

**B.TECH DEGREE EXAMINATIONS: MAY/JUNE 2014**

(Regulation 2013)

Second Semester

**U13PHT204: APPLIED PHYSICS**

(Common to TXT/FT)

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

- The unit of mobility of electron is given by:
  - m/s
  - s/m
  - $V^2/s$
  - $M^2/V s$
- The value of Lorentz number is -----  $W\Omega K^{-2}$
- Hall effect is used to determine:
  - Strength of the semiconductors
  - Mass of the Semiconductors
  - Nature of charge carriers in semiconductors
  - Defects in semiconductors
- The expression for the density of electrons in conduction band of an N type semiconductor is - -----
- The relation between permeability and susceptibility is:
  - $\mu_r = 1/\chi$
  - $\mu_r = 1 - \chi$
  - $\mu_r = \chi$
  - $\mu_r = 1 + \chi$
- The magnetic material which has no permanent dipole is -----
- Which of the following is not ceramic material:
  - Whitewares
  - Refractories
  - Ferrites
  - Cements
- The bio material used for Contact Lens is-----
- Nano materials have superior property when compared to bulk materials because of
  - Low surface to volume ratio
  - High surface to volume ratio
  - Low volume to surface ratio
  - High volume to surface ratio
- CNT are \_\_\_\_\_ time stronger than steel.

**PART B (10 x 2 = 20 Marks)**

**(Not more than 40 words)**

- Mention any two drawbacks of classical free electron theory.
- All the super conductors are diamagnets. Justify the statement.
- How Fermi level of intrinsic semiconductor varies with temperature?
- A N type semiconductor has Hall coefficient  $4.16 \times 10^{-4} m^3 C^{-1}$ . The conductivity is  $108 \text{ohm}^{-1} m^{-1}$ . Calculate the charge density at room temperature.
- Write short notes on (any one of) the magnetic storage device.
- Define: Dielectric loss.
- What do you understand from the term quenching?
- What is NITINOL?
- What is bottom up process?
- Give any two applications of plasma technology in textile industry

**PART C (5 x 14 = 70 Marks)**

**(Not more than 400 words)**

**Q.No. 21 is Compulsory**

- Derive an expression for density of states and hence deduce the expression for carrier Concentration in metals.
- a) Derive expressions for carrier concentration and Fermi energy in a N type semiconductor. Explain the variation of Fermi level with temperature and donor impurity concentration.

**(OR)**

- (i) What is Hall effect? Obtain the expression for Hall coefficient for a N type semiconductor and describe the experimental set up for the measurement of Hall voltage. (10)
- (ii) Mention the uses of Hall effect. (4)
- a) (i) Explain the domain theory of Ferromagnetism and how will you account hysteresis of ferromagnetic materials? (10)
- (ii) Write short notes on Ferrites. (4)

**(OR)**

- (i) What is meant by polarization in dielectrics? Explain the different types of (10)

polarization mechanisms in dielectric materials.

(ii) Mention the different types of dielectric breakdown mechanisms. (4)

24. a) Explain in detail about SMA.

**(OR)**

b) What are Biomaterials? Explain the properties and application of Biomaterials.

25. a) (i) Explain the synthesis of nano materials using electro deposition and ball milling methods. (10)

(ii) What are the properties of Carbon Nano Tubes? (4)

**(OR)**

b) (i) Explain the various types of plasmas. (10)

(ii) How to produce plasma using glow discharge method? (4)

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