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Question Paper Code : 82025

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

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 — ($10 \times 2 = 20$ marks)

1. Define relative permittivity of a material.
2. Write the working principle of crystal filter.
3. Mention any two success of classical free electron theory.
4. What is meant by electron effective mass?
5. Distinguish between P- and N-type semiconductors.
6. What is diffusion current?
7. Find the wavelength of light emitted by the semiconductor having band gap of 2.8 eV?
8. List out the applications of plasmonics.
9. Why band gap energy of most of the materials increases at nanoscale?
10. Give the conditions for electrons to achieve ballistic transport.

PART B — ($5 \times 16 = 80$ marks)

11. (a) Derive Clausius-Mossotti equation and mention its applications.

Or

- (b) Explain the phenomenon of piezoelectricity, pyroelectricity and ferroelectricity with their applications.

12. (a) Obtain an expression for density of energy states in metals using free electron theory.

Or

- (b) Explain the classification of magnetic materials with examples. Explain the concept of paramagnetism due to conduction electrons in metals.

13. (a) Elucidate an expression for electron concentration in n-type semiconductor.

Or

- (b) Explain the principle, construction and working of Schottky diode.

14. (a) Elaborate the types, principle and working of photo-detectors.

Or

- (b) Summarize various electro-optical phenomenon involved in optical-modulators.

15. (a) Highlight the rules and conditions for single electron phenomenon to occur and describe the electrical behavior of ideal single electron transistor.

Or

- (b) With neat diagram clarify different structure, properties and applications of carbon nanotubes in detail.