Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 21683

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

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. Copper has electrical conductivity at 300 K as 6.40×10^7 mho m^{-1}. Calculate the thermal conductivity of copper.

2. Define density of states. What is its use?

3. Compared with Germanium, Silicon is widely used to manufacture the elemental device. Why?

4. Draw the graph for variation of Fermi level with temperature in p-type semiconductor.

5. The magnetic field strength of silicon is 1500 Am^{-1}. If the magnetic susceptibility is $-(0.3 \times 10^{-5})$. Calculate the magnetisation and flux density is silicon.

6. What is meant by persistent current?

7. What are the factors involved in dielectric loss in a dielectric material?

8. An atom has a polaraisibility of 10^{-40} Fm^2. It finds itself at a distance of 1.0 nm from a proton. Calculate the dipole moment induced in the atom. ($\varepsilon_0 = 8.85 \times 10^{-12}$).

9. Sketch the two phases which occur in shape memory alloy.

10. Mention the properties of carbon nano tubes.

PART B — (5 × 16 = 80 marks)

11. (a) Define electrical conductivity. Obtain an expression for electrical conductivity by free electron theory.

Or

(b) Based on Fermi — Dirac statistics, state the nature of Fermi distribution function. How does it vary with temperature?

12. (a) Explain the terms conduction band and valence band of an intrinsic semiconductor with a diagram. Derive an expression for density of electrons in conduction band.

Or

(b) What is Hall Effect? Derive an expression for Hall coefficient. Describe an experiment for the measurement of the Hall coefficient and mention its application.

13. (a) Explain domain theory of ferromagnetism.

Or

(b) Mention the difference between soft and hard superconductors. Describe principle and working of SQUID and Cryotron.

14. (a) Define Electric and Ionic polarisation and explain them with a neat diagram.

Or

(b) Define dielectric breakdown. Explain five types of dielectric breakdown occur in dielectric materials.

15. (a) Explain the characteristics of Shape Memory Alloy and mention its advantages and disadvantages.

Or

(b) (i) Describe plasma arcing technique with a diagram to fabricate nano particles. (8)

(ii) Explain how are carbon nano particles fabricated using Laser deposition method. (8)