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**Question Paper Code : X 10948**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020  
AND APRIL/MAY 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. What are the main drawbacks of classical free electron theory ?
2. Define Mean free path of an electron.
3. What is an intrinsic semiconductor ? Give two examples.
4. What is the difference between direct and indirect bandgap semiconductors ?
5. Define Magnetic dipole moment.
6. What is Bohr Magnetron ?
7. Explain the terms population inversion, meta stable state in laser materials.
8. Give six examples of insulating materials.
9. Explain the term Fermi energy.
10. What is nanomaterials ?

PART – B

(5×16=80 Marks)

11. a) Derive the energy levels of particle in a one dimensional box and also plot the probability of identifying a particles in various excited states.

(OR)

- b) Derive the Fermi-Dirac statistics distribution.



12. a) Draw energy level diagram for i) intrinsic semiconductor, ii) n type semiconductor iii) p type semiconductor.

(OR)

- b) What is Hall effect ? Explain physical origin of Hall effect, show that p type semiconductor has Hall co-efficient  $R_H = 1/pe$ .

13. a) Write about Domain theory of magnetic materials also explain a hysteresis curve.

(OR)

- b) Discuss in detail about magnetic materials classifications with its behavior.

14. a) Explain with neat band structure of Laser diode also distinguish between LED and Laser diode.

(OR)

- b) Write a note on i) Scattering of light and its types ii) PN diode and its function.

15. a) How size affects Fermi energy in nanomaterials ? Also explain how it connects with quantum confinement.

(OR)

- b) Write two ways of preparation of carbon nanotubes. Discuss three of its applications.
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