Reg. No. : ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

Question Paper Code : 51768

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

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.   Write down the expression for Fermi-Distribution function.

2.   Give the expression for the carrier concentration in metals.

3.   Give any two examples of pentavalent and Trivalent impurities.

4.   Name any two compound semiconductor with applications.

5.   What is hysteresis phenomenon?

6.   What are High Temperature Superconductors?

7.   Define : oriental polarization.

8.   What are dielectric losses?

9.   What are Shape Memory alloys?

10. What do you mean by Nanomaterials?

PART B — (5 × 16 = 80 marks)

11. (a) Obtain an expression for electrical and thermal conductivities based on classical free electron theory and prove the Wiedmann-Franz law. (16)

Or

(b) Obtain an expression for the Fermi energy. Also deduce the expression for the average of an electron at 0K. (16)

12. (a) Obtain an expression for carrier concentration of charges in an n-type semiconductor. Describe the variations of Fermi-level with Temp and impurity concentration. (12 + 4)

Or

(b) (i) Define Hall effect. Derive the Hall co-efficient. Any four applications of Hall effect. (2 + 6 + 4)

(ii) An n-type Germanium sample has a donar density of $10^{21}/m^3$. It is arranged in a Hall experiment having $B = 0.5$ W/m^2 and $J = 500$ A/m^2. Find the Hall voltage if the sample is 3 mm thick. (4)

13. (a) (i) Discuss the various energies involved in the formation of domains. (8)

(ii) Write an essay on ferrites. (8)

Or

(b) Write short notes on :
(i) Properties of superconductor. (8)
(ii) Applications of Superconductor. (8)

14. (a) Explain about :
(i) Electronic Polarisation, Ionic Polarisation. (8)
(ii) Dielectric breakdown. (8)

Or

(b) Derive an expression for the internal field in a dielectric and hence obtain the Clausius–Mosotti equation. (16)

15. (a) Write short notes on :
(i) Metallic glasses. (8)
(ii) Shape Memory Alloys. (8)

Or

(b) (i) Any two methods of preparing Nanomaterials. (8)
(ii) Discuss the structure and applications of Carbon Nano Tubes. (8)

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