Reg. No. : E N G G T R E E . C O M

Question Paper Code : 30311

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

Second Semester

Electrical and Electronics Engineering

PH 3202 — PHYSICS FOR ELECTRICAL ENGINEERING

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define dielectric constant of a material.
2. Differentiate dielectric loss and insulation breakdown.
3. State degeneracy.
4. Which type of magnetic material have spontaneous magnetization and why?
5. Compare drift and diffusion transport.
6. Classify semiconducting materials preliminarily based on the value of Hall coefficient.
7. Why direct band gap semiconductors are suitable for LED applications?
8. What will be the energy in eV for photon of wavelength 650 nm?
9. How tunneling effect play a significant role in single electron transistor?
10. Write the advantages of quantum well laser.

PART B — (5 × 16 = 80 marks)

11. (a) Discuss the types of polarization in dielectrics and derive expression for total polarization.

Or

(b) Derive Clausius-Mossotti equation and write its significance.

12. (a) Obtain an expression for electrical and thermal conductivity of metals.

Or

(b) Describe the exchange interaction mechanism of ferromagnetic material in detail and discuss four properties of ferromagnet.

13. (a) Elucidate the variation of carrier concentration with temperature for both p and n-type semiconductor with neat diagram.

Or

(b) What is Schottky barrier and explain the principle, working and advantages of Schottky barrier diode.

14. (a) Explain the light emitting mechanism of LED with suitable sketch.

Or

(b) Discuss about the optical processes in organic semiconductor devices in detail.

15. (a) With suitable sketch, explain different quantum structures with their corresponding density of states in detail.

Or

(b) Explain the types, properties and applications of carbon nanotubes in detail.