Quiz: Coordination Compounds 1

Q1: The IUPAC name of the complex [Co(NH3)5Cl]Cl2 is:

A) Pentaamminechlorocobalt(II) chloride
B) Pentaamminechlorocobalt(III) chloride
C) Chloropentaamminecobalt(II) chloride
D) Chloropentaamminecobalt(III) chloride

Q2: Which of the following ligands shows both linkage and ambidentate behavior?

A) NO2-
B) SCN-
C) CN-
D) NH3

Q3: The coordination number of the central metal atom in [Fe(C2O4)3]3- is:

A) 3
B) 4
C) 6
D) 2

Q4: Which complex will show cis-trans isomerism?

A) [Co(NH3)6]3+
B) [Pt(NH3)2Cl2]
C) [Fe(CN)6]4-
D) [Ni(CO)4]

Q5: The magnetic moment of a complex depends primarily on:

A) Oxidation state only
B) Number of unpaired electrons
C) Coordination number only
D) Nature of counter ion

Q6: Which of the following is a strong field ligand according to spectrochemical series?

A) F-
B) Cl-
C) CN-
D) OH-

Q7: The oxidation state of chromium in [Cr(H2O)4Cl2]+ is:

A) +1
B) +2
C) +3
D) +4

Q8: Which complex will be optically active?

A) [Co(en)3]3+
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]

D) [Fe(CN)6]4-

Q9: In crystal field theory, the splitting of d-orbitals in an octahedral field results in:

A) Three higher and two lower orbitals
B) Two higher and three lower orbitals
C) Equal energy orbitals
D) Four higher and one lower orbital

Q10: Which of the following complexes has zero unpaired electrons?

A) [FeF6]3-
B) [Fe(CN)6]3-
C) [CoF6]3-
D) [Ni(H2O)6]2+

Q11: The denticity of EDTA is:

A) 2
B) 4
C) 6
D) 8

Q12: Which type of isomerism is shown by [Co(NH3)5(NO2)]Cl2?

A) Geometrical
B) Optical
C) Linkage
D) Ionisation

Q13: The coordination number of Ni in [Ni(CO)4] is:

A) 2
B) 4
C) 6
D) 8

Q14: Which of the following complexes is diamagnetic?

A) [MnF6]3-
B) [Fe(H2O)6]2+
C) [Ni(CO)4]
D) [CoF6]3-

Q15: The geometry of [Ni(CN)4]2- is:

A) Tetrahedral
B) Square planar
C) Octahedral
D) Trigonal planar

Q16: Which of the following ligands can form chelate complexes?

A) NH3
B) H2O
C) en
D) Cl-

Q17: The effective atomic number (EAN) of Fe in [Fe(CN)6]4- is:

A) 36
B) 54
C) 18
D) 28

Q18: Which complex exhibits ionisation isomerism?

A) [Co(NH3)5Br]SO4
B) [Co(en)3]3+
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q19: The IUPAC name of [Cr(H2O)4Cl2]+ is:

A) Tetraaquadichlorochromium(III)
B) Tetraaquadichlorochromate(III)
C) Dichlorotetraaquachromium(III)
D) Dichlorotetraaquachromate(III)

Q20: Which of the following statements about crystal field splitting energy (Deltao) is correct?

A) Deltao is independent of ligand nature
B) Deltao increases with weak field ligands
C) Deltao depends on metal, ligand, and oxidation state
D) Deltao is same for all complexes

Q21: The number of geometrical isomers possible for [MA2B2] square planar complex is:

A) 1
B) 2
C) 3
D) 4

Q22: Which of the following is NOT explained by valence bond theory?

A) Geometry of complexes
B) Magnetic behavior
C) Color of complexes
D) Hybridisation

Q23: The spin-only magnetic moment (in BM) for a complex with 3 unpaired electrons is approximately:

A) 1.73
B) 2.83
C) 3.87
D) 4.90

Q24: Which complex is expected to be high spin?

A) [Fe(CN)6]4-
B) [Co(NH3)6]3+
C) [FeF6]3-
D) [Ni(CO)4]

Q25: The coordination polyhedron for coordination number 4 can be:

A) Only tetrahedral
B) Only square planar
C) Tetrahedral or square planar
D) Octahedral

Q26: Which of the following metals commonly forms square planar complexes?

A) Zn(II)
B) Ni(II)
C) Mn(II)
D) Fe(III)

Q27: The ligand field stabilisation energy (LFSE) for a d6 low spin octahedral complex is:

A) -0.4Deltao
B) -1.2Deltao
C) -2.4Deltao
D) 0

Q28: Which of the following complexes shows coordination isomerism?

A) [Co(NH3)6]Cl3
B) [Cr(H2O)6]Cl3
C) [Co(en)3]3+
D) [Cu(NH3)4][PtCl4]

Q29: Which ligand causes maximum pairing of electrons?

A) I-
B) Br-
C) H2O
D) CO

Q30: The number of optical isomers possible for [Cr(en)3]3+ is:

A) 0
B) 1
C) 2
D) 3

Q31: Which of the following complexes violates the EAN rule?

A) [Ni(CO)4]
B) [Fe(CN)6]4-
C) [Co(NH3)6]3+
D) [Zn(NH3)4]2+

Q32: The oxidation state of Mn in KMnO4 is:

A) +5
B) +6
C) +7
D) +4

Q33: Which of the following complexes is inner orbital complex?

A) [FeF6]3-
B) [CoF6]3-
C) [Fe(CN)6]4-
D) [Mn(H2O)6]2+

Q34: The shape of [Co(NH3)5Cl]2+ is:

A) Tetrahedral
B) Square planar
C) Octahedral
D) Trigonal bipyramidal

Q35: Which of the following does NOT show geometrical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(NH3)4Cl2]+
C) [Ni(CO)4]
D) [Cr(en)2Cl2]+

Q36: The metal-ligand bond in coordination compounds is best described as:

A) Purely ionic
B) Purely covalent
C) Coordinate covalent
D) Metallic

Q37: Which of the following ligands has the highest field strength?

A) NH3
B) H2O
C) CN-
D) F-

Q38: The number of coordination sites occupied by diethylenetriamine (dien) is:

A) 2
B) 3
C) 4
D) 6

Q39: Which complex will show fac-mer isomerism?

A) [Co(NH3)6]3+
B) [Co(NH3)3Cl3]
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q40: The color of coordination compounds arises mainly due to:

A) d-d transitions
B) Charge on metal ion
C) Size of ligand
D) Nature of solvent only

Q41: The number of unpaired electrons in the complex [Fe(H2O)6]2+ is:

A) 0
B) 2
C) 4
D) 6

Q42: Which one of the following pairs of complexes exhibits coordination isomerism?

A) [Co(NH3)6][Cr(CN)6] and [Cr(NH3)6][Co(CN)6]
B) [Pt(NH3)2Cl2] and [PtCl2(NH3)2]
C) [Co(en)3]3+ and [Co(NH3)6]3+
D) [Fe(CN)6]3- and [Fe(CN)6]4-

Q43: The hybridisation of the central metal ion in [Ni(CO)4] is:

A) sp3
B) dsp2
C) d2sp3
D) sp2

Q44: Which of the following complexes will show optical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(en)2Cl2]+
C) [Co(en)3]3+
D) [Ni(CN)4]2-

Q45: The ligand field stabilisation energy (LFSE) for a high spin d4 octahedral complex is:

A) -0.6Deltao
B) -0.4Deltao
C) -1.6Deltao
D) 0

Q46: Which of the following ligands is ambidentate?

A) H2O
B) NO2-
C) NH3
D) OH-

Q47: The coordination number and oxidation state of Co in [Co(en)2Cl2]+ are respectively:

A) 4, +1
B) 6, +1
C) 6, +3
D) 4, +3

Q48: Which of the following statements regarding chelate complexes is correct?

A) They are less stable than non-chelates
B) They form only with monodentate ligands
C) They show chelate effect and enhanced stability
D) They are always optically inactive

Q49: The spin-only magnetic moment of [Mn(H2O)6]2+ is closest to:

A) 3.87 BM
B) 4.90 BM
C) 5.92 BM
D) 6.93 BM

Q50: Which complex shows fac-mer isomerism?

A) [Co(NH3)6]3+
B) [Co(NH3)3Cl3]
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q51: The oxidation number of metal in [Cr(NH3)4Cl2]Cl is:

A) +1
B) +2
C) +3
D) +4

Q52: Which of the following is a weak field ligand?

A) CN-
B) CO
C) NO2-
D) F-

Q53: The effective atomic number (EAN) of Ni in [Ni(CO)4] is:

A) 28
B) 36
C) 18
D) 54

Q54: Which of the following complexes does NOT obey the EAN rule?

A) [Fe(CN)6]4-
B) [Ni(CO)4]
C) [Co(NH3)6]3+
D) [Cu(NH3)4]2+

Q55: The colour of [Ti(H2O)6]3+ is due to:

A) Charge transfer transitions
B) d-d transitions
C) Ligand transitions
D) Metal ion size

Q56: Which of the following complexes is square planar?

A) [NiCl4]2-
B) [Ni(CN)4]2-
C) [Zn(NH3)4]2+
D) [CoF4]2-

Q57: The coordination number of central metal in [Al(C2O4)3]3- is:

A) 3
B) 4
C) 6
D) 8

Q58: Which complex shows ionisation isomerism?

A) [Co(NH3)5SO4]Br
B) [Co(en)3]3+
C) [Ni(CO)4]
D) [Pt(NH3)2Cl2]

Q59: The LFSE for a high spin d5 octahedral complex is:

A) -2.0Deltao
B) -1.2Deltao
C) 0
D) -0.4Deltao

Q60: Which of the following ligands is bidentate?

A) NH3
B) CN-
C) en
D) Cl-

Q61: The shape of [Fe(CN)6]4- is:

A) Tetrahedral
B) Square planar
C) Octahedral
D) Trigonal bipyramidal

Q62: Which metal ion commonly forms tetrahedral complexes?

A) Ni2+
B) Pt2+
C) Zn2+
D) Pd2+

Q63: The number of geometrical isomers possible for [Co(en)2Cl2]+ is:

A) 1
B) 2
C) 3
D) 4

Q64: Which of the following complexes is paramagnetic?

A) [Ni(CO)4]
B) [Fe(CN)6]4-
C) [Mn(H2O)6]2+
D) [Zn(NH3)4]2+

Q65: The IUPAC name of [Pt(NH3)2Cl2] is:

A) Diamminedichloroplatinum(II)
B) Dichlorodiamminoplatinum(II)
C) Diamminedichloroplatinate(II)
D) Dichlorodiamminoplatinate(II)

Q66: Which of the following is NOT a chelating ligand?

A) en
B) EDTA4-
C) C2O4 2-
D) NH3

Q67: The magnetic behaviour of coordination compounds is best explained by:

A) Valence bond theory
B) Crystal field theory
C) Molecular orbital theory
D) Werner theory

Q68: Which complex will be low spin?

A) [FeF6]3-
B) [CoF6]3-
C) [Fe(CN)6]4-
D) [Mn(H2O)6]2+

Q69: The coordination number of Fe in hemoglobin is:

A) 4
B) 5
C) 6
D) 8

Q70: Which of the following complexes shows linkage isomerism?

A) [Co(NH3)5(NO2)]Cl2
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Fe(CN)6]4-

Q71: The LFSE of a low spin d7 octahedral complex is:

A) -1.8Deltao
B) -2.0Deltao
C) -0.8Deltao
D) -1.2Deltao

Q72: Which of the following is an inner orbital complex?

A) [CoF6]3-
B) [Fe(H2O)6]2+
C) [Fe(CN)6]4-
D) [MnF6]3-

Q73: The number of donor atoms in EDTA4- is:

A) 2
B) 4
C) 6
D) 8

Q74: Which of the following complexes is colourless?

A) [Ti(H2O)6]3+
B) [Cu(H2O)6]2+
C) [Zn(H2O)6]2+
D) [Fe(H2O)6]3+

Q75: The oxidation state of Fe in [Fe(CN)6]3- is:

A) +2
B) +3
C) +4
D) +6

Q76: Which theory explains both colour and magnetic properties of complexes most accurately?

A) Werner theory
B) Valence bond theory
C) Crystal field theory
D) Ligand field theory

Q77: The shape of [Cu(NH3)4]2+ is:

A) Tetrahedral
B) Square planar
C) Octahedral
D) Trigonal planar

Q78: Which of the following complexes shows meridional isomer?

A) [Co(NH3)3Cl3]
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(en)3]3+

Q79: The number of unpaired electrons in [CoF6]3- is:

A) 1
B) 2
C) 3
D) 4

Q80: The stability of chelate complexes is mainly due to:

A) High charge on metal ion
B) Large size of ligand
C) Entropy increase during complex formation
D) Strong metal-metal bonding

Q81: The number of unpaired electrons in [Co(NH3)6]3+ is:

A) 0
B) 1
C) 2
D) 4

Q82: Which of the following complexes will show maximum CFSE?

A) [FeF6]3- (high spin d5)
B) [Co(NH3)6]3+ (low spin d6)
C) [Mn(H2O)6]2+ (high spin d5)
D) [Zn(H2O)6]2+ (d10)

Q83: The correct order of increasing ligand field strength is:

A) CN- < NH3 < H2O < F-
B) F- < H2O < NH3 < CN-
C) H2O < F- < NH3 < CN-
D) NH3 < H2O < F- < CN-

Q84: Which of the following complexes will be optically inactive?

A) [Cr(en)3]3+
B) [Co(en)3]3+
C) [Co(en)2Cl2]+ (cis)
D) [Pt(NH3)2Cl2]

Q85: The oxidation state of metal in [Ni(en)3]2+ is:

A) +1
B) +2
C) +3
D) 0

Q86: The geometry of [Fe(CO)5] is:

A) Octahedral
B) Square pyramidal
C) Trigonal bipyramidal
D) Tetrahedral

Q87: Which of the following statements is correct for [Fe(CN)6]4-?

A) High spin and paramagnetic
B) Low spin and diamagnetic
C) High spin and diamagnetic
D) Low spin and paramagnetic

Q88: The number of geometrical isomers possible for [MA2B4] octahedral complex is:

A) 1
B) 2
C) 3
D) 4

Q89: Which of the following complexes does NOT show linkage isomerism?

A) [Co(NH3)5(NO2)]Cl2
B) [Co(NH3)5(SCN)]2+
C) [Co(NH3)5(CN)]2+
D) [Co(NH3)5(ONO)]2+

Q90: The LFSE for a high spin d7 octahedral complex is:

A) -1.2Deltao
B) -0.8Deltao
C) -1.8Deltao
D) -2.0Deltao

Q91: Which of the following ligands can form pi-back bonding?

A) NH3
B) H2O
C) CO
D) F-

Q92: The coordination number of Fe in [Fe(CO)5] is:

A) 4
B) 5
C) 6
D) 8

Q93: Which complex will be diamagnetic?

A) [Fe(H2O)6]3+
B) [CoF6]3-
C) [Ni(CO)4]
D) [Mn(H2O)6]2+

Q94: The number of unpaired electrons in [Cr(H2O)6]3+ is:

A) 1
B) 2
C) 3
D) 4

Q95: Which of the following complexes exhibits ionisation isomerism?

A) [Co(NH3)5Br]SO4
B) [Co(en)3]3+
C) [Ni(CO)4]
D) [Fe(CN)6]4-

Q96: The EAN of Co in [Co(NH3)6]3+ is:

A) 27
B) 36
C) 54
D) 18

Q97: Which of the following metal ions forms only high spin complexes?

A) Fe2+
B) Co3+
C) Mn2+
D) Ni2+

Q98: The colour of [Cu(H2O)6]2+ is mainly due to:

A) Charge transfer
B) d-d transition
C) Ligand excitation
D) Metal ion oxidation

Q99: Which complex will show maximum number of optical isomers?

A) [Cr(en)3]3+
B) [Co(en)2Cl2]+
C) [Pt(NH3)2Cl2]
D) [Co(NH3)6]3+

Q100: The number of geometrical isomers for [M(AA)B2C2] octahedral complex is:

A) 2
B) 3
C) 4
D) 5

Q101: Which of the following complexes shows coordination isomerism?

A) [Co(NH3)6]Cl3
B) [Cu(NH3)4][PtCl4]
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q102: The magnetic moment of a complex with 2 unpaired electrons is closest to:

A) 1.73 BM
B) 2.83 BM
C) 3.87 BM
D) 4.90 BM

Q103: Which of the following is a pi-donor ligand?

A) CO
B) NO+
C) Cl-
D) CN-

Q104: The coordination number of Al in [Al(H2O)6]3+ is:

A) 3
B) 4
C) 6
D) 8

Q105: Which of the following complexes violates the EAN rule?

A) [Ni(CO)4]
B) [Fe(CN)6]4-
C) [Co(NH3)6]3+
D) [Cu(NH3)4]2+

Q106: The LFSE of a low spin d5 octahedral complex is:

A) 0
B) -1.2Deltao
C) -2.0Deltao
D) -0.4Deltao

Q107: Which of the following complexes shows fac-mer isomerism?

A) [Co(NH3)3Cl3]
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(en)3]3+

Q108: The metal-ligand bond in coordination compounds is best described as:

A) Ionic
B) Covalent
C) Coordinate covalent
D) Metallic

Q109: Which of the following complexes is colourless?

A) [Ti(H2O)6]3+
B) [Cu(H2O)6]2+
C) [Zn(H2O)6]2+
D) [Fe(H2O)6]3+

Q110: The oxidation state of Cr in K3[Cr(C2O4)3] is:

A) +2
B) +3
C) +4
D) +6

Q111: Which of the following ligands increases Deltao the most?

A) F-
B) H2O
C) NH3
D) CN-

Q112: The coordination number of Cu in [Cu(NH3)4]2+ is:

A) 2
B) 4
C) 5
D) 6

Q113: Which of the following complexes is high spin?

A) [Fe(CN)6]4-
B) [Co(NH3)6]3+
C) [FeF6]3-
D) [Ni(CO)4]

Q114: The number of donor atoms in diethylenetriamine (dien) is:

A) 2
B) 3
C) 4
D) 6

Q115: Which theory best explains spectrochemical series?

A) Werner theory
B) Valence bond theory
C) Crystal field theory
D) Ligand field theory

Q116: The magnetic behaviour of [Fe(H2O)6]2+ is:

A) Diamagnetic
B) Paramagnetic with 2 unpaired electrons
C) Paramagnetic with 4 unpaired electrons
D) Paramagnetic with 6 unpaired electrons

Q117: Which complex shows no geometrical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(NH3)4Cl2]+
C) [Ni(CO)4]
D) [Cr(en)2Cl2]+

Q118: The LFSE of tetrahedral complexes is generally:

A) Greater than octahedral
B) Equal to octahedral
C) Zero
D) Less than octahedral

Q119: Which of the following complexes shows linkage isomerism?

A) [Co(NH3)5(NO2)]Cl2
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(en)3]3+

Q120: The main reason for higher stability of chelate complexes is:

A) Strong covalent bonding
B) Higher lattice energy
C) Entropy increase
D) Higher charge density

Q121: The number of unpaired electrons in a low spin d6 octahedral complex is:

A) 0
B) 1
C) 2
D) 4

Q122: Which of the following complexes has the highest ligand field stabilisation energy (LFSE)?

A) High spin d5 octahedral
B) Low spin d5 octahedral
C) High spin d6 octahedral
D) Low spin d6 octahedral

Q123: The oxidation state of Co in K3[Co(CN)6] is:

A) +2
B) +3
C) +4
D) +6

Q124: Which of the following complexes will be diamagnetic?

A) [FeF6]3-
B) [CoF6]3-
C) [Ni(CN)4]2-
D) [Mn(H2O)6]2+

Q125: The geometry of a d8 metal complex with strong field ligands is usually:

A) Tetrahedral
B) Octahedral
C) Square planar
D) Trigonal bipyramidal

Q126: The LFSE of a high spin d4 octahedral complex is:

A) -0.4Deltao
B) -0.6Deltao
C) -1.6Deltao
D) 0

Q127: Which of the following ligands is a pi-acceptor ligand?

A) Cl-
B) OH-
C) CO
D) NH3

Q128: The number of optical isomers possible for [Cr(en)3]3+ is:

A) 0
B) 1
C) 2
D) 3

Q129: Which of the following complexes shows ionisation isomerism?

A) [Co(NH3)5Cl]SO4
B) [Co(en)3]3+
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q130: The coordination number of Fe in hemoglobin is:

A) 4
B) 5
C) 6
D) 8

Q131: Which of the following complexes will show fac-mer isomerism?

A) [Co(NH3)3Cl3]
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(en)3]3+

Q132: The magnetic moment (spin-only) of a complex having 4 unpaired electrons is closest to:

A) 3.87 BM
B) 4.90 BM
C) 5.92 BM
D) 6.93 BM

Q133: Which of the following complexes is colourless?

A) [Ti(H2O)6]3+
B) [Cu(H2O)6]2+
C) [Zn(H2O)6]2+
D) [Fe(H2O)6]3+

Q134: The effective atomic number (EAN) of Fe in [Fe(CO)5] is:

A) 26
B) 28
C) 36
D) 18

Q135: Which of the following metal ions always forms high spin complexes?

A) Fe2+
B) Co3+
C) Mn2+
D) Ni2+

Q136: The number of geometrical isomers possible for [M(en)2Cl2]+ is:

A) 1
B) 2
C) 3
D) 4

Q137: Which of the following complexes shows coordination isomerism?

A) [Co(NH3)6]Cl3
B) [Cu(NH3)4][PtCl4]
C) [Ni(CO)4]
D) [Pt(NH3)2Cl2]

Q138: The LFSE of a low spin d7 octahedral complex is:

A) -1.2Deltao
B) -1.8Deltao
C) -2.0Deltao
D) -0.8Deltao

Q139: Which of the following ligands increases Deltao the least?

A) CN-
B) NH3
C) H2O
D) F-

Q140: The coordination number of Al in [Al(C2O4)3]3- is:

A) 3
B) 4
C) 6
D) 8

Q141: Which complex violates the EAN rule?

A) [Ni(CO)4]
B) [Fe(CN)6]4-
C) [Co(NH3)6]3+
D) [Cu(NH3)4]2+

Q142: The shape of [Cu(NH3)4]2+ is best described as:

A) Tetrahedral
B) Square planar
C) Octahedral
D) Trigonal planar

Q143: The LFSE of a tetrahedral complex compared to its octahedral analogue is:

A) Greater
B) Equal
C) Zero
D) Smaller

Q144: Which of the following complexes is paramagnetic?

A) [Ni(CO)4]
B) [Fe(CN)6]4-
C) [Mn(H2O)6]2+
D) [Zn(NH3)4]2+

Q145: The denticity of diethylenetriamine (dien) is:

A) 2
B) 3
C) 4
D) 6

Q146: Which of the following complexes shows linkage isomerism?

A) [Co(NH3)5(NO2)]Cl2
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(en)3]3+

Q147: The oxidation state of Mn in [Mn(CN)6]4- is:

A) +2
B) +3
C) +4
D) +6

Q148: Which of the following best explains the colour of coordination compounds?

A) Werner theory
B) Valence bond theory
C) Crystal field theory
D) Lewis acid-base theory

Q149: The number of donor atoms in EDTA4- is:

A) 2
B) 4
C) 6
D) 8

Q150: Which of the following complexes does NOT show geometrical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(NH3)4Cl2]+
C) [Ni(CO)4]
D) [Cr(en)2Cl2]+

Q151: The coordination number of Ni in [Ni(CO)4] is:

A) 2
B) 4
C) 6
D) 8

Q152: Which of the following complexes is low spin?

A) [FeF6]3-
B) [CoF6]3-
C) [Fe(CN)6]4-
D) [Mn(H2O)6]2+

Q153: The main reason for higher stability of chelate complexes is:

A) Higher lattice energy
B) Stronger covalent bonds
C) Entropy increase
D) Higher oxidation state of metal

Q154: Which of the following ligands is a bidentate ligand?

A) NH3
B) H2O
C) en
D) Cl-

Q155: The geometry of [Fe(CN)6]3- is:

A) Tetrahedral
B) Square planar
C) Octahedral
D) Trigonal bipyramidal

Q156: Which of the following complexes shows optical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(en)3]3+
C) [Ni(CO)4]
D) [Co(NH3)6]3+

Q157: The LFSE of a high spin d5 octahedral complex is:

A) -0.4Deltao
B) -1.2Deltao
C) 0
D) -2.0Deltao

Q158: Which of the following metals commonly forms square planar complexes?

A) Zn2+
B) Ni2+
C) Mn2+
D) Fe3+

Q159: The coordination number of Fe in [Fe(H2O)6]2+ is:

A) 4
B) 5
C) 6
D) 8

Q160: Which of the following best explains the chelate effect?

A) Decrease in entropy
B) Increase in entropy
C) Decrease in enthalpy
D) Increase in lattice energy

Q161: The number of unpaired electrons in a high spin d6 octahedral complex is:

A) 0
B) 2
C) 4
D) 6

Q162: Which of the following complexes will show the highest magnetic moment?

A) [Fe(CN)6]4-
B) [Mn(H2O)6]2+
C) [Co(NH3)6]3+
D) [Ni(CO)4]

Q163: The oxidation state of Ni in [Ni(CN)4]2- is:

A) 0
B) +1
C) +2
D) +3

Q164: Which of the following complexes is expected to be square planar?

A) [NiCl4]2-
B) [Ni(CN)4]2-
C) [ZnCl4]2-
D) [CoF4]2-

Q165: The LFSE of a low spin d4 octahedral complex is:

A) -0.6Deltao
B) -1.6Deltao
C) -2.4Deltao
D) 0

Q166: Which of the following ligands causes maximum crystal field splitting?

A) I-
B) Br-
C) NH3
D) CO

Q167: The number of geometrical isomers possible for [MA3B3] octahedral complex is:

A) 1
B) 2
C) 3
D) 4

Q168: Which of the following complexes will be optically active?

A) [Co(en)3]3+
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(NH3)6]3+

Q169: The coordination number of the central metal ion in [Cr(C2O4)3]3- is:

A) 3
B) 4
C) 6
D) 8

Q170: Which of the following complexes exhibits ionisation isomerism?

A) [Co(NH3)5Br]SO4
B) [Co(en)3]3+
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q171: The effective atomic number (EAN) of Ni in [Ni(CO)4] is:

A) 28
B) 36
C) 18
D) 54

Q172: Which of the following metal ions always forms high spin complexes?

A) Fe2+
B) Co3+
C) Mn2+
D) Ni2+

Q173: The colour of coordination compounds mainly arises due to:

A) Charge on metal ion
B) d-d transitions
C) Ligand size
D) Metal-metal bonding

Q174: The geometry of [Fe(CO)5] is:

A) Square pyramidal
B) Trigonal bipyramidal
C) Octahedral
D) Tetrahedral

Q175: The number of unpaired electrons in [Cr(H2O)6]3+ is:

A) 1
B) 2
C) 3
D) 4

Q176: Which of the following ligands is ambidentate?

A) NH3
B) H2O
C) SCN-
D) en

Q177: The LFSE of a high spin d5 octahedral complex is:

A) -0.4Deltao
B) -1.2Deltao
C) 0
D) -2.0Deltao

Q178: Which of the following complexes is diamagnetic?

A) [FeF6]3-
B) [CoF6]3-
C) [Ni(CO)4]
D) [Mn(H2O)6]2+

Q179: The coordination number of Cu in [Cu(NH3)4]2+ is:

A) 2
B) 4
C) 5
D) 6

Q180: Which of the following complexes shows coordination isomerism?

A) [Co(NH3)6]Cl3
B) [Cu(NH3)4][PtCl4]
C) [Pt(NH3)2Cl2]
D) [Ni(CO)4]

Q181: The denticity of EDTA4- is:

A) 2
B) 4
C) 6
D) 8

Q182: Which of the following complexes shows fac-mer isomerism?

A) [Co(NH3)3Cl3]
B) [Pt(NH3)2Cl2]
C) [Ni(CO)4]
D) [Co(en)3]3+

Q183: The magnetic moment of a complex with three unpaired electrons is closest to:

A) 1.73 BM
B) 2.83 BM
C) 3.87 BM
D) 4.90 BM

Q184: Which of the following ligands is a pi-donor ligand?

A) CO
B) CN-
C) Cl-
D) NO+

Q185: The oxidation state of Fe in [Fe(CN)6]3- is:

A) +2
B) +3
C) +4
D) +6

Q186: Which of the following complexes is colourless?

A) [Ti(H2O)6]3+
B) [Cu(H2O)6]2+
C) [Zn(H2O)6]2+
D) [Fe(H2O)6]3+

Q187: The coordination number of Al in [Al(H2O)6]3+ is:

A) 3
B) 4
C) 6
D) 8

Q188: Which of the following complexes is low spin?

A) [FeF6]3-
B) [CoF6]3-
C) [Fe(CN)6]4-
D) [Mn(H2O)6]2+

Q189: The number of geometrical isomers possible for [MA2B4] octahedral complex is:

A) 1
B) 2
C) 3
D) 4

Q190: Which of the following best explains the chelate effect?

A) Decrease in entropy
B) Increase in entropy
C) Decrease in enthalpy
D) Increase in lattice energy

Q191: The shape of [Ni(CO)4] is:

A) Square planar
B) Tetrahedral
C) Octahedral
D) Trigonal planar

Q192: Which of the following complexes does NOT show geometrical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(NH3)4Cl2]+
C) [Ni(CO)4]
D) [Cr(en)2Cl2]+

Q193: The LFSE of a tetrahedral complex compared to an octahedral complex is:

A) Greater
B) Equal
C) Smaller
D) Zero

Q194: Which of the following complexes shows optical isomerism?

A) [Pt(NH3)2Cl2]
B) [Co(en)3]3+
C) [Ni(CO)4]
D) [Co(NH3)6]3+

Q195: The oxidation state of Mn in [Mn(CN)6]4- is:

A) +1
B) +2
C) +3
D) +4

Q196: Which of the following ligands is bidentate?

A) NH3
B) H2O
C) en
D) Cl-

Q197: The coordination number of Fe in [Fe(H2O)6]2+ is:

A) 4
B) 5
C) 6
D) 8

Q198: Which of the following complexes violates the EAN rule?

A) [Ni(CO)4]
B) [Fe(CN)6]4-
C) [Co(NH3)6]3+
D) [Cu(NH3)4]2+

Q199: The metal-ligand bond in coordination compounds is best described as:

A) Ionic
B) Covalent
C) Coordinate covalent
D) Metallic

Q200: Which of the following statements about tetrahedral complexes is correct?

A) They show large Deltao
B) They are always diamagnetic
C) They rarely show low spin configurations
D) They commonly show cis-trans isomerism