3**	**1**	**2**	**3**
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	**1**	**2**	**3**	**3**	**1**	**4**	**2**	**2**	**4**	**4**	**2**	**3**	**3**	**1**	**3**
Question	31	32	33	34	35	36	37	38	39	40	41	42			
Answer	1	2	4	1	2	2	2	4	2	3	1	4			

1. Given below are two statements :

Statement-I : Complex $[Fe(H_2O)_5(NO)]SO_4$ is paramagnetic.

Statement-II : The Fe in Complex $[Fe(H_2O)_5(NO)]SO_4$ has three unpaired electrons.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

2. Given below are two statements :

Statement-I : All the geometrical formers of the complex $[M(NH_3)_4Cl_2]$ are optically inactive.

Statement-II : Both geometrical isomers of the complex $[M(NH_3)_4Cl_2]$ does not posses plane of symmetry.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

3. Given below are two statements :

Statement-I : $[Cr(H_2O)_6]Cl_2$ and $[Fe(H_2O)_6]Cl_2$ are oxidising in nature.

Statement-II : $[Fe(CN)_6]^{4-}$ ion is an outer orbital complex.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

4. Given below are two statements :

Statement-I : Cis-platin is used in the treatment of Cancer.

Statement-II : EDTA is used for treatment of lead poisoning.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

5. Given below are two statements :

Statement-I : The metal to ligand bonding creates a synergic effect which strength the bond between CO and the metal.

Statement-II : The complex with d^0 and d^{10} configuration show d–d transition.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

6. Given below are two statements :

Statement-I : The primary valency are normally ionisable and are satisfied by negative ions.

Statement-II : The secondary valency are non-ionisable are satisfied by neutral molecules or negative ions.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

7. Given below are two statements :

Statement-I : Valence bond theory explain the colour exhibited by co-ordination compounds.

Statement-II : CFT considers the metal-ligand bond to be ionic from electrostatic interactions between the metal ion and the ligand.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

8. Given below are two statements :

Statement-I : d^4 to d^7 co-ordination entities are less stable for strong field as compound to weak field cases.

Statement-II : Ruby is aluminium oxide (Al_2O_3) containing about 0.5 – 1% Cr^{+2} ions (d^4).

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

9. Given below are two statements :

Statement-I : Decacarbonyl diamangnes (0) is made up of two square bipyramidal $[Mn(CO)_5]$ units joined by a Mn–Mn bond.

Statement-II : Zero oxidation state of central metal cannot be stabilised by CO groups.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

10. Given below are two statements :

Statement-I : Excess of copper and iron from plant/animal systems are removed by the chelating ligands D-penicillamine and deferrioxime B via the formation of Co-ordination compounds.

Statement-II : Crystal field splitting energy in tetrahedral complex is less as compared to the octahedral complexes.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Statement-I and Statement-II are correct.
(2) Statement-I is correct but Statement-II is incorrect.
(3) Both Statement-I and II are incorrect.
(4) Statement-I is incorrect but Statement-II is correct.

11. Given below are two statements :

Assertion : EDTA ligand forms complex with metal ion of 3d series in the ratio of 1 : 1

Reason : EDTA ligand has four –COOH group's

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is not correct.
(4) (A) is not correct but (R) is correct.

12. **Assertion :** The correct order of the wavelength of absorption in the visible vision is

$[Ni(NO_2)_6]^{4-} < [Ni(NH_3)_6]^{+2} < [Ni(H_2O)_6]^{+2}$

Reason : The stability of different complexes depends on the strength of the ligand field of the various ligand

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is not correct.
(4) (A) is not correct but (R) is correct.

13. **Assertion :** $KMnO_4$ & $K_2Cr_2O_7$ both are coloured compound.
Reason : The colour of the compound is only due to d–d transition.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is not correct.
(4) (A) is not correct but (R) is correct.

14. **Assertion :** Cu^{+2} ion never form complex with CN^- & I^- ions.
Reason : Cu^{+2} is a stronger oxidising while CN^- & I^- both are stronger reducing agent.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is not correct.
(4) (A) is not correct but (R) is correct.

15. **Assertion :** The colour of $[Co(NH_3)_5NO_2]^{+2}$ and $[Co(NH_3)_5ONO]^{2+}$ is different.
Reason : Both are linkage isomers.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is not correct.
(4) (A) is not correct but (R) is correct.

16. Match the column :

Column-I [Complex Ion]		**Column-II [Hybridisation & no. of unpaired electron]**	
(1)	$[Co(H_2O)_6]^{+3}$	(a)	dsp^2, 0
(2)	$[Fe(CN)_6]^{3-}$	(b)	dsp^2, 1
(3)	$[Ni(CN)_4]^{2-}$	(c)	d^2sp^3, 0
(4)	$[Co(CN)_4]^{2-}$	(d)	d^2sp^3, 1

(1) 1 - c, 2 - a, 3 - d, 4 - b
(2) 1 - c, 2 - d, 3 - b, 4 - a
(3) 1 - c, 2 - d, 3 - a, 4 - b
(4) 1 - a, 2 - c, 3 - d, 4 - b

17. Match the column :

Column-I [Complex Ion]		**Column-II [No. of geometrical Isomer]**	
(1)	$[Co(NH_3)_6]^{+3}$	(a)	5
(2)	$[Co(NH_3)_2Cl_2Br_2]^-$	(b)	0
(3)	$[Pt(NH_3)_3Cl_3]^+$	(c)	15
(4)	$[Pt(NH_3)(H_2O)(Py)ClBr\ I]^+$	(d)	2

(1) 1 - b, 2 - d, 3 - a, 4 - c
(2) 1 - b, 2 - a, 3 - d, 4 - c
(3) 1 - a, 2 - b, 3 - d, 4 - c
(4) 1 - c, 2 - a, 3 - d, 4 - b

18. Match the column :

Column-I (Complexion)		**Column-II (Type of complex with magnetic moment)**	
(1)	$[Co(OX)_3]^{3-}$	(a)	Inner orbital, complex, $\mu = \sqrt{3}$
(2)	$[Fe(EDTA)]^-$	(b)	Outer orbital, complex, $\mu = \sqrt{24}$
(3)	$[MnF_6]^{3-}$	(c)	Outer orbital, complex, $\mu = \sqrt{8}$
(4)	$[Ni(H_2O)_6]^{+2}$	(d)	Inner orbital, complex, $\mu = 0$

(1) 1 - d, 2 - a, 3 - b, 4 - c
(2) 1 - c, 2 - a, 3 - b, 4 - d
(3) 1 - d, 2 - b, 3 - a, 4 - c
(4) 1 - a, 2 - d, 3 - b, 4 – c

19. Match the column :

Column-I [Confiscation in octahedral complex]		Column-II [Magnetic moment]	
(1)	d^4 [Low spin]	(a)	$\mu = \sqrt{3}$ BM
(2)	d^4 [High spin]	(b)	$\mu = \sqrt{35}$ BM
(3)	d^5 [Low spin]	(c)	$\mu = \sqrt{8}$ BM
(4)	d^5 [High spin]	(d)	$\mu = \sqrt{24}$ BM

(1) 1 - b, 2 - d, 3 - a, 4 - c
(2) 1 - a, 2 - d, 3 - d, 4 - b
(3) 1 - d, 2 - c, 3 - a, 4 - b
(4) 1 - c, 2 - d, 3 - a, 4 - b

20. Match the column :

Column-I [Complex Ion]		Column-II [Total no. of chelate ring]	
(1)	$[Fe(EDTA)]^-$	(a)	2
(2)	$[Ni(dmg)_2]$	(b)	3
(3)	$[Fe(en)_3]^{+3}$	(c)	4
(4)	$[Co(en)_2Cl_2]^+$	(d)	5

(1) 1 - a, 2 - c, 3 - b, 4 - d
(2) 1 - d, 2 - c, 3 - b, 4 - a
(3) 1 - b, 2 - c, 3 - d, 4 - a
(4) 1 - c, 2 - d, 3 - b, 4 - a

21. Match the column :

Column-I [Complex Ion]		Column-II [Value of CFSE]	
(1)	$[Cr(H_2O)_6]^{+2}$	(a)	Zero
(2)	$[Cr(NH_3)_6]^{+2}$	(b)	$-0.4\ \Delta_0$
(3)	$[Fe(H_2O)_6]^{+3}$	(c)	$-0.6\ \Delta_0$
(4)	$[CoF_6]^{3-}$	(d)	$-1.6\ \Delta_0 + P$

(1) 1 - a, 2 - c, 3 - b, 4 - d
(2) 1 - b, 2 - d, 3 - c, 4 - a
(3) 1 - c, 2 - d, 3 - a, 4 - b
(4) 1 - d, 2 - a, 3 - c, 4 – b

22. Match the column :

Column-I (Complex compound)		Column-II (Element)	
(1)	Chlorophyll	(a)	Rhodium
(2)	Blood pigment	(b)	Cobalt
(3)	Vitamin B_{12}	(c)	Magnesium
(4)	Wilkinson catalyst	(d)	Iron

(1) 1 - a, 2 - d, 3 - b, 4 - c
(2) 1 - c, 2 - d, 3 - b, 4 - a
(3) 1 - c, 2 - b, 3 - d, 4 - a
(4) 1 - d, 2 - a, 3 - b, 4 – c

23. Which of the following is/are inner orbital complex(es) ?

(A) $[Fe(NH_3)_6]^{+2}$ (B) $[Co(H_2O)_6]^{+3}$
(C) $[Mn(NH_3)_6]^{+2}$ (D) $[Co(C_2O_4)_3]^{-3}$

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

24. The compound(s) belonging to the alum family is(are)

(A) $K.Al(SO_4)_2.12H_2O$
(B) $K_2SO_4.Cr_2(SO_4)_3.24H_2O$
(C) $FeSO_4.(NH_4)_2SO_4.6H_2O$
(D) $KCl.MgCl_2.6H_2O$

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

25. Which of the following complexes is/are have square planar in shape

(A) $[Cu(H_2O)_4]^{+2}$ (B) $[Ni(CN)_4]^{-2}$
(C) $[Pt(Gly)_2]$ (D) $[Zn(Cl)_4]^{-2}$

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

26. Which statement is/are correct :-

(A) $[Ni(CO)_4]$ tetrahedral & diamagnetic
(B) $[Ni(CN)_4]^{-2}$ square planer & diamagnetic
(C) $[Cu(NH_3)_4]^{+2}$ tetrahedral and diamagnetic
(D) $[NiCl_4]^{-2}$ tetrahedral and paramagnetic

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) and (D) options are correct.
(3) If (B) and (C) both options are correct.
(4) If (A) and (C) both options are correct.

27. Which of the following complexes are paramagnetic in nature ?

(A) $[Ni(CO)_4]$ (B) $[Mn(CN)_6]^{-3}$

(C) $[Co(H_2O)_6]^{+3}$ (D) $[Ni(NH_3)_6]^{+2}$

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

28. Correct match is/are -

(A) Nesseler's reagent – $K_2[HgI_4]$ + KOH

(B) Ferrocene – $[Fe\{\eta^2-C_5H_5\}_2]$

(C) Chromocene – $[Cr(\eta^6 - C_6H_6)_2]$

(D) Zeilglar Natta catalyst – $[(Ph_3P)_3RhCl]$

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

29. Which is true for $EDTA^{-4}$ ligand :-

(A) Chelating ligand
(B) Flexidentate ligand
(C) Polydentate ligands
(D) Ambidentate ligands

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

30. Which are organometallic compound

(A) Zeise's salt
(B) Ferrocene
(C) Grignard reagent
(D) Cis-platin

(1) If (A), (B) and (C) options are correct.
(2) If (A) and (B) both options are correct.
(3) If (B) and (D) both options are correct.
(4) If (A) and (C) both options are correct.

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	**1**	**2**	**3**	**1**	**2**	**1**	**4**	**3**	**2**	**1**	**3**	**2**	**3**	**1**	**1**
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	**3**	**2**	**1**	**4**	**2**	**3**	**2**	**3**	**2**	**1**	**2**	**3**	**1**	**1**	**1**