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Question Paper Code: 92005

B.E./B.Tech. DEGREE EXAMINATION, AUGUST 2021

Second Semester

Computer Science Engineering

19UPH205 – PHYSICS FOR INFORMATION SCIENCE

(Common to EEE & Information Technology)

(Regulation 2019)

Duration: 1.45 hrs

Maximum: 50 Marks

PART A (Answer Any Ten)

10*2 = 20 Marks

1. Define relaxation and collision time of free electrons in a metal. CO1 – U
2. Give the microscopic form of ohm's law in a metallic conductor. CO1 – U
3. Define Magnetic induction CO1 – U
4. The intrinsic carrier density at room temperature in Ge is 2.37×10^{19} per m^3 . CO2 – U
If the electron and hole Mobility are 0.38 and $0.18m^2v^{-1}s^{-1}$ respectively.
Calculate its resistivityThe intrinsic carrier density at room temperature in Ge is 2.37×10^{19} per m^3 .
5. Define Mobility CO1 – U
6. Why do we prefer GaAs for making LED and LASER? CO1 – U
7. Mention the various breakdown mechanisms CO1 – U
8. Define polarization of a dielectric material CO3 – U
9. The number of atoms in volume of one cubic meter of hydrogen gas is 9.8×10^{26} .The radius of the hydrogen atom is 0.53 \AA . Calculate the polarisability and relative Permittivity. CO1 – U
10. What are requirements of good insulating materials? CO4 – U
11. Distinguish single mode and multi mode fiber? CO1 – U
12. What are basic attenuation mechanisms? CO1 – U
13. Write any two examples for High resistive materials? CO1 – U

- 14 Write any two applications of Hall Effect CO1 – U
- 15 In a magnetic material the field strength is found to 10^6 A m^{-1} . If the magnetic susceptibility of the material is 0.5×10^{-5} . Calculate the intensity of magnetization in the material. CO6– U

PART B (Answer Any Three)

3*10 = 30 Marks

16. Based on the assumptions of classical free electron theory derive an expression for electrical conductivity of metals. What are the success and failures of this theory? CO1-U (10)
- 17 Obtain an expression for the Hall coefficient for Silicon doped with Antimony and also describe the experimental set up for the measurement of Hall voltage CO1-App (10)
- 18 Describe the domain theory of ferromagnetism and also explain the energy involved in domain structure. CO1- U (10)
- 19 Obtain an expression for space charge and electronic polarization in dielectrics CO3- U (10)
- 20 Describe CO4- U (10)
- (i) The propagation of light through an optical fiber.
- (ii) What are numerical aperture and acceptance angle of a fiber?