

Roll No.

Jamia Hamdard
Department of chemistry
School of Chemical and Life Sciences (SCLS)
M.Sc. Chemistry, Semester-I
Supplementary Examination 2024

Paper Name: Inorganic Chemistry-I
Time: 2:30 hours

Paper Code: MCHCC-103
Maximum Marks: 60

Note: This paper has three sections A, B and C. Attempt all the sections.

Section A: Answer all questions; **Section B:** Answer any two out of four questions; **Section C:** Answer all questions and each question has an internal choice.

Abbreviations used.

CLO-Course Learning Outcome, PLO-Program Learning Outcome, BTL-Bloom Taxonomy Level, BTL1-Remember, BTL2-Understand, BTL3-Apply, BTL4-Analyse, BTL5-Evaluate, BTL6-Create.

Section A				
Attempt all questions		1X15 = 15 marks		
Q.No.	Question	BTL	PLO	CLO
A1	Define the van der Waals radius.	1-2	1	2
A2	Define the Ring Whizzer.	1-2	1	2
A3	Discuss in brief the Berry pseudorotation mechanism.	2-3	2	3
A4	What is the geometry and hybridization of SF ₄ ?	2-3	2	3
A5	Discuss the Lewis acid-base concept in brief.	1-2	1	2
A6	Write the example of any two aprotic solvents.	1-2	1	2
A7	Write the hybridization and geometry of diamond.	2-3	2	3
A8	Find out the structure of B ₄ H ₈ .	2-3	2	2
A9	Calculate the total number of electrons in B ₅ H ₉ .	2-3	3	3
A10	Calculate the STYX number in B ₂ H ₆ .	2-3	3	3
A11	Write the denticity of ethylene diamine.	1-2	2	2
A12	Calculate the effective atomic number of [Ni(NH ₃) ₆] ²⁺ .	2-4	3	4
A13	Write the electronic configuration of Ce ⁴⁺ .	1-2	1	2
A14	Calculate the number of microstates in Oxygen atom.	3-5	5	5
A15	Calculate the magnetic moment of [NiCl ₄] ²⁻ .	3-5	4	4

Section B				
Attempt any two out of four questions		10X2 = 20 marks		
Q.No.	Question	BTL	PLO	CLO
B1	Define the non-aqueous solvents. Discuss the properties of H ₂ SO ₄ as a solvent.	2-3	2	2

B2	Describe the valence shell electron pair repulsion (VSEPR) theory. Calculate the hybridization and draw the geometry of Cl_2O , NF_3 and PCl_2F_3 .	3-5	4	5
B3	Describe the Jahn-Teller distortion. Draw the orbital energy diagram in the case of z-elongation and z-compression.	3-4	3	4
B4	Describe the ferredoxin iron-sulfur proteins.	1-3	2	3

Section C				
Attempt all questions and each question has an internal choice		5X5 = 25 marks		
Q.No.	Question	BTL	PLO	CLO
C1	Describe the Bent rule with the help of suitable examples. OR Define the ionization energy. Discuss the periodic variation and application of ionization energy.	2-3	2	3
C2	According to valence bond theory discuss the properties of $[\text{Fe}(\text{NH}_3)_6]^{3+}$ and $[\text{Fe}(\text{NH}_3)_6]^{2+}$. OR Calculate the crystal field stabilization energy of $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$.	3-5	4	4
C3	Draw the molecular orbital diagram of $[\text{Cr}(\text{NH}_3)_6]^{2+}$. OR Describe the crystal field splitting of d-orbitals in the tetrahedral complex.	4-6	4	5
C4	Discuss the cis and trans synthesis of $[\text{Pt}(\text{NH}_3)(\text{NO}_2)\text{Cl}_2]^-$. OR Describe the Bohr's effect.	2-3	2	3
C5	Describe the cooperative effect. OR Discuss the differences between oxy- and deoxy-hemoglobin.	2-3	2	3