MANIPAL ACADEMY of HIGHER EDUCATION
(Institution of Eminence Deemed to be University)

Reg.No.									

DEPARTMENT OF SCIENCES
I SEMESTER M.Sc. (Chemistry)
END SEMESTER MAKEUP EXAMINATIONS, DECEMBER 2023
INORGANIC CHEMISTRY -1 [CHM 5101]
(CHOICE BASED CREDIT SYSTEM - 2021)

Time: 3 Hours Date: 27/12/2023 MAX. MARKS: 50

Note (i) Answer ALL questions
(ii) Draw diagrams, and write equations wherever necessary

		Marks	CO	BL
1A	(i)Explain the hybridization of the BF_3 molecule	2	1	2
	(ii)Find out the number of lone pairs of electrons and geometry of the following molecules (a)NO_3^- (b) H_2S (c) NH_4^+	3	1	3
1B	Explain and compare the stabilities of N_2, O_2^- and F_2 molecules by using MOT theory.	3	1	2
1C	The dipole moment of the HCl molecule is 0.816 and the bond length of the molecule is 1A°. Calculate its percentage ionic character.	2	1	2
2A	(i) Justify your answer for the following statements:			
	(a) The ice cubes float on the surface of water.	2	1	3
	(b) The melting point of Al metal is higher than Na metal.	1	1	2
	(ii) Compare the absorption spectral properties of actinides with lanthanides.	2	3	2
2B	Compare the magnetic properties of 3d, 4d, and 5d block element complexes.	3	3	2
2C	Give reasons for the following:			
	(i)$KMnO_4$ is dark purple in color.	1	3	3
	(ii) The atomic size of copper is lower than that of zinc.	1	3	2
3A	(i)Explain the extraction of lanthanides by ion exchange method.	3	3	2
	(ii) Arrange the following molecules in the ascending order of their covalent character and justify your answer. RbCl, LiCl, KCl, NaCl	2	1	3
3B	Write the conditions that favours the formation of ammonia gas along with reaction involved in Haber's process? Why is the boiling point of PH_3 lesser than NH_3?	3	4	3
3C	What are the important characteristics of pseudohalogen?	2	4	2

4A	(i) Explain the types of acid base titration with an example. (ii) The normality of a solution of potassium hydroxide as determined by an analyst by FOUR different titrations are found to be 0.4038, 0.4049, 0.4042, and 0.4039. Calculate the median, average deviation, standard deviation and coefficient of variation.	5	2	3
4B	Explain precipitation titration with an example? A 60mL of 0.1M HCl is titrated against 0.1N NaOH. Calculate the pH at the start of titration and after addition of 10, 50 and 60 mL of NaOH?	3	2	3
4C	Explain the comparison between classical and instrumental methods.	2	2	2
5A	(i) Describe the large scale of hydrogen by Bosch process with necessary conditions. (ii) How is lithium hydride prepared in laboratory? Write any two properties and its uses.	5	4	2
5B	Explain the basic structure and classification of silicates with examples.	3	4	2
5C	Arrange the following triatomic species in the increasing order of bond angle with the appropriate reason. NO_2, NO_2^-, $NO2^+$	2	4	3

① NO_2^-, NO_2, NO_2^+