

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP2023)

CLASS: IMSc
BRANCH: CHEMISTRY

SEMESTER : IV
SESSION : SP2023

SUBJECT: CH207R1- INORGANIC CHEMISTRY-III

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
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		CO	BL
Q.1(a)	Which has greater conductivity and why: $\text{CoCl}_3\cdot 4\text{NH}_3$ or $\text{CoCl}_3\cdot 6\text{NH}_3$?	[2]	1 2
Q.1(b)	The octahedral complexes, $[\text{CoF}_6]^{3-}$ is known to be paramagnetic with two unpaired electrons. In contrast, the compound $[\text{Co}(\text{NH}_3)_6]^{3+}$ is diamagnetic. Suggest the hybridization schemes.	[3]	1 4
Q.2(a)	Show by means of a diagram how the pattern of d orbital splitting changes as an octahedral complex undergoes tetragonal distortion and eventually becomes a square planar complex	[2]	1 3
Q.2(b)	Answer the following questions related to the complex: $[\text{Fe}(\text{CN})_6]^{3-}$ (a) Figure out the oxidation number and the d count of Fe ? (b) Draw octahedral crystal field splitting diagram (c) Calculate the CFSE of the complex	[3]	1 2
Q.3(a)	Determine if NiFe_2O_4 is a normal or inverse Spinel ?	[2]	2 3
Q.3(b)	Taking $\text{Cu}(\text{II})$ d^9 system, explain the phenomenon of Z-in & Z-out.	[3]	2 2
Q.4(a)	What are the reasons for lead toxicity?	[2]	4 3
Q.4(b)	Discuss the role of copper in biological system.	[3]	4 1
Q.5(a)	Draw the structure of D-Penicillamine. In which case it is used?	[2]	4 1
Q.5(b)	Discuss uptake, transport and storage of iron.	[3]	4 2

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