



L.D. College of Engineering, Ahmedabad

Mid-Semester examination syllabus

First Sem-2022\_23 - Physics (3110018)



**Module - 1**

**ELECTRONIC MATERIALS**

**CO - 1**

- ❖ Classical free electron model OR Drude Model  
Description, Assumptions, Successes, Failures
- ❖ Derivation of Electrical and Thermal Conductivity, Wiedemann Franz Law, Density of States, Kronig Penney Model, E-K Diagram, Direct and Indirect Bandgap semiconductors, Effective mass of an electron ( $m^*$ )
- ❖ Numericals based on the all-above-mentioned topics

**Module - 2**

**SEMICONDUCTORS**

**CO - 2**

- ❖ Classification of solid state materials based on Energy Band diagram
- ❖ Introduction to Semiconducting material
- ❖ Introduction and importance of Fermi energy level in Semiconducting material
- ❖ F-D Distribution function
  - As a function of temperature
  - As a function of energy by taking  $E_f$  as a reference energy level
  - Numericals based on the above formulations
- ❖ Intrinsic Semiconducting material
  - Exciton
  - Electron concentration at C.B. ( $n$ )
  - Hole concentration at V.B. ( $p$  or  $h$ )
  - Total intrinsic carrier concentration ( $n_i$ )
  - Intrinsic conductivity ( $\sigma_i$ )
  - Analysis of  $\ln(R)$  vs  $(1/T)$  graph
  - Mathematical proof of  $E_f = E_g/2$
  - Numericals based on the above formulations



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**Module-3**

**Measurements**

**CO-4**

- Two Probe method
- Assumptions of Four probe method
- Four probe method for Bulk sample
- Four probe method for Thin film
- Van der Pauw method
- Hall effect

**Module-4**

**Superconductivity**

**CO-5**

- Introduction to Superconductor
- All properties of Superconductivity

**Mid Sem Exam Instructions for students**

- Answers must be in a detailed manner with time consideration.
- Start a new section/Question on a new page.
- Do mention below given data on your supplement without fail
  - Name
  - Roll number
  - Division(@ top right corner of your supplement)
  - Mobile Number (@top center of your supplement )

Subject Co-ordinator  
(PHYSICS)