

**A-0552**

**Total Pages : 3**

**Roll No. ....**

**MSCCH-504**

**M.Sc. CHEMISTRY (MSCCH)**

**(Group Theory, Instrumentation Chemistry  
& Computer for Chemist)**

**1st Semester Examination, Session December 2024**

**Time : 2:00 Hrs.**

**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      2×19=38**

**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.

1. Provide the examples of different point groups, and explain how to determine the point group of a molecule.
2. Explain the Bragg's method for determining the crystal structure of a material. How does this technique provide insights into the arrangement of atoms within a crystal ?
3. What is the basic principle of Gas liquid chromatography, and write its Applications ?
4. Provide a detailed explanation of the different generations of computers and their distinguishing characteristics.
5. Write short notes on the following :
  - (i) MATLAB
  - (ii) Radioactive decay
  - (iii) Application of electron diffraction

### **Section–B**

**Short Answer Type Questions**      4×8=32

**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.

1. Write point group and symmetry operations of the following :
  - (i)  $\text{NH}_3$
  - (ii)  $\text{CCl}_4$
2. Describe the process and underlying mechanism of paper chromatography, for separating and identifying chemical substances.
3. Explain memory and different types of memory in detail.
4. Explain the concept of error analysis and its importance in scientific measurements.
5. What are the general characteristics of Flame ionization detectors ? Write about their applications.
6. Write the notes on radiometric titrations and radio chromatography.
7. Write application of group theory in IR and Raman Spectroscopy.
8. Write short notes on the following :
  - (i) HPLC
  - (ii) pH titration

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