LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – **APRIL 2024**

PCH1MC02 – CONCEPTS IN INORGANIC CHEMISTRY

Date: 05-04-2024 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A – K1 (CO1)	
	Answer ALL the questions	**(5 x 1 = 5)**
1	**Answer the following**	
a)	Predict the number of spherical nodal surfaces arising from a radial function for 4p and 5d orbitals.	
b)	Calculate the total number of atoms present in FCC unit cell.	
c)	Write the molecular geometry obtained from AB_3E_2 molecule where E represents the lone pair of electrons.	
d)	What are barbiturates?	
e)	Name the coordination compound : $[Pt(NH_3)_4Br_2]Br_2$	
	SECTION A – K2 (CO1)	
	Answer ALL the questions	**(5 x 1 = 5)**
2	**Answer the following**	
a)	Notify the variation in electrode potential of Lithium both in aquous medium and non aqueous medium.	
b)	What are schottky defects?	
c)	Write the hybridization and geometry of PF_5.	
d)	How is a redox reaction using BF_3 as a solvent carried out?	
e)	Formulate the complex compound sodium pentacyano nitrosyl sulphido ferrate (III).	
	SECTION B – K3 (CO2)	
	Answer any THREE of the following	**(3 x 10 = 30)**
3	Determine the ground state term symbol for ^{7}N and ^{26}Fe.	
4	What is diffusion? Articulate any types of diffusion with mechanism.	
5	Draw and explain the M.O. diagram of NO and CO_3^{2-}.	
6	Demonstrate the effect of any four types of covalent interactions in supramolecules.	
7	Explain the factors affecting the chelate effect.	
	SECTION C – K4 (CO3)	
	Answer any TWO of the following	**(2 x 12.5 = 25)**
8	Determine the value of $Z_{effective}$ for Boron and Beryllium	
9	Draw and deduce the crystal structure of NaCl and CaF_2.	
10	State Bent rule. Explain with an example.	
11	Discuss any four types of structural isomerism in coordination compounds	

	SECTION D – K5 (CO4)	
	Answer any ONE of the following	**(1 x 15 = 15)**
12	a. Explain the determination of composition of a complex species and formation constants. b. Write a note on masking and demasking agents.	(8+7)
13	a. Draw and discuss the crystal structure of NaCl. b. Predict the hybridization and geometry of XeF_4.	(8+7)
	SECTION E – K6 (CO5)	
	Answer any ONE of the following	**(1 x 20 = 20)**
14	a. Explain Zeeman Effect. b. Describe the applications of ORD and CD in detail. c. Discuss the role of coordination compounds in the qualitative detection of Co^{2+} and Fe^{3+}.	(5+10+5)
15	a. Derive the relationship between *a* and *r* in BCC unit cell. b. Explain the chemical reactions of high and room temperature molten salts with suitable examples. c. Discuss the hybridization and geometry of I_3^-.	(5+10+5)
