A–065

Total Pages : 3 **Roll No. .....**

MSCCH–601

M.Sc. CHEMISTRY (MSCCH)

(Solid State and Materials Chemistry)

3rd Semester Examination, 2024 (June)

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. Explain the thermodynamics of Schottky and Frenkel defects.

2. What are the advantages of solid-state reactions ? Describe their kinetics and rate law expressions.

3. Write a note on the following

   (a) Optical properties of liquid crystals

   (b) X-ray diffraction

   (c) Thermodynamics of micellization

   (d) liquid crystal

4. Explain conduction in intrinsic and extrinsic semiconductors. Describe the temperature dependence of charge carrier concentration and drift mobility.

5. How will you determine particle size by X-ray technology ?

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 electronic properties and band theory of semiconductors.
2. How do point defects change material properties ? Explain.
3. Explain why polyacetylene is an electrical conductor whereas polyethene is not.
4. Deduce Bragg's equation and find the crystal's distance between successive lattice planes.
5. Describe the important applications of surfactants.
6. How do defects affect material properties ?
7. Calculate the number of atoms in a cubic unit cell having one atom on each corner and two atoms on each body diagonal.
8. Write about active and passive sensor.

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