A-882

Total Pages : 3 **Roll No. ----------**

MCH-501

Inorganic Chemistry-I

M.Sc. Chemistry (MSCCH)

1st Semester Examination 2024 (June)

Time: 2:00 hrs Max. Marks: 35

Note : This paper is of Thirty Five (35) marks divided into Two (02) Section A and B. Attempt the questions contained in these sections according to the detailed given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

P.T.O.

Section-A (Long-Answer-Type Questions)

Note : Section 'A' contains Five (05) long-answer-type questions of Nine and Half (9½) marks each. Learners are required to answer any Two (02) questions only.

[2x9½=19]

Q.1. What is the difference between symmetry elements and symmetry operations? How many kinds of symmetry operations are there?

Q.2. State the postulates of crystal field theory (CFT). How are the d-electrons distributed between various energy levels in octahedral and tetrahedral fields?

Q.3. Discuss the salient features of molecular orbital theory. Draw the molecular orbital diagrams of an octahedral complex involving:

a. Only σ - bonding

b. Both σ and π -bonding

Q.4. State Grand Orthogonality Theorem (GOT) and derive the character table for C_3v point group.

Q.5. Give the example of molecules where their molecular plane is identified with

a. Vertical plane and

b. Horizontal plane and draw their character table

Section-B (Short-Answer-Type Questions)

Note : Section 'B' contains Eight (08) short-answer-type questions of Four (04) marks each. Learners are required to answer any Four (04) questions only.

[4x4=16]

Q.1. Write a note on abelian and non-abelian mathematical rules of group theory.

Q.2. Describe the factors which influence the magnitude of Crystal Field Splitting.

Q.3. Draw Orgel energy diagrams in octahedral field for d^1 and d^9 electronic system.

Q.4. Relate the symmetry of molecule with optical activity.

Q.5. How does the CFT explain colour of co-ordination compounds?

Q.6. Draw and explain orgel diagram of d^8 ion in tetrahedral field.

Q.7. Determine the symmetry point group of the following:

a. Benzene

b. $Co(NH_3)_4Cl_2$ (trans).

c. P-Dichlorobenzene

d. BF_3

Q.8. Write about the electronic spectra given by transition metal complexes.

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