BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATIONSP/2025)

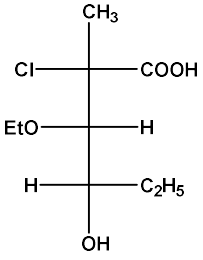
CLASS: BTECH/IMSc **SEMESTER : II/ADD**
BRANCH: BT/CHEMICAL/CIVIL/ME/PIE/FT/PHYSICS **SESSION : SP/2025**

SUBJECT: CH24101 CHEMISTRY

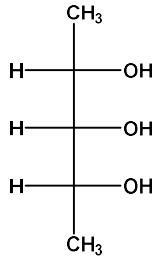
TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	On the basis of Werner's theory explain why cobalt ammine complex, $CoCl_3.4NH_3$ when treated with $AgNO_3$ solution precipitates only one Cl^- ion although it has three Cl^- ion. Give the reaction also.	[2]	CO1	2
Q.1(b)	Explain the bonding in Hexafluoro ferrate (III) ion using valence bond theory.	[3]	CO1	2
Q.2(a)	Calculate the total pairing energy for $[Cr(H_2O)_6]^{+2}$ ion in high and low spin state. The mean pairing energy is 23500 cm^{-1}.	[2]	CO1	3
Q.2(b)	With the help of energy level diagram explain Z-in and Z-out for d^9 complex.	[3]	CO1	2
Q.3(a)	Give an example of keto-enol tautomerism. Why enolic form of β - diketones are more stable then the enolic form of monoketones.	[2]	CO2	4
Q.3(b)	Designate R & S description for each chiral centre of the following compounds.	[3]	CO2	4



(a)



(b)

Q.4(a)	Explain functional isomer. Write all the functional isomers possible for the molecular formulae C_3H_8O.	[2]	CO2	2
Q.4(b)	Explain the following terms: (a) Plane polarized light (b) Specific rotation (c) Racemic mixture	[3]	CO2	2
Q.5(a)	Why boat form of cyclohexane is less stable then Chair form. Give two reasons.	[2]	CO2	4
Q.5(b)	(i)How are the cations distributed in normal and inverse spinel ? (ii) Give the conditions for Metal to ligand Charge transfer (MLCT) to take place.	[1.5+1.5]	CO1	2

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