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

Question Paper Code : 90499

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Second Semester

Computer Science and Engineering

PH8252 – 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. Write down the expression for electrical conductivity of a metallic conductor.
2. Which statistics can be used for explaining energy distribution in conductors? Write down the expression.
3. Draw the energy band diagram for an intrinsic semiconductor with necessary parameters.
4. Differentiate between direct and indirect band gap materials.
5. Define magnetic permeability and susceptibility.
6. What are hard and soft magnetic materials ? Give examples for both.
7. Discuss the absorption, emission and scattering of light in metals.
8. How LASER is different from LED ?
9. What is quantum confinement ?
10. What is a single electron transistor ? How does it work ?

PART – B **(5×16=80 Marks)**

11. a) Discuss the classical free electron theory in detail. What are the success and failures of this theory ?

(OR)

b) Derive an expression for the density of single-particle states as a function of energy for a free electron gas in three dimension.

12. a) Derive an expression for carrier concentration in intrinsic semiconductors.

(OR)

b) Discuss the variation of Fermi level with temperature and impurity concentration with the help of neat diagrams.

13. a) How materials can be classified according to their magnetic properties ? Describe them with examples.

(OR)

b) What are GMR sensors ? Explain their applications in digital storage media with necessary diagrams.

14. a) Discuss the carrier generation and recombination processes in semiconductor devices with neat diagram.

(OR)

b) What is photo-current ? How photo-current is generated in a P-N junction diode ?

15. a) How nanomaterials are different from bulk materials? Discuss the basic properties of nanomaterials.

(OR)

b) What are carbon nanotubes ? Explain their properties and applications in detail.