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Question Paper Code : 30317

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Second Semester

Electronics and Communication Engineering

PH 3254 — PHYSICS FOR ELECTRONICS ENGINEERING

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Distinguish crystalline and non-crystalline materials.
2. What is Bravais lattice?
3. Mention any two merits of classical free electron theory.
4. What is GMR in magnetic field?
5. What are direct bandgap semiconductors? Give any two examples.
6. Define mobility.
7. How many different kinds of light detectors exist?
8. What is the origin of electro optic effect?
9. What is meant by quantum confinement?
10. List out any two applications of Spintronic device.

PART B — (5 × 16 = 80 marks)

11. (a) Describe the structure of a simple cubic crystal (SC) system and body centred cubic (BCC) system. Also, calculate the atomic packing factor (APF) of simple cubic crystal system and body centred cubic (BCC) system.

Or

- (b) Give the procedure for finding Miller indices of crystal planes. What are their significance? Also deduce a relation between Miller indices and the inter-planar distance.
12. (a) Deduce the mathematical expression for electrical conductivity and thermal conductivity of a conducting material. Also explain tight binding approximation.

Or

- (b) Explain the classification of magnetic materials as dia, para and ferromagnetic materials.
13. (a) Derive an expression for density of electrons in the conduction band and density of holes in the valence band of an intrinsic semiconductor.
- Or
- (b) (i) Give the theory of Hall Effect and obtain the expression for Hall coefficient. (8)
- (ii) Describe the construction and working of Schottky diode. (8)
14. (a) Describe in detail about the optical processes in semiconductors and quantum well.
- Or
- (b) Explain the principle and working of a (i) solar cell and (ii) LED with neat diagram.
15. (a) Discuss in detail the density of states in quantum well, quantum wire and quantum dot structures.
- Or
- (b) (i) Describe the construction and working of single electron transistor. (8)
- (ii) What is carbon nanotube? Discuss the physical properties and application of carbon nanotubes. (8)
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