M.Sc. DEGREE EXAMINATION, NOVEMBER 2017

FIRST SEMESTER

Branch – Physics

Paper III — SOLID STATE PHYSICS

(New Syllabus)

Time : 3 Hours
Max. Marks : 70

PART – A

Answer any FOUR of the following. All questions carry equal marks.

(Marks : 4 × 5 marks = 20 marks)

1. What are the phonons and explain the their properties?

2. Write note on elastic properties and lattice.

3. Explain the Lorentz number.

4. What is the Bloch Function?

5. Explain the carrier mobility.

6. Explain the Hall Effect.

7. What is the Meissener Effect?

8. Explain the penetration depth.

PART – B

Answer ALL questions. All questions carry equal marks.

(Marks : 4 × 12½ marks = 50 marks)

9. (a) Describe the diatonic one dimensional infinitely long lattice vibrations.

Or

(b) Discuss lattice energy calculation for ionic and Vander Waals crystals.

10. (a) Describe the Kroning-penny models for periodic square well potential of electron transport.

Or

(b) Discuss the formulation of Boltzmann transport equation of its relaxation and distribution function.

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11. (a) Derive the expression for position of Fermi level and carrier concentrations of n-type semiconductor.

Or

(b) Derive the continuity equation for drift and diffusion of Einstein relations.

12. (a) Describe the high Tc super conductor of its synthesis properties and applications.

Or

(b) Discuss the two fluid models and London equations.

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