USN | | | | | | | | | | **206BS003**

Ph.D./M.S. (Engg.) by Research Degree Examination, Aug./Sep. 2023
Solid State Chemistry

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain the general principles to solid state chemistry, importance and significance. **(10 Marks)**
b. Describe the experimental procedure of solid state chemistry. **(10 Marks)**

OR

2 a. Explain the co-precipitation as a precursor to solid state reactions. **(10 Marks)**
b. Describe the kinetics of solid state reactions, importance and their significances. **(10 Marks)**

Module-2

3 a. What is a crystal defect? Explain. **(05 Marks)**
b. Describe non-stoichiometry of crystals defects. **(05 Marks)**
c. Explain about perfect and imperfect crystals. **(05 Marks)**
d. Write a short note on Frenkel defects. **(05 Marks)**

OR

4 a. Distinguish between intrinsic and extrinsic defects. **(05 Marks)**
b. Explain the Vacancies-Schottky defects. **(05 Marks)**
c. Describe the thermodynamics of Schottky and Frenkel defects formation. **(05 Marks)**
d. Write short notes on colour centres. **(05 Marks)**

Module-3

5 a. Explain the metal insulators and semiconductors. **(05 Marks)**
b. Explain the electronic structure of solids band theory band structure of metals, insulators and semiconductors. **(10 Marks)**
c. Distinguish between intrinsic and extrinsic semiconductors. **(05 Marks)**

OR

6 a. What is doping of semiconductors? Explain the p-n (diode) junction. **(05 Marks)**
b. Write a short note on super conductors, importance and significances. **(05 Marks)**
c. Explain the optical properties, application of optical electron microscopy. **(05 Marks)**
d. Describe the mechanism of ferro and anti-ferro magnetic ordering super exchange. **(05 Marks)**

Module-4

7 a. Explain the electrically conducting solids. **(10 Marks)**
b. Describe the organic change transfer complex. **(10 Marks)**

OR

8 a. Explain organic metals. **(10 Marks)**
b. Write a short note on "new super conductors" importance to organic solids/metals, significance. **(10 Marks)**

Module-5

9	a.	What are liquid crystals? Explain.	**(05 Marks)**
	b.	Explain the different types of liquid crystals.	**(10 Marks)**
	c.	Write a short note on “Anti-Ferro Electric”.	**(05 Marks)**

OR

10	a.	Describe the various theories of liquid crystals.	**(10 Marks)**
	b.	Explain the liquid crystal display.	**(05 Marks)**
	c.	What are new materials? Explain importance and their significances.	**(05 Marks)**

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