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

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 $(3/5)^{th}$ 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)