

27/10/13

B.E./B.Tech. DEGREE EXAMINATION NOV / DEC 2013

II SEMESTER

**PH 184 PHYSICS FOR ELECTRICAL ENGINEERING
PH9167- PHYSICS OF ELECTR. & ELECTRO MATERIALS**

Time: 3 Hours

Maximum Marks: 100 marks

(Answer ALL questions)

PART -A

(10x2=20 marks)

1. Define classical theory of conduction based on Drude's model
2. What is the significance of band theory of solids ?
3. A n type semiconductor has Hall coefficient $R_H = 3.55 \times 10^{-4} \text{ m}^3/\text{coulomb}$. The conductivity of specimen is found to be $110 \Omega^{-1}\text{m}^{-1}$. Calculate the electron mobility (Given $n_e = 2 \times 10^{22}/\text{m}^3$)
4. Distinguish between Ohmic and Schottky contact.
5. Briefly explain some characteristics of ferroelectric materials.
6. Differentiate between piezoelectricity and pyroelectricity.
7. What are magnetic domains and domain walls?
8. Define Giant Magneto Resistance.
9. Define the terms refractive index and dispersion.
10. Write a note on optical anisotropy.

PART -B

(5x16 = 80 marks)

11. Derive Schrodinger equation for a particle in a one-dimensional box. Determine the Eigen values and Eigen functions for the same.
12. a) Explain extrinsic semiconductors and derive the expression for carrier concentration for n-type and p-type semiconductors.

(or)

Explain HALL effect with necessary theory. Describe the experiment to determine the HALL coefficient of a conducting material.

13. a) Explain the different type of polarization mechanisms in dielectrics? What is the role of frequency of applied electric field on the polarization in dielectrics?

(or)

b) What is dielectric breakdown? Explain the various factors contributing to breakdown in dielectrics.

14. a) Discuss the properties of ferro, para and diamagnetic materials? Explain the essential differences between hard and soft magnetic materials with examples

(or)

b) Define superconductivity. Write a note on the different types of superconductors and mention their properties with applications.

15. a) Explain the following:

(i) Group velocity

(ii) Expression for reflection and transmission coefficients

(iii) Complex refractive of a material with an example

(iv) Difference between fluorescence and phosphorescence

(v) Birefringence with an example

(or)

b) Define electro-optic effect. Explain in detail about the amplitude and phase modulators.