22CHP102N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 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	Secondary valency in coordination compounds refers to: (A) Oxidation state of the central metal atom (B) Number of ligands directly bonded to the metal (C) Charge of the complex ion (D) Spin state of the metal ion	K1	CO2
	2	Jahn-Teller distortion is more likely to occur in complexes containing: (A) d^0 and d^{10} configurations (B) High-spin d^6 configurations (C) Partially filled e_g orbitals (D) Completely filled t_{2g} orbitals	K2	CO3
2	3	Which of the following terms on the Tanabe-Sugano diagram corresponds to low-energy transitions? (A) Ground state (B) High spin excited state (C) Low spin excited state (D) Intermediate spin state	K1	CO2
	4	Which type of magnetic behavior is shown by coordination complexes with unpaired electrons? (A) Diamagnetism (B) Paramagnetism (C) Ferromagnetism (D) Antiferromagnetism	K2	CO2
3	5	Which factor most directly influences the kinetic stability of a coordination complex? (A) The overall charge on the complex. (B) The size of the metal ion. (C) The strength of the metal-ligand bonds. (D) The electronic configuration of the central metal ion.	K1	CO2
	6	In an inner-sphere electron transfer reaction, which of the following steps typically occurs? (A) Formation of a bridging ligand between two metal complexes. (B) The electron transfers directly between metal centers without ligand involvement. (C) The coordination spheres remain completely unchanged. (D) Ligands dissociate after the electron transfer process.	K2	CO3
4	7	Which type of stereoisomerism is most commonly associated with square planar complexes? (A) Optical isomerism (B) Geometrical isomerism C)Conformational isomerism (D)Linkage isomerism	K1	CO2
	8	Which of the following is true about tetrahedral complexes with four different ligands (ABCD type)? (A) They exhibit optical isomerism. (B) They exhibit geometrical isomerism. (C) They exhibit both geometrical and optical isomerism. (D) They exhibit neither geometrical nor optical isomerism.	K2	CO3

Cont...

5	9	Myoglobin primarily functions in: (A) Oxygen storage in muscles (B) Oxygen transport in blood (C) Carbon dioxide removal from tissues (D) Nerve impulse transmission	K1	CO2
	10	Cisplatin is most effective against which types of cancer? (A) Bone and brain cancers (B) Skin and thyroid cancers (C) Prostate and liver cancers (D) Lung, ovarian, and testicular cancers	K2	CO3

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.	Discuss the theory of coordination compounds proposed by Sidwick.	K4	CO3
		(OR)		
	11.b.	Explain the factors affecting magnitude of 10 Dq.		
2	12.a.	Describe the Orgel's diagram of d^2 and d^6 ions.	K5	CO3
		(OR)		
	12.b.	Explain the ferromagentisim and anti-ferromagnetism.		
3	13.a.	Explain the thermodynamic and kinetic stability.	K4	CO2
		(OR)		
	13.b.	Discuss the mechanism of outer sphere electron transfer reaction.		
4	14.a.	Explain the separation and modifications of isomers.	K4	CO3
		(OR)		
	14.b.	Describe the geometrical isomerism of octahedral complexes.		
5	15.a.	Write notes on blue copper proteins.	K5	CO3
		(OR)		
	15.b.	Discuss the transport of Ion and storage of Iron.		

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 the valence bond theory with example.	K4	CO2
2	17	Discuss the determination of magnetic susceptibility by Gouy's method.	K5	CO3
3	18	Explain the bimolecular nuclephilic substitution reaction in octahedral complexes.	K4	CO2
4	19	Explain the optical isomerism in octahedral complexes.	K5	CO3
5	20	Discuss the anticancer activity of *cis*-platin.	K4	CO2

Z-Z-Z END