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

CLASS: IMSc **SEMESTER: IV**
BRANCH: CHEMISTRY **SESSION : SP/2020**

SUBJECT: CH207 INORGANIC CHEMISTRY-III

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates may attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.

				CO	BL
Q1	(a)	Tetrahedral complexes always give high spin complexes. Explain	[2]	CO1	Knowledge + Analysis
Q1	(b)	$[FeF_6]^{3-}$ is paramagnetic w.r.t 5 electrons but $[Fe(CN)_6]^{3-}$ is paramagnetic w.r.t 1 electron. Justify with the help of hybridization theory.	[3]	CO1	Comprehension + Analysis
Q2	(a)	Explain why almost all cobalt (III) complexes are low spin octahedral, where $[CoF_6]^{3-}$ is the only exception?	[2]	CO1	Comprehension
Q2	(b)	State John Teller theorem. The x-ray crystal structure of $CuCl_2$ shows 4 Cu—Cl bond length at 2.30 A and 2 Cu—Cl bond length at 2.95 A. Explain the electronic arrangement of d electrons with justification.	[3]	CO1	Comprehension + Application
Q3	(a)	Write down the IUPAC nomenclature of $[Co(NH_3)_6]$ $[Cr(CN)_6]$ and $[CoCl(NO_2)(NH_3)_4]Cl$	[2]	CO2	Knowledge +Comprehension
Q3	(b)	Chelate effect is mainly an entropy effect. Justify	[3]	CO2	Knowledge + Application
Q4	(a)	In solution two geometries of $Ni(PPh_2Et)_2Br_2$ exists. Explain	[2]	CO2	Application
Q4	(b)	Draw the MO diagram for $[Co(NH_3)_6]^{3+}$.	[3]	CO2	Comprehension
Q5	(a)	How V_2O_3 can be obtained from V2O5? Draw the structure of [VO(acac)2].	[2]	CO3	Comprehension
Q5	(b)	Name one titanium ore. Write the two hydrate isomers of titanium(III) chloride mentioning their colour. What is the origin of the colour of the complexes?	[3]	CO3	Knowledge + Analysis

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