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

Question Paper Code : Q 2376

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Second Semester

Chemical Engineering

PH 1156 — PHYSICS — II

(Common to Polymer Technology, Textile Technology, Bio Technology, Textile Technology (Textile Chemistry), Textile Technology (Fashion Technology) and Petroleum Engineering)

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A superconducting tin has a critical temperature of 3.7 K at zero magnetic filed and a critical field of 0.0306 T at 0 K. Find the critical field at 2 K.

2. Define Fermi level.

3. List the difference between n-type and p-type semiconductor.

4. State Wiedemann-Franz law.

5. What is domain theory of ferromagenetism?

6. What are the different mechanisms in dielectric breakdown?

7. Give short notes on metallic glasses.

8. Mention any four applications of ceramic materials.

9. What do you mean by A-scan and B-scan?

10. Give the principle of Geiger-Muller counter.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the properties and applications of superconductor. (8)

(ii) Describe Type I and Type II superconductors with suitable diagrams. (8)

Or

(b) Discuss classical free electron theory of metals. Obtain the expression for electrical resistivity in terms of well known microscopic quantities. Discuss its dependence on temperature. (16)

12. (a) Obtain an expression for density of electrons in the conduction band of a n-type and density of holes in the valence band of a p-type intrinisic semiconductor. (16)

Or

(b) (i) With a neat diagram explain the variation of Fermi level with temperature and impurity concentration. (8)

(ii) Derive an expression for Hall coefficient and how it can be determined. (8)

13. (a) (i) Explain hysteresis on the basis of domain theory of ferromagnetism. (8)

(ii) Distinguish between soft and hard magnetic materials. (8)

Or

(b) (i) Explain the different types of polarization. (6)

(ii) Briefly explain the effects of frequency and temperature on polarization of dielectrics. (10)

14. (a) (i) Give a detailed account of metallic glasses, their method of production, types, properties and applications. (12)

(ii) What are shape memory alloys? Give their significance. (4)

Or

(b) (i) Discuss the manufacturing methods of ceramics. (10)

(ii) Explain the electrical and chemical properties of ceramic materials. (6)

15. (a) (i) Explain the physiological effect of ultrasound therapy. (8)

(ii) Write a note on radioactive sources in nuclear medicine. (8)

Or

(b) (i) Explain the working of Scintillation detector. (8)

(ii) Explain how Positron camera is used in nuclear imaging. (8)