Reg. No. : | | | | | | | | | | | |

T 3429

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Second Semester

(Regulation 2004)

Electrical and Electronics Engineering

PH 1151 — PHYSICS — II

(Common to Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Write down any four drawbacks of classical free electron theory.

2. Define Fermi energy in metals.

3. The electrical conductivity of germanium at 20°C is 2 mho/m. What is the conductivity at 40°C if the band gap of germanium is 0.72 eV?

4. Mention any four properties of superconductors.

5. What is diamagnetism?

6. Write down any two examples of ferrite materials that are used as magnetic storage memories.

7. Write a note on electronic polarization.

8. Define fluorescence.

9. What are nano-phase materials?

10. Write down any four IC packaging materials.

PART B — (5 × 16 = 80 marks)

11. (a) Derive expressions for the thermal and electrical conductivities of metals. (8 + 8)

Or

(b) (i) Derive an expression for density of states. (12)

(ii) Explain the origin of band gap in solids. (4)

12. (a) (i) Derive an expression for density of electrons in intrinsic semiconductors. (12)

(ii) Discuss the variation of Fermi level with temperature in semi conducting materials. (4)

Or

(b) Give the theory of Hall effect. How will you determine Hall coefficient of a semi conducting material? (8 + 8)

13. (a) Discuss Langevin's theory of paramagnetism and obtain an expression for paramagnetic susceptibility. (16)

Or

(b) Discuss in detail various types of magnetic storage media. (16)

14. (a) (i) Obtain an expression for Lorentz field in a dielectric material. (12)

(ii) Deduce Classius Mossotti relation. (4)

Or

(b) Explain in detail with the help of a neat diagram the dynamic scattering display and twisted nematic display in liquid crystals. (8 + 8)

15. (a) (i) Explain in detail the use of metallic glasses as transformer core materials. (8)

(ii) Write short note on shape memory alloys. (8)

Or

(b) (i) Discuss in detail the optical mixing. (8)

(ii) Write short note on solitons. (8)