

**K-384**

Total Pages : 3

Roll No. ....

## **MSCCH-504**

### **Group Theory, Instrumentation Chemistry & Computer for Chemist**

M.Sc. Chemistry (MSCCH)

1st Semester Examination, 2023 (Dec.)

**Time : 2 Hours]**

**Max. Marks : 70**

**Note :** This paper is of Seventy (70) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein. Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

#### **SECTION-A**

#### **(Long Answer Type Questions)**

**Note :** Section 'A' contains Five (05) long answer type questions of Nineteen (19) marks each. Learners are required to answer any Two (02) questions only.

(2×19=38)

1. Define the term symmetry element and operation. Explain the different types of symmetry present in the molecules with suitable examples.
2. What is group representation? Discuss the reducible and irreducible representation.
3. What is matrix? Write the matrix for Identity (E), rotation ( $C_n$ ) and reflection ( $\sigma$ ) symmetry elements.
4. Write the explanatory notes on TLC and ion exchange chromatography.
5. Discuss the Lave's method and Debye-Schener method of X-Ray structural analysis of crystals.

## SECTION-B

### (Short Answer Type Questions)

**Note :** Section 'B' contains Eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any Four (04) questions only. (4×8=32)

1. Discuss the Ramchandran diagram.
2. Discuss the different types of detector used in the gas chromatography.

3. Differentiate between accuracy and precision, low level and high level computer languages with examples.
  4. Explain the different generation of computers in details.
  5. Write a note on radiometric titrations and radiochromatography.
  6. Explain algorithm and flow chart with example.
  7. Discuss the principle and instrumentation of HPLC.
  8. Discuss the point group present in the  $\text{NH}_3$ ,  $\text{H}_2\text{O}$ ,  $\text{BF}_3$  and Benzene molecules.
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