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

Question Paper Code : 70179

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Second Semester

Aeronautical Engineering

PH 3205 – APPLIED PHYSICS

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A —- (10 × 2 = 20 marks)

1. Mention any two merits of classical free electron theory.

2. Write the expression for Fermi - Dirac distribution function.

3. State any two differences between an intrinsic and extrinsic semiconductor.

4. What are direct band gap semiconductors? Give two examples.

5. Define Electronic Polarization.

6. What is the difference between pyro and piezoelectric Crystal?

7. Define Meissner effect.

8. Mention any two differences between soft and hard magnetic materials.

9. Define phase matching of (SHG) material.

10. Why crystalline structures are anisotropic?

PART B — (5 × 16 = 80 marks)

11. (a) Deduce the mathematical expression for electrical conductivity and thermal conductivity of a conducting material and hence obtain Wiedemann-Franz law.   (16)

Or

(b) Derive an expression for the density of states and based on it calculate the carrier concentration in metals.   (16)

12. (a) Derive an expression for density of electrons in the conduction band and density of holes in valence band of an intrinsic semiconductor. (16)

Or

(b) (i) Explain the theory of Hall Effect and obtain the expression for Hall coefficient. (8)

(ii) Explain the construction and working of Schottky diode. (8)

13. (a) What are dielectric materials? Explain electronic, ionic, orientational and space charge polarization. (16)

Or

(b) Derive local internal field and deduce the Clausius-Mosotti equation for a solid dielectric. (16)

14. (a) (i) Write the differences between dia, para and ferro magnetic materials. (8)

(ii) Explain the domain theory of ferro magnetism. (8)

Or

(b) (i) What are super conductors? Explain the BCS theory of superconductivity. (8)

(ii) Distinguish between Type I and Type II superconductors. (8)

15. (a) Explain briefly the occurrence of dispersion, group velocity and group index. (16)

Or

(b) (i) Describe briefly about the phenomenon of Luminescence and polarization. (8)

(ii) Explain the applications of phosphorescence. (8)

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