Reg. No.

B.E. / B.TECH. (EXAMINATIONS, MAY 2023)
Second Semester
PH16251 – ENGINEERING PHYSICS II
(Common to all branches)
(Regulation 2016)

TIME: 3 HOURS   **MAX. MARKS: 100**

PART- A (10 x 2 = 20 Marks)
(Answer all Questions)

1. Find the drift velocity of the copper wire whose cross-sectional area is $1mm^2$ when the wire carries a current of 10A. Given density of electrons is $8.5*10^{28}\,m^{-3}$.

2. Define the terms (i) Relaxation time and (ii) Mobility

3. What are the differences between n-type and p-type semiconductors?

4. Mention few properties of Semiconductor.

5. Define: Retentivity and coercivity.

6. The transition temperature for a superconducting material is 3.7 K at zero magnetic field and critical field is 0.0306 A/m at zero Kelvin. Calculate the critical field at 2 K.

7. Give the relation between Dielectric constant and electronic polarisability.

8. State the properties of Ferroelectric materials.

9. What are Shape Memory Alloys?

10. Define the term birefringence.

PART- B (5 x 16 = 80 Marks)

Marks

11. (a) Derive an expression for electrical and thermal conductivity of a metal; hence deduce Wiedemann-Franz law.   **(16)**

(OR)

(b) Define density of states and derive an expression for density of energy states. Calculate the carrier concentration in metals.   **(16)**

12. (a)   Obtain an expression for the carrier concentration in an Intrinsic semiconductor.   **(16)**

<div align="center">(OR)</div>

    (b)   Derive an expression for Hall coefficient in n-type and p-type semiconductor. Describe an experimental setup for the measurement of Hall coefficient.   **(16)**

13. (a)   **(i)**   State the origin of magnetic moment and hence define Bohr Magneton.   **(4)**

           (ii)   How magnetic materials are classified? Compare their properties and give examples.   **(12)**

<div align="center">(OR)</div>

    (b)   **(i)**   Distinguish between Type I and Type II superconductors.   **(8)**

           (ii)   Briefly explain the following: 1. BCS Theory 2. High TC Superconductors.   **(8)**

14. (a)   **(i)**   Derive an expression for electronic and ionic polarisability.   **(10)**

           (ii)   Explain the frequency and temperature dependence of polarisation.   **(6)**

<div align="center">(OR)</div>

    (b)   What is meant by local field in a dielectric and how it is calculated for a cubic structure? Deduce Clausius – Mosotti relation.   **(16)**

15. (a)   What are metallic glasses? Explain the preparation, properties and applications of metallic glasses.   **(16)**

<div align="center">(OR)</div>

    (b)   What are nanomaterials? Explain with necessary diagram to synthesize nanomaterials by chemical vapour deposition method. Write any two applications of nanomaterials.   **(16)**

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