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Question Paper Code : 51106

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017

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. A copper wire whose diameter is 0.16 cm carries a steady state current of 10 A. What is the current density of the wire ?
2. Draw the Fermi distribution curve at 0K and at any temperature.
3. Distinguish between intrinsic and extrinsic semiconductors.
4. What are indirect band gap semiconductors ? Give example.
5. Define magnetic field intensity.
6. What is Curie temperature ?
7. What are the essential properties of dielectric materials ?
8. Mention any four applications of dielectric materials.
9. Give any four properties of metallic glasses.
10. What are non-linear optical materials ?



PART – B

(5×16=80 Marks)

11. a) i) Define : Relaxation time and Mean free path. (4)
ii) Write the postulates of Lorentz and Drude theory and deduce an expression for electrical conductivity of conducting materials. (12)
(OR)
- b) Derive a general expression for the Fermi energy of electrons in solids at 0K and show that at the same temperature, the average energy of the electron is $(3/5)^{\text{th}}$ of the Fermi energy. (16)
12. a) Derive an expression for the density of the holes in a p-type semiconductor and explain its Fermi energy varies with the temperature using diagram. (16)
(OR)
- b) Define Hall Effect. Describe the theory of Hall Effect and how will you determine the Hall Coefficient of a semiconductor experimentally. (16)
13. a) Discuss the classification of different type of magnetic materials. (16)
(OR)
- b) i) Distinguish between type I and type II superconductors. (8)
ii) Write short notes on Cooper pairs and Cryotron switches. (8)
14. a) Derive an expression for Lorentz internal field and hence arrive Clausius-Mosotti equation. (16)
(OR)
- b) i) Explain the effect of frequency dependence and temperature on different polarizations. (8)
ii) Write short notes on Ferroelectric materials and its applications. (8)
15. a) What are metallic glasses ? Explain the rapid quenching method for the preparation of metallic glasses and write its properties. (16)
(OR)
- b) i) Explain the pulsed laser deposition method to produce Nano materials. (8)
ii) Write notes on Non-linear Optics. (8)