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

Question Paper Code : 30319

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

Second Semester

Computer Science and Engineering

PH 3256 – PHYSICS FOR INFORMATION SCIENCE

(Common to : Computer and Communication Engineering/Artificial Intelligence and Data Science/Computer Science and Business Systems/Information Technology)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define effective mass of an electron.
2. Define Fermi level.
3. What is a Schottky diode?
4. Define diffusion current.
5. Compare hard and soft magnetic materials.
6. Define saturation magnetization.
7. What is a photovoltaic device?
8. Mention any two applications of laser diode.
9. Define qubit.
10. What are quantum gates?

PART B — (5 × 16 = 80 marks)

11. (a) Derive an expression for the density of states.

Or

(b) Describe the classical free electron theory to obtain an expression for electrical and thermal conductivity and deduce Lorentz number.

12. (a) Derive an expression for density of electrons in the conduction band of an N-type and density of holes in the valence of P-type extrinsic semiconductor.

Or

(b) Derive an expression for Hall coefficient and describe the experimental setup for the measurement of Hall coefficient.

13. (a) Describe the ferromagnetic domain theory in detail.

Or

(b) Discuss in detail about the classification of magnetic materials.

14. (a) Explain the absorption and emission of light in metal, insulator and semiconductor.

Or

(b) Describe the construction and working of a LED with energy band diagram.

15. (a) Explain quantum confinement and quantum structures of nanomaterials.

Or

(b) Explain coulomb blockade effect and single electron phenomena.

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