

--	--	--	--	--	--	--	--	--	--



GIET UNIVERSITY, GUNUPUR – 765022
M. Sc. (First Semester) Examinations, March – 2023
22CHPC102 – Inorganic Chemistry-I
(Chemistry)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)****Q.1. Answer all questions**

	CO#	Blooms Level
a. Predict the hybridization of NH ₃ and PCl ₅ .	CO1	K2
b. Define crystal field stabilization energy. Calculate its value for the <i>d⁶ low spin</i> octahedral.	CO2	K2
c. Discuss the <i>sp³d³</i> hybridization.	CO1	K1
d. $\lambda = 0.2$. Calculate the % occupancy in A ²⁺ in tetrahedral void and A ²⁺ in octahedral void.	CO2	K2
e. Predicting the structure and spinels of CO ₃ O ₄ and Fe ₃ O ₄ .	CO2	K2
f. Predict the bond order in C ₂ molecule with the help of MO energy level diagram.	CO1	K2
g. What is Magic number ?	CO4	K1
h. Define nuclear fusion ?	CO4	K1
i. Define magnetic susceptibility ?	CO3	K1
j. Predict BeH ₂ molecules stable in linear or bent arrangement.	CO1	K2

PART – B**(10 x 5 = 50 Marks)**Answer ANY FIVE questions

	Marks	CO#	Blooms Level
2. a. Construct the wave functions for <i>sp²</i> .	10	CO1	K2
3.a. Formation of HF molecule using Linnett theory	5	CO1	K2
b. B ₂ molecule is paramagnetic or diamagnetic? Discuss.	5	CO1	K2
4. a. Explain [Fe (H ₂ O) ₆] ³⁺ is strongly paramagnetic whereas [Fe (CN) ₆] ³⁻ is weakly paramagnetic.	5	CO2	K2
b. Draw and discuss the qualitative correlation diagrams for the following systems: <i>d¹</i> octahedral and <i>d⁸</i> tetrahedral	5	CO3	K2
5.a. Discuss the electronic spectra of [Co(H ₂ O) ₆] ²⁺ , [FeCl ₄] ²⁻ and [CoCl ₄] ²⁻ .	6	CO3	K2
b. What are the important limitations of valence bond theory?	4	CO2	K2
6. a. Which complex has larger crystal field splitting: [Co (CN) ₆] ³⁻ or [Co (NH ₃) ₆] ³⁺	5	CO2	K1
b. Explain the mass defect and binding energy of a nucleus.	5	CO4	K1
7.a. Write down the expression for the law of radioactivity	6	CO4	K1
b. What is meant by disintegration constant?	4	CO4	K1
8. a. What is valence bond theory?	2	CO1	K2
b. Explain the potential energy diagram for H ₂ molecule.	8	CO1	K1

--- End of Paper ---