

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-II [All Branch] examination June 2009****Subject code: 110011****Subject Name: Physics****Date: 08/06/2009****Time: 10:30am-1:00pm****Instructions:****Total Marks: 70**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) List and explain the characteristics of musical sound. **03**
 (b) Explain factor affecting acoustics of the building. **03**
 (c) Properly explain the advantage of the fiber optics. **03**
 (d) How properties of semi conducting materials are differed From conducting materials? **03**
 (e) List the application of the LASER. **02**
- Q.2** (a) Explain the arrangement of determine the velocity of ultrasonic Waves using required figures. Also explain the application of the ultrasonic. **07**
 (b) Explain & derived the relation between the inter planar distance and cube edge. **07**
- OR**
- (b) What is Einstein coefficient? Derived the relation between the Einstein coefficient. Also give the difference between stimulated Emission. **07**
- Q.3** (a) A rectangular semiconductor specimen of thickness 1 mm place the magnetic field of flux density 0.5 Wb/m^2 . Current of 1.5 mA is flowing through specimen in one direction. Calculate resulting hall voltage. Here Hall coefficient of the material is $1 \times 10^{-2} \text{ M}^3/\text{C}$. **05**
 (b) Explain the classical free electron theory of metal. **05**
 (c) Give the comparison of class I and class II super conductors. **04**
- OR**
- Q.3** (a) Calculate the energy gap in Ge when it is transparent to radiation of wavelength of 12000A [$h=6.625 \times 10^{-34} \text{ J C}$, $C=3 \times 10^8 \text{ m/s}$]. **05**
 (b) Give the application of the super conductor. **04**
 (c) Give the understanding of Thermal conductivity. **05**
- Q.4** (a) Calculate the electrical conductivity of copper. Given atomic weight, density and relaxation time as 63.5, $8.9 \times 10^3 \text{ Kg m}^{-3}$ and $2.48 \times 10^{-14} \text{ S}$ respectively. **05**
 (b) Give the difference between simple, zener, and varactor diode. **05**
 (c) Explain the hall effect. **04**
- OR**
- Q.4** (a) Calculate the change in wavelength of x-ray photon when it is scattered through an angle of 90° by a free electron. **05**
 (b) Give the classification of solids into metals, semiconductor, insulator on the basis of energy band theory. **05**
 (c) Explain pulse echo system. **04**
- Q.5** (a) List the various methods of Non Destructive testing and explain Two of Them in details. **06**
 (b) What is biomaterial? List them. **04**
 (c) What is dielectric loss? explain in details. **04**
- OR**
- Q.5** (a) What is super conducting material? List the properties of super conducting materials and explain each in detail. **07**
 (b) What is nano technology ? List the application of Nano technology. **04**
 (c) Explain the principal of pseudo elasticity. **03**