25CHP102 / 22CHP102N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - **CHEMISTRY**

TRANSITION METAL CHEMISTRY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Select the stronger ligand a)NH_3 b) Br^- c)H_2O d)CO	K1	CO2
	2	Identify that the spinel structure belong to which of the following types? a)AB type b)AB_3 type c)AB_2O_4 type d)AB_2type	K2	CO2
2	3	Select the ground state term symbol of d^2 ion. a)^3F b)^5F c) ^5D d) ^5P	K1	CO2
	4	The susceptibility of a certain magnetic material is 400.Express the class of the material? a) Diamagnetic b)Paramagnetic c) Ferroelectric d) Ferromagnetic	K2	CO2
3	5	Which type of reaction involves the conversion of one isomeric form of a coordination complex to another under the influenze of light? a)Photo-redox reaction b)Photo-substitution c)Photo-isomerisation d)Photolysis	K1	CO2
	6	Identify the kinetically inert ion given below. a)Co^{3+}(high spin) b) Cr^{3+} c) Co^{3+}(high spin) d) Cr^{3+}	K2	CO2
4	7	For a square planar complex of the type $[Ma_2b_2]$ where 'a' and 'b' are different ligands, the two geometrical isomers are called: (a) Fac and Mer (b) Cis and Trans (c) Enantiomers and Diastereomers (d) Optical and Geometrical	K1	CO2
	8	Find the coordination complexes which shows optical isomerism? (a) $[Cr(NH_3)_6]^{3+}$ (b) $[PtCl_2(en)_2]^{2+}$ (c) trans-$[Cr(en)(Cl_2)(NH_3)_2]^+$ (d) $[Ni(CN)_4]^{2-}$	K2	CO2
5	9	Select the primary function of myoglobin? a) Transport oxygen in the bloodstream. b) Catalyze the hydrolysis of carbonic acid. c) Store oxygen in muscle tissues. d) Transport electrons in the respiratory chain.	K1	CO2
	10	What is the coordination geometry of Cisplatin? a)Tetrahedral b)Square planar c)Octahedral d)Trigonal planar	K2	CO2

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SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Describe the formation of $[Fe(CN)_6]^{4-}$ & $[CoF_6]^{3-}$ complex ions on the basis of valence bond theory .	K2	CO2
		(OR)		
	11.b.	Discuss the splitting of d- orbitals in Td & Square planar complexes.		
2	12.a.	Construct the Tanabe Sugano diagram of Ni(II) octahedral complex.	K3	CO1
		(OR)		
	12.b.	Explain the magnetic properties of coordination complexes.		
3	13.a.	Explain the mechanism of substitution reactions in square planar complexes.	K4	CO3
		(OR)		
	13.b.	Outline the complementary & non- complementary electron transfer reactions.		
4	14.a.	Evaluate different experimental techniques used to separate stereoisomers of coordination complexes.	K5	CO4
		(OR)		
	14.b.	Explain trigonal prismatic and antiprismatic with suitable example.		
5	15.a.	Explain the anticancer activity of cis-platin.	K4	CO4
		(OR)		
	15.b.	Explain the role of magnesium present in chlorophyll.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Explain pi bonding & evidence for pi bonding in octahedral complexes.	K2	CO2
2	17	Derive the ground state term symbol for the d^2 ion and construct the orgel diagram for it.	K3	CO1
3	18	Explain trans effect and its theories.	K4	CO3
4	19	Elaborate the stereo isomerism in Octahedral complexes.	K5	CO4
5	20	Explain the structure and functions of Carboxy peptidase A & Carbonic anhydrase.	K4	CO5

Z-Z-Z END