P-67

Roll No. ....

MSCCH-504

Group Theory, Instrumentation Chemistry and Computer for Chemist

M.Sc. Chemistry (MSCCH)

1st Semester Examination, 2023 (June)

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 answer 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. (a) Define symmetry operation. Explain elements of symmetry in detail with examples.

(b)   Discuss the postulates of Great Orthogonality theorem.

2.   Write notes on the following :

(a)   Flowchart.

(b)   WINDOWS.

(c)   DOS.

(d)   MS-WORD.

3.   (a)   Discuss the mechanism, types and applications of paper chromatography.

(b)   Explain van der Waals equation and generate C language program that calculate the pressure of a gas when all other quantities are given.

4.   Explain the following :

(a)   High performance liquid chromatography (HPLC).

(b)   Classification of computers.

5.   (a)   Explain the principle of chromatography along with the classification of chromatography.

(b)   Describe ion-exchange chromatography along with applications.

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 applications of group theory in I.R. and Raman spectroscopy.

2. (a) Discuss symmetry operations and point group of ammonia molecule.

   (b) Describe Laue's method for structure determination of crystals.

3. Explain the following :

   (a) Miller indices.

   (b) Ramchandran diagram.

4. Discuss the applications of thin layer chromatography (TLC) and gas-liquid chromatography (GLC).

5. (a) Explain the concept of HEPT and discuss the factors that affects HEPT.

   (b) Describe least square analysis method.

6. Write notes on the following :

    (a)   Thermal conductivity detector (TCD).

    (b)   Isotope dilution technique.

7.   (a)   Describe input and output devices in detail with examples.

    (b)   Explain primary and secondary memory of a computer.

8.   (a)   Define algorithm and discuss its properties.

    (b)   Write short note on "*Character table for water molecule*".

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