Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2025.
(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., CHEMISTRY

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
IV	PART-III	CORE	U21CH406	INORGANIC CHEMISTRY-III

Date & Session:06.11.2025/AN **Time: 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	**SECTION – A (10 X 1 = 10 Marks)** **Answer ALL Questions.**
CO1	K1	1.	Which of the d-orbitals is having unique shape? a) dx^2-y^2 b) dxz c) dyz d) dz^2
CO1	K2	2.	The instrument used to measure the magnetic moment of a complex is _____. a) electronic balance b) Metler balance c) Guoy balance d) UV spectrometer
CO2	K1	3.	Which of the following complexes is used for cancer therapy? a) cis-platin b) trans-platin c) $[Cu(NH_3)_4]^{2+}$ d) $[Cu\text{-}EDTA]^{2-}$
CO2	K2	4.	The number of pyrrole nucleus present in porphyrin is _____. a) 1 b) 2 c) 3 d) 4
CO3	K1	5.	Oxidation number of Fe in $K_4Fe(CN)_6$ is _____. a) +2 b) +3 c) 0 d) +1
CO3	K2	6.	Which of the following is a neutral ligand? a) CN^- b) $C_2O_4^{2-}$ c) NO d) Cl^-
CO4	K1	7.	Which one of the following does not obey EAN rule? a) $[Co(NH_3)_6]^{3+}$ b) Fe $(CO)_5$ c) Mn_2 $(CO)_{10}$ d) V $(CO)_6$
CO4	K2	8.	The complex responsible for the brown ring is _____. a) $[Fe(H_2O)_5NO]^{3+}$ b) $[Fe(H_2O)_5(NO_2)]^{2+}$ c) $[Fe(H_2O)_5NO]^{2+}$ d) $[Fe(H_2O)_5CN]^{2+}$
CO5	K1	9.	Wilson's disease is caused by _____. a) deficiency of copper b) deficiency of iron c) excess of copper d) excess of iron
CO5	K2	10.	Oxyhemoglobin is _____. a) tetrahedral b) square pyramidal c) octahedral d) none of these

Course Outcome	Bloom's K-level	Q. No.	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Explain the difference between coordination number and oxidation state with examples from coordination complexes. **(OR)**
CO1	K3	11b.	Apply the IUPAC nomenclature rules to name the following complexes: (i) $[Co(NH3)4Cl2]Br$ (ii) $[Cr(en)_2Cl_2]^+$
CO2	K3	12a.	Analyze how the effective atomic number (EAN) rule helps in predicting the stability of metal complexes. **(OR)**
CO2	K3	12b.	Explain the splitting pattern of d-orbitals in an octahedral complex.
CO3	K4	13a.	Analyze the factors that determine whether an octahedral complex behaves as labile or inert. **(OR)**
CO3	K4	13b.	Assess the role of the trans effect in the synthesis of specific platinum-based anticancer drugs.
CO4	K4	14a.	Analyze how the Effective Atomic Number (EAN) rule help predict the stability of organometallic complexes. **(OR)**
CO4	K4	14b.	Analyze how the 18-electron rule help predict the stability of organometallic complexes.
CO5	K5	15a.	Use Adamson's rules to assess the differences in photochemical behavior between Cr(III), Co(III). **(OR)**
CO5	K5	15b.	Evaluate the photochemical isomerization behavior of Pt(II) complexes.

Course Outcome	Bloom's K-level	Q. No.	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Analyze the possible types of isomerism in $[PtCl_2(NH_3)_2]$. Draw the structures for the isomers identified. **(OR)**
CO1	K3	16b.	Using Valence Bond Theory, explain the hybridization and geometry of square planar complexes such as $[PtCl_4]^{2-}$
CO2	K4	17a.	Evaluate the limitations of Crystal Field Theory in explaining the bonding in transition metal complexes. **(OR)**
CO2	K4	17b.	Using CFSE, justify why d^3 and d^8 octahedral complexes are generally more stable compared to other configurations.
CO3	K4	18a.	Evaluate the mechanism of ligand substitution in octahedral complexes during aquation and base hydrolysis reactions. **(OR)**
CO3	K4	18b.	Critically evaluate the various theories (σ-bond, π-bond, and steric theories) proposed to explain the trans effect.
CO4	K5	19a.	Explain the polymerization of olefins. **(OR)**
CO4	K5	19b.	Explain structure and nature of M-L bond in metal carbonyls.
CO5	K5	20a.	Compare metal-centered vs. charge-transfer transitions. **(OR)**
CO5	K5	20b.	Evaluate the parameters influence the photo-substitution pathway and product distribution.