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

CLASS: IMSc **SEMESTER : III**
BRANCH: IMSC CHEMISTRY **SESSION : MO/2023**

SUBJECT: CH201R1 INORGANIC CHEMISTRY-II

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.

			CO	BL
Q.1(a)	Outline the principles of refining metals by the following methods: i) Refining of Titanium by electrolytic Kroll Process ii) Vapour Phase refining of Nickel and Zirconium	[5]	1	2
Q.1(b)	(i) Outline the principles of refining metals by a) Zone refining and b) Mond's Process. (ii) Explain the Hall-Heroult process for the isolation of Aluminium metal.	[5]	1	2
Q.2(a)	(i) Compare the aromaticity and total valance electron counts (TVE) of Benzene and boroxine. (ii) Write the reactions for a) complete and ii) partial hydrolysis of borazine.	[5]	2	3
Q.2(b)	(i) Explain the solvent system definition of acid and base. Write the auto-ionization of BrF_3 and predict whether BrF_2AsF_6 is acid or base if it is soluble in BrF_3 solvent. (i) How aqua acid is different from hydroxoacids and oxoacids? Give one example in each case.	[5]	2	2
Q.3(a)	What do you mean by inorganic benzene? Draw the structure of Basic beryllium acetate.	[5]	3	2
Q.3(b)	Discuss the structure and properties of the allotropes of carbon.	[5]	3	1
Q.4(a)	What are pseudohalogens? Discuss the structure of IF_7 and ClF_3.	[5]	4	2
Q.4(b)	Explain the preparation, properties and structure of XeF_6.	[5]	4	1
Q.5(a)	Identify the structure of x_1, y_1, x_2, and y_2 in the following reactions. (i) $3B(CH_3)_3 + 3NH_3 \xrightarrow[20\ atm]{320\text{-}340^0C} x_1 + 6CH_4$ $x_1 + 3H_2O \longrightarrow y_1 + 3NH_3$ (ii) $3B_2H_6 + 6NH_2CH_3 \xrightarrow{180\text{-}200^0C} x_2 + 12H_2$ $x_2 + 3H_2O \xrightarrow{60^0C} y_2 + 3H_2$	[5]	5	3
Q.5(b)	Write the reactions for the following transformation and identify the structure of reactants and product/(s) i) Hydrolysis of *cyclic-tetra*-phosphonitrilic chloride ii) Ammonolysis of *cyclic-tri*-phosphonitrilic chloride iii) The reaction of *cyclic-tri*-phosphonitrilic chloride with 1,2-dihydroxybenzene	[5]	5	3

:::::: 21/11/2023::::::E