

# S-462

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Roll No. ....

## MSCCH-504

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

M.Sc. Chemistry (MSCCH)

1st Semester Examination, 2022 (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.

### 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. Explain the following :

- Algorithm and its properties.
- Character table for ammonia molecule.

2. Derive Bragg's equation. Discuss any two method of X-ray structural analysis of crystals.
3. (a) Discuss the principle and applications of thin layer chromatography (TLC).  
(b) Explain different steps involved in paper chromatography.
4. (a) Describe the theory of gas chromatography. Discuss Van Deemter equation.  
(b) Discuss isotope dilution technique in detail along with its advantages.
5. Explain the following :
  - (a) Classification of computers.
  - (b) WINDOWS and MATLAB.

## **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. Write notes on the following :
  - (a) Axis of symmetry.
  - (b) Reducible and irreducible representation.

2. (a) Explain Ramchandran diagram.  
(b) Discuss symmetry operations and point group of water molecule.
  3. Describe the principle of chromatography. Give the classification of chromatographic methods in detail.
  4. Write notes on the following :  
(a) Ion- exchange chromatography.  
(b) Flame ionization detector (FID).
  5. (a) Discuss the types of error in data analysis.  
(b) Write short note on least square analysis method.
  6. Explain input and output devices in detail with examples.
  7. (a) What do you mean by the term RAM AND ROM.  
\* (b) Define flowchart and explain the symbols used in flowchart.
  8. Explain van der Waals equation and generate C language program that calculate the pressure of a gas when all other quantities are given.
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