Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 72093

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2015.

Second Semester

Civil Engineering

PH 2161/PH 23/080040002 — ENGINEERING PHYSICS – II
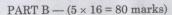
(Common to all branches)

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Give the statement of Wiedemann-Franz law.

2. Mention two drawbacks of classical free electron theory of metals.

3. What is acceptor energy level in semiconductor?

4. How the Fermi level changes its position with the impurity concentration in P – type semiconductors?

5. What is Bohr magneton?

6. What are the advantages of SQUID?

7. What is meant by relaxation frequency in dielectric materials?

8. What is dielectric loss in a dielectric materials?

9. What is pseudo elasticity in shape memory alloys?

10. Give four properties of carbon nano tubes.

PART B — (5 × 16 = 80 marks)

11. (a) Based on Drude and Lorentz classical free electron theory derive the expression for electrical conductivity and thermal conductivity of a metal. (16)

Or

(b) Derive the expression for density of energy states. (16)

12. (a) (i) What is Fermi level in intrinsic semiconductor? And discuss the variation of Fermi level in intrinsic semiconductor with temperature. (8)

(ii) Derive the expression for electrical conductivity in an intrinsic semiconductor and explain the variation of it with temperature. (8)

Or

(b) (i) How the Fermi level changes its position with the temperature and impurity concentration in N — type semiconductors? (6)

(ii) Define Hall effect in semiconductors. How the Hall coefficient is determined? (10)

13. (a) (i) Give domain theory of Ferromagnetism and discuss four types of energy involved in the process of domain growth. (10)

(ii) Explain the hysteresis of ferromagnetic materials. (6)

Or

(b) (i) Explain in detail Type I and Type II superconductors. (6)

(ii) Discuss BCS theory of superconductivity. (10)

14. (a) (i) Describe in detail the different types of polarization present in dielectrics. (10)

(ii) Explain the variation of polarization with frequency and temperature. (6)

Or

(b) (i) Define Local Field and derive Clausius Mosotti Relation. (10)

(ii) Discuss the applications of dielectric materials. (6)

15. (a) (i) Discuss the preparation, properties and applications of metallic glasses. (10)

(ii) Give the physical properties of NiTi alloy and discuss the applications of Shape Memory Alloys. (6)

Or

(b) (i) Describe the process steps involved in Sol-gel technique to produce high pure nano materials. (10)

(ii) Give six properties of nano particles. (6)

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