Question Paper Code : 80840

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Second Semester

Civil Engineering

PH 6251 — ENGINEERING PHYSICS – II

(Common to all branches except Biotechnology and Pharmaceutical Technology)

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the properties of metals described inadequately by Drude's – model?

2. Define the mobility of electrons.

3. Define fermilevel and write its expression.

4. Sketch a graph between electrical conductivity and temperature of an intrinsic semiconductor.

5. Compare Para and ferromagnetic materials.

6. What is SQUID and mention its uses?

7. Define dielectric loss.

8. Write the applications of ferroelectric materials?

9. What are shape memory alloys?

10. Mention any four methods to produce nano materials.

PART B — (5 × 16 = 80 marks)

11. (a) Derive the expression for electrical and thermal conductivities of a metal, hence obtain the expression for Wiedemann-Franz law.   (6 + 6 + 4)

Or

(b) Define density of energy states? Derive the expression for the density of energy states in metals.   (2 + 14)

12. (a) Derive the expression for the carrier concentration in an intrinsic semiconductor and show the variation of fermilevel with temperature with a neat diagram.

Or

(b) Obtain an expression for the carrier concentration of electrons in the conduction band of an n-type semiconductor.

13. (a) What are the different types of magnetic materials? Explain each magnetic material in detail with diagrams.

Or

(b) Write an essay on different types of superconducting materials, their properties and their applications.

14. (a) Explain the different types of polarization mechanisms in dielectrics and sketch their dependence on the frequency of applied electric field.

Or

(b) What is meant by local field in a dielectric and how it is calculated for a cubic structure? Deduce Clausius-Mosotti relation.

15. (a) What are metallic glasses? How are they prepared? Explain their use as transformer core material.

Or

(b) Explain biomaterial and its applications in the field of medicine.

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