Reg. No. ☐☐☐☐☐☐☐☐☐☐

PHS 556

IV Semester M.Sc. Degree Examination, Sept./Oct. 2022
PHYSICS
Condensed Matter Physics – IV
(CBCS)

Time : 3 Hours   Max. Marks : 70

Note : *Answer **any four full** questions, choosing **one** from each Part (**I** to **IV**) and Part – **V** is **compulsory**.*

PART – I

1. a) Give a brief account on classification of point defects in crystals. **5**

   b) Using a pictorial representation, distinguish between Schottky and Frenkel defects. Obtain an equilibrium concentration for Frenkel defects. **10**

2. a) What are dislocations ? Explain edge and screw dislocations. **6**

   b) Explain the terms : **9**
      i) thermoluminescence
      ii) electroluminescence.

PART – II

3. a) State the salient features of sputter deposition of thin films and distinguish between the DC and RF sputtering techniques. **10**

   b) Give a brief account on spin coating of thin films. **5**

4. a) Explain any one of the methods of estimation of thin film thickness. **6**

   b) Discuss the applications of thin films in optical and magnetic recording. **9**

PART – III

5. a) Discuss the thermodynamics of superconductivity. **9**

   b) Explain the magnetic flux quantization in a superconducting ring. **6**

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6. a) Explain the theory of ac Josephson effect and show that how this can be utilized in a precision to determine the value of $\hbar/e$ **9**

   b) Write a note on SQUIDS. **6**

PART – IV

7. a) Discuss the classification of polymers based on molecular forces. **7**

   b) Distinguish between the number average and the weight average molecular weights in polymers. **8**

8. a) Explain with schematic the nematic, smectic and cholesteric liquid crystalline phases. **9**

   b) Write a note on the applications of liquid crystals in displays. **6**

PART – V

9. Answer **any two** questions :

   a) Give a brief account on polorons and excitons in ionic crystals. **5**

   b) Explain the nucleation and growth mechanisms of thin films. **5**

   c) Write a note on high Tc superconductor. **5**

   d) Explain the process of condensation polymerization. **5**

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