

8. (a) Explain in detail the S_N^1 mechanism of substitution reaction For Octahedral (Oh) complexes.
- (b) Discuss the mechanism of racemization in optically active Octahedral (Oh) complexes.
9. (a) Discuss crystal field effect on S_N1 and S_N^2 path in nucleophilic substitution reaction with examples.
- (b) Explain the term electrophilic attack on ligands.

(PG507)

Roll No.

S.C.No.—701101

M. Sc. EXAMINATION, 2021

(First Semester)

(Main/Re-appear) (2020/2019)

CHEMISTRY

19CHE101

Inorganic Chemistry-I

Time : 3 Hours

Maximum Marks : 80

Note : Attempt any *Four* questions. All questions carry equal marks.

1. Explain in brief the following :

- (a) Chelate effect
- (b) Rotation – Reflection (S_n)
- (c) Point group in N_2O and S_8
- (d) Higher energy d orbital in TBP, SP and PBP

- (e) Dissociative mechanism
- (f) Inert complexes
- (g) Base hydrolysis
- (h) Formation constant.
2. (a) Write down the geometry and point group of given molecules PCl_4F , SF_4 , H_3PO_4 , Chair form of cyclohexane.
- (b) What is Improper Rotation ? Explain the S_2 and S_4 with example.
3. (a) Explain the Pure Rotation. Also define C_{2V} , C_{3V} , D_{3h} , D_{4h} and D_{2d} with example.
- (b) Explain all the terms :
- (i) Dihedral angle
- (ii) Symmetry operation
- (iii) Rotation–Inversion axes.
4. (a) Derive relation between stepwise and overall stability constants.
- (b) Explain $d\pi-p\pi$ bonding with example.
- (c) Define energetics of hybridization.
5. (a) How does the nature of ligands affect the stability of the complexes ?
- (b) Write down the limitation of VESPR theory.
- (c) Write Bent Rule with example.
6. Draw the molecular diagram of Octahedral (Oh) and Tetrahedral (Td) complexes (Sigma and Pi bonding) with explanation.
7. (a) Explain John teller distortion for octahedral compounds.
- (b) Find out the CFSE of given compounds :
- (i) $[\text{Fe}(\text{CO})_6]^{2+}$
- (ii) $[\text{Ru}(\text{H}_2\text{O})_6]^{2+}$
- (iii) $[\text{Cr}(\text{en})_3]$
- (iv) $[\text{Ni}(\text{CO})_4]$.