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Question Paper Code : 41114

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Second Semester

Computer Science and Engineering

PH 8252 — PHYSICS FOR INFORMATION SCIENCE

(Common to Information Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define drift velocity.
2. What is called thermal conduction?
3. Distinguish between intrinsic and extrinsic semiconductors.
4. Define Hall effect and Hall voltage.
5. Define Magnetic susceptibility.
6. What is the Curie Temperature?
7. What are the properties LASER light?
8. Define optical data storage.
9. State the expression for Fermi energy of non-interacting ensemble of identical spin $\frac{1}{2}$ particles.
10. Define nanomaterials and give example for carbon based nanomaterials.

PART B — (5 × 16 = 80 marks)

11. (a) Derive the wavefunction and probability of particle in a one dimensional box and also show the possibility of energy levels in three dimensional case. (16)

Or

- (b) Explain Wiedezman - Franz law, also explain electrical conductivity of metals based on free electron theory of gases. (16)

12. (a) (i) What is Hall effect? Explain with theory also give two of its applications. (4)
(ii) Derive the Hall coefficient for n-type and p-type semi conductor. (12)

Or

- (b) Obtain the expression for carrier concentration of the intrinsic semiconductor, Distinguish p and n type semiconductors. (16)

13. (a) With neat diagram explain properties of para, dia, ferri, ferro and anti ferro magnetism. (16)

Or

- (b) Discuss domain theory of ferromagnetic materials and explain energy associated with it.

14. (a) Define LASER, also explain with neat band structure of homo junction laser diode.

Or

- (b) What is P-N junction diode? Explain the characteristics of p-n-junction under reverse and forward bias with suitable graph and also explain LED.

15. (a) (i) Define Quantum confinement effect. (2)
(ii) Explain the properties and significance of quantum structures
(1) Quantum well
(2) Quantum wire
(3) Quantum dots. (12)
(iii) Write a note on size dependence of Fermi Energy. (2)

Or

- (b) What are the allotropes of carbon nanostructures? Write two ways of preparation of carbon nanotubes?