

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

CLASS: BSc
BRANCH: CHEMISTRY

SEMESTER : V
SESSION : MO/2025

SUBJECT: CH333 INORGANIC CHEMISTRY-I

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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		CO	BL
Q.1(a)	Outline the principles of refining metals by the following methods:	[4] 1	2
	i) Refining of Titanium by electrolytic Kroll Process		
	ii) Vapour Phase refining of Nickel and Zirconium		
Q.1(b)	(i) Explain the Hall-Heroult process for the isolation of Aluminium metal.	[6] 1	2
	(ii) Discuss the hydrometallurgical process of extraction of Silver and gold.		
Q.2(a)	In a carbonyl complex with linear CO-M-CO group, how will ν_{CO} (stretching frequency) change when a) one CO is replaced by Et_3N ; b) a positive charge is put on the complex; and c) a negative charge is placed on the complex.	[3] 2	3
Q.2(b)	Trimetallic complexes of phosphido bridges are well known. Assuming that the 18e rule is followed, postulate the structure of $[\text{Mn}(\mu\text{-PH}_2)(\text{CO})_4]_3$.	[3] 2	3
Q.2(c)	Discuss the synthesis of transition metal-alkyl complexes by i) transmetallation; and ii) oxidative addition.	[4] 2	2
Q.3(a)	Discuss the synthesis and characteristic features of Fischer and Schrock type metal carbene complexes.	[5] 3	2
Q.3(b)	Discuss the synthesis of i) Tebbe's reagent; ii) Grubbs' reagent and (ii) petasis reagent.	[5] 3	2
Q.4(a)	Discuss Faraday's method of determination of magnetic susceptibility.	[5] 4	2
Q.4(b)	Define Magnetic susceptibility and Magnetic moment.	[5] 4	2
Q.5(a)	For Acid hydrolysis of Co(III) complex, increase in chelation cause a decrease in reaction rate. Explain	[5] 5	3
Q.5(b)	Discuss the trans effect on the basis of resonance theory.	[5] 5	2

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