

A-0412

Total Pages : 3

Roll No.

MSCCH-601

M.SC. CHEMISTRY (MSCCH)

(Solid State and Materials Chemistry)

Examination, June 2025

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. What are Bravais lattices ? Discuss seven crystal systems and fourteen space lattices in crystal structure.
2. What are different types of defects ? Explain Schottky and Frenkel defect in detail.
3. Explain the following :
 - (a) Bergers vector
 - (b) Fullerenes
 - (c) Liquid crystals
4. What are sensors ? Give their characteristics and types.
5. What are surface active agents (surfactants), and what are their main types ? Describe how surfactants function at the molecular level to reduce surface tension and facilitate processes like cleaning, emulsification, and foam formation.

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. Discuss the thermodynamics of micellization.
2. Describe optical properties of liquid crystals.

3. Write short note on the following :
 - (a) Laue equations
 - (b) Screw axes
4. What are molecular rectifiers and transistors. Discuss their theories with suitable examples.
5. Write note on the following :
 - (a) Artificial photosynthesis
 - (b) Kraft temperature
6. Discuss the electronic properties and band theories of semiconductors.
7. Discuss the magnetism in organic materials.
8. Write note on miller indices.
