Rekha Ajikumar, Preethi Colaco, Mahima Philip

St. Francis Institute of Technology (Engg. College)

Internal Assessment Test-II

Academic Year: 2017-2018

Branch: ALL BRANCHES	Year: F E. Semester: I
Subject: APPLIED PHYSICS-I	Time: 17/10/2017
Date: 11:00 -12:00	No. of Pages: 01
Marks: 15Marks	

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

Note the following instructions.

1. All questions are compulsory.
2. Draw neat diagrams wherever necessary.
3. Write everything in ink (no pencil) only.
4. Assume data, if missing, with justification.

Q.1. Attempt any THREE

a. Draw the band diagram to show the variation of Fermi level with varying temperature for n type semiconductor. 2M

b. Define Fermi Level. Write the expression for Fermi Dirac distribution function and explain the terms involved. 2M

c. Find resistivity of intrinsic germanium at 300K. Given density of carriers is $2.5 \times 10^{19}/m^3$. Mobility of electrons is $0.39 m^2/V\text{-sec}$ and mobility of holes is $0.19\ m^2/V\text{-sec}$. 2M

d. The resistivity of Copper is 1.72×10^{-8} ohm-m. Calculate the mobility of electrons in Copper. Given the number of electrons per unit volume is $10.41 \times 10^{28}/m^3$ 2M

e. Define magnetostriction effect? What are the limitations of magnetostriction oscillator? 2M

Q.2. Attempt any ONE.

a. Discuss the effect of doping concentration on p type semiconductor 5M

b. Draw the circuit diagram of piezoelectric oscillator. Explain the working of this oscillator 5M

Q.3. Attempt any ONE

a. The Fermi energy level for an element is 6.25eV. Determine the temperature at which there is a 1% probability that an energy state 0.30eV below the Fermi energy level will not contain an electron. 4M

b. In an intrinsic semiconductor the energy gap E_g of an intrinsic semiconductor is 1.2eV.Its hole mobility is very much smaller than electron mobility and is independent of temperature. What is the ratio between conductivity at 600K and that of 300K. 4M