PSG COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2023

(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 $(10 \times 1 = 10)$						
Module No.	Question No.	Question	K Level	СО			
1	1	What is the effective Atomic Number of Cr (atomic no. 24) in [Cr(NH ₃) ₆]Cl ₃ is a) 35 b) 27 c) 33 d) 26	K1	CO1			
	2	Which of the following pairs has the same bond order? a) O_2^+ , NO^+ b) N_2 , O_2 c) $O_2^{2^+}$, B_2 d) NO, CO	K2	CO1			
2	3	Find Ground state term for V^{3+} ion is a) 3F_2 b) 5D_0 c) 3F_4 d) $^3D_{5/2}$	K1	CO2			
	4	Which of the following ions has the maximum magnetic moment? a) Fe ²⁺ b) Mn ²⁺ c) Cr ²⁺ d) Ti ²⁺	K2	CO2			
3	5	How many ligands does a octahedral complex have? a) 4 b) 5 c) 6 d) 3	K1	CO3			
	6	Name the effect of a coordinated group upon the rate of substitution at the position trans to itself in a square or octahedral complex. a) Trans effect b) CFT c) VBT d) MOT	K2	CO3			
4	7	If a compound has two chiral carbon. What is the number of optically active isomers? a) Two b) Three c) Four d) Five	K2	CO4			
	8	Which type of compounds cannot exhibit geometrical isomerism? a) Singly Bonded b) Doubly Bonded c) Triply Bonded d) Cyclic Compounds	K1	CO4			
5	9	Which of the following is the function of hemoglobin? a) Storage of oxygen b) Transport of oxygen c) Both of the above d) None of the above	K1	CO5			
	10	Which of the following has both sulphur and iron? a) Ferridoxin b) Cytochromes c) Cysteine d) methionine	K2	CO5			

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

 $(5 \times 7 = 35)$

CONTRACTOR - A TOUR -						
Module No.	Question No.	Question	K Level	СО		
1	11.a.	State EAN rule. Examine it with suitable example.				
	(OR)			CO1		
	11.b.	Discuss the postulates of valence bond theory.				
	12.a.	Explain selection rules for electronic spectra of transition metal complexes.				
2		(OR)	K5	CO2		
	12.b.	How do you determine magnetic susceptibility by Guoy's method?	-7			
	13.a.	Explain the nucleaophilic substitution in square planar complexes.				
3	(OR)		K6	CO3		
	13.b.	Elaborate the thermodynamic and kinetic stability of coordination complexes.				
	14.a.	Describe on geometrical and optical isomerism in coordination complexes.				
4	(OR)			CO4		
	14.b.	Discuss the trigonal prismatic and antiprismatic molecular geometry with suitable example.				
	15.a.	Explain role of porphyrins in biological systems.				
5	(OR)		K5	CO5		
	15.b.	Discuss the role of manganese in photosynthesis.				

SECTION -C (30 Marks) Answer ANY THREE questions

ALL questions carry EQUAL Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	СО
1	16	Explain the detailed account on John Teller distortion.	K4	CO1
2	17	Elaborate the followings: i) Ferromagnetism ii) Anti-ferromagnetism.	K6	CO2
3	18	Discuss the theories of Trans effect.	K6	CO3
4	19	Justify the stereo isomers in six coordinate complexes with suitable examples.	K5	CO4
5	20	Explain the detailed study on Carboxypepdidase and Carbonic anhydrase.	K4	CO5