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

Question Paper Code : 41115

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

Second Semester

Electrical and Electronics Engineering

PH 8253 – PHYSICS FOR ELECTRONICS ENGINEERING

(Common to: Biomedical Engineering/ Computer and Communication Engineering/ Electronics and Communication Engineering/Electronics and instrumentation Engineering/Electronics and Telecommunication Engineering/Instrumentation and Control Engineering/Medical Electronics)

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the drawbacks of classical free electron theory.

2. What are the sources of resistance in metals?

3. What are n-type and p-type semiconductors? Give examples.

4. Define the terms: Hall Effect and Hall Voltage.

5. What are Giant Magneto Resistance? Mention its importance.

6. Define the term dielectric loss.

7. List out the effects of optical absorption in semiconductors.

8. Calculate the wavelength of radiation emitted by a LED made up of GaAs with band gap energy 1.43 eV.

9. What is meant by quantum confinement?

10. Write any two applications of quantum well, quantum wire and quantum dot

PART B — (5 × 16 = 80 marks)

11. (a) Derive Schrödinger equation for a particle in three dimensional box. Determine the Eigen values and Eigen functions for the same.

Or

(b) Derive an expression for both electrical conductivity and thermal conductivity of electrons in metal. Hence deduce Wiedemann – Franz law.

12. (a) Deduce an expression for carrier concentration in an n - type semiconductor.

Or

(b) With a neat sketch, describe the principle, construction and working of a Schottky diode.

13. (a) Draw the B-H curve for a ferromagnetic material and identify the retentivity and the coercive field on the curve.

Or

(b) Give the detailed discussion on the various types of dielectric breakdown in dielectric materials.

14. (a) What is injection luminescence? Explain how-a P-N junction diode acts as a LED.

Or

(b) Explain with suitable diagram how laser action is achieved in homo junction and hetro junction diode laser.

15. (a) Explain the preparation, physical properties and applications of carbon nanotubes.

Or

(b) Write note a Zener - Bloch oscillations, resonant tunnelling and quantum interference effect.
