Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

L 1548

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Second Semester

Computer Science and Engineering

PH 136 — SEMICONDUCTOR PHYSICS AND OPTOELECTRONICS

(Common to Information Technology)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Explain covalent bonding in solids?

2.   What are intrinsic and extrinsic semiconductors?

3.   What are High Tc superconductors? Give example.

4.   What are the various classes of liquid crystals?

5.   What is modulation and demodulation?

6.   What is Stark effect?

7.   Give the refractive index profile for step and graded index fibres.

8.   How signal losses take place in optical fibres?

9.   What are the material parameters set out for magnetic recording?

10. List the advantages of Compact Disk (CD) storage media.

PART B — (5 × 16 = 80 marks)

11. (a) Using Schrodinger's equation derive the expressions for the energy and wave functions of a particle in an one dimensional box. (16)

Or

(b) Give the theory of PN junction and derive the equation for electron and hole concentrations in P and N regions. (16)

12. (a) (i) Give the properties of superconductors and explain Type-I and Type-II superconductors. (12)

(ii) List any two applications of superconductors. (4)

Or

(b) Write notes on :

(i) Metallic glasses (8)

(ii) Shape Memory Alloys. (8)

13. (a) Describe a quantum well electro absorption modulator. (16)

Or

(b) (i) Explain electro optic effect. (4)

(ii) Describe any one of electro optic modulator. (12)

14. (a) (i) Give the principle and explain the propagation of light in an optical fibre. (8)

(ii) Derive the expression for numerical aperture. (8)

Or

(b) Explain various modes of light propagation in optical fibres. (16)

15. (a) (i) What are Bubble memories? (4)

(ii) Explain various magnetic storage media used in practice. (12)

Or

(b) Write notes on :

(i) Optical (8)

(ii) Magneto optical data storage methods. (8)

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