

B 2385

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Second Semester

Computer Science and Engineering

PH 136 — SEMICONDUCTOR PHYSICS AND OPTO ELECTRONICS

(Common to Information Technology)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are Miller indices?
2. Write the expression for the electrical conductivity of an intrinsic semiconductor.
3. What is Meissner effect?
4. What is the need to pack the integrated circuits?
5. Define half wave voltage.
6. What is meant by electroabsorption?
7. A signal of 100mW is injected into a optical fiber. If the loss is 3.98dB then calculate the signal power output from the fiber.
8. What are the advantages of soliton based optical fiber communication?
9. How are earth garnets used for data storage?
10. Compare between the phase change recording and magneto-optic recording methods.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Apply Schrodinger wave equation to solve a standard particle in a box problem.
(ii) At what temperature, one can expect a 5% probability that electrons in silver have an energy which is 1% above the Fermi energy? (The Fermi energy of silver is 5.5eV).

Or

- (b) Derive an expression for density of states and based on that calculate the carrier concentration in metals and semiconductors.

12. (a) Explain the theory and working of LCD. What are the different types? Explain the advantages.

Or

- (b) Write an essay on super-conducting materials and its applications. What are the new developments?
13. (a) Give an account on optical switching. Explain SEED as an optical switch with suitable diagram.

Or

- (b) Describe with theory, the principle, construction and working of an electro-optical amplitude modulator.
14. (a) Write an essay about different manufacturing processes of optical fibers.

Or

- (b) Derive an expression for numerical aperture and angle of acceptance in terms of refractive indices of the core and cladding.
15. (a) Write an essay on different magnetic storage media. What are their relative merits and demerits?

Or

- (b) Describe in detail the holographic method of storing optical data.
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