LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – **APRIL 2025**

UCH1MC01 – BASIC CONCEPTS IN INORGANIC CHEMISTRY

Date: 23-04-2025 Dept. No. Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

		SECTION A - K1 & K2 (CO1)	
Q.No	Levels	**Answer ALL the Questions**	**(10 x 2 = 20)**
1	K1	Give any one example each for polar and non-polar solvents.	
2		Metallic conduction decreases on increasing temperature. Why?	
3		Bond order of NO is lesser than NO^+ ion. Why?	
4		State octet rule.	
5		Define unit cell.	
6	K2	State Hund's rule of maximum multiplicity.	
7		Mention the bond order and magnetic nature of N_2.	
8		Why does ice float on water?	
9		Predict the % of *s* and *p* character in sp^2 hybridized orbitals.	
10		What are F centres?	
		SECTION B – K3 & K4 (CO2)	
		Answer ALL the Questions	**(4 x 10 = 40)**
11	K3	(a) The relative energies of the atomic orbitals vary with the atomic numbers. Explain.	(5)
		(b) Explain the shielding effect of electrons.	(5)
		[OR]	
12		Explain the factors that govern a transition from electro-valency to covalency.	(10)
13		Draw the MO diagram of O_2 molecule and explain its bond order and magnetic property.	(10)
		[OR]	
14		(a) Explain the complex formation reactions of liquid ammonia.	(5)
		(b) Discuss the Pearson's concept of HSAB.	(5)
15	K4	(a) What is meant by ionization potential? What are the factors that influence this property?	(4)
		(b) Explain any two scales used to measure electronegativity.	(6)
		[OR]	
16		(a) Mention the postulates of VSEPR theory.	(5)
		(b) Predict the hybridisation, geometry and structure of XeO_3 and SF_4.	(5)
17		(a) Describe the hexagonal close packing arrangements of crystals.	(5)
		(b) Explain the band theory of metals.	(5)
		[OR]	
18		Account for the following.	(3+3+4)
		(a) Ammonia is gas whereas water is liquid at room temperature.	
		(b) Hydrogen sulphide is a gas whereas water is a liquid at room temperature.	
		(c) HF is liquid whereas HCl is a gas at room temperature.	

SECTION C – K5 & K6 (CO3)			
	Answer ALL the Questions		**(2 x 20 = 40)**
19	K5	(a) Write Schrodinger's and de Broglie's equations and mention the terms in it.	(5)
		(b) Lithium shows greater resemblance with magnesium than with other alkali metals. Explain.	(5)
		(c) Explain the periodicity of ionic and covalent radii.	(10)
		[OR]	
20		Explain the hybridization and geometry of the following molecules $SnCl_2$, NH_3, CH_4, PCl_5, and SF_6.	(20)
21	K6	(a) Describe the band theory of metals and semiconductors.	(10)
		(b) Write examples with equations for the following reactions where liquid ammonia is used as a solvent: (i) acid-base (ii) precipitation	(10)
		[OR]	
22		(a) Draw the unit cell of CsCl and wurtzite and explain their crystal structure.	(10)
		(b) Explain the stoichiometric types of defects in crystals.	(10)
