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B.E /B.Tech (Full Time) END SEMESTER EXAMINATIONS, April / May 2019

Common to EEE and ECE Branches

Second Semester

PH8252 & PHYSICS FOR ELECTRONICS ENGINEERING

(Regulation 2012)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is called effective mass of an electron?
2. The electrical resistivity of copper at 27°C is $1.72 \times 10^{-8} \Omega\text{m}$, compute its thermal conductivity, if the Lorentz number is $2.26 \times 10^{-8} \text{W}\Omega\text{K}^{-2}$.
3. What are the differences between direct and Indirect band gap.
4. What is Hall effect? Mention the applications of Hall Effect.
5. Define Dipole moment
6. What is dielectric loss?
7. What do you understand exchange interaction?
8. What is Giant Magneto Resistance?
9. How can you calculate the refractive index of a medium?
10. State and explain electro-optic effect?



Part – B (5 x 16 = 80 marks)
(Question No.11 is Compulsory)

11. (i). Derive the Fresnel's equation for reflection coefficient in a perpendicular plane of incident radiation (12)
(ii). Discuss about the white LEDs and its advantages. (4)
 12. a) (i). Derive an expression to find the energy of the electron in a potential box using Schrodinger wave equation. (12)
(ii). Find the drift velocity of free electron in a copper wire whose cross sectional area is $1.0 \times 10^{-6} \text{m}^2$ when the wire carries a current of 1 amp. Assume that each copper atom contributes one electron to the electron gas. If $n = 8.5 \times 10^{28} \text{m}^{-3}$. (4)
- (OR)
- b) (i). Define density of energy states. Derive an expression for density of energy states in metals. (12)
(ii). The Fermi energy of Copper is 7.0 eV. Find the Fermi velocity of the electron. (4)

13. a) (i). Derive an expression to determine the carrier concentration in the intrinsic semiconductors. (12)
(ii). Explain how conductivity depends upon temperature? (4)
- (OR)
- b) (i). With neat diagram explain the working of Schottky diode. (8)
(ii). What is Hall effect? And discuss about the devices using Hall effect. (8)
14. a) (i). Derive the mathematical expression for the internal field in solid dielectrics and hence deduce Claussius-Mossotti equation. (12)
(ii). Write short note on interfacial and total polarization. (4)
- (OR)
- b) (i). Discuss about the piezoelectricity, ferroelectricity and pyroelectricity (12)
(ii). Distinguish Piezoelectric crystals and Pyroelectric crystals (4)
15. a) (i). How the magnetic materials are classified? Explain the properties of dia, para ferro and antiferro magnetic materials. (12)
(ii). The magnetic field intensity of copper is 10^6 Am^{-1} . If the magnetic susceptibility of copper is -0.8×10^{-5} , calculate the flux density and magnetization in copper. (4)
- (OR)
- b) (ii). What is superconductor? Explain in detail about the classification, properties and applications of superconductors (12)
(ii). Mention the properties of soft and hard magnetic materials (4)

