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PG/IIS/ELC/206/25(Pr.)

**M.Sc. 2nd Semester Examination, 2025**

**ELECTRONICS**

*( Semiconductor Device Lab. )*

*( Practical )*

**PAPER — ELC-206**

*Full Marks : 50*

*Time : 3 hours*

**Answer any one question selecting from lucky draw**

- 1. Determine the Hall-co-efficient, carrier concentration, and mobility of the semiconductor sample (To be supplied) using Hall measurement method. Comment on the type of the semiconductor sample.**

*( Turn Over )*

2. Measure the resistivity of a silicon/germanium wafer using four probe method. The semiconductor sample will be supplied. Determine also band-gap of the given sample.

3. Study the current-voltage Output and Transfer characteristics of a Junction Field-Effect Transistor.

From the graph prove that  $\mu = r_d \text{ gm}$

4. Study the current-voltage characteristics of a *P-N* junction diode. Plot diode current with diode voltage. Determine the Knee voltage of the diode. Plot the  $\ln I$  vs  $V$  and find out reverse saturation current and material constant.

5. Determine the energy band-gap of the semiconductor of a *P-N* Junction diode from the thermal variation of the junction voltage.

6. Measure the depletion capacitance of a  $P^+-N$  junction diode for different voltages and draw the C-V Plot. Can you find out carrier concentration of the  $N$  type semiconductor using this C-V data ?
7. Study the dielectric constant of Barium Titanate with temperature. Plot  $\epsilon_s$  vs T and determine the curie temperature.
8. Determine the barrier-height of a metal semiconductor diode using activation energy method.
9. Study the operational characteristics of SCR. Measure the respective data for at least 04 gate bias and draw its I-V curve.

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10. Study the operational characteristics of a DIAC. Measure the respective data and draw the I-V curve.

**Marks Distribution**

Circuit design	:	15 Marks
Implementation	:	10 Marks
Results & Discussions	:	10 Marks
Viva-voce	:	10 Marks
LNB	:	05 Marks
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Total	:	50 Marks