

M.Sc. 2nd Semester Examination, 2023

ELECTRONICS

(Semiconductor Device Lab)

[Practical]

PAPER – ELC-296

Full Marks : 50

Time : 3 hours

Candidates are required to give their answers in their own words as far as practicable

Answer any one question selecting it by a Lucky draw

1. Study the current voltage characteristics of a P-N junction diode under forward bias condition. Draw the forward I-V curve on a mm graph paper. Calculate the dynamic resistance and cut-in voltages from your graph. Plot $\ln I$ vs V curve and find the reverse saturation current.

2. Study the temperature dependent junction voltage of a P-N Junction diode. Fix the diode current to 1 mA. Determine the band gap of the semiconductor for using your measured data. Repeat the above work for a diode current value of 2 mA.
3. Determine the junction capacitance of a P-N junction diode using the set up present in your laboratory. Calculate junction capacitance for a wide range of junction voltage. Draw the C-V curve of the device.
4. Measure the resistivity of a 'Ge' sample using four-probe method. Write down its necessary theoretical background.
5. Study the dielectric constant of a ferroelectric sample (BaTiO_3) varying temperature and hence determine its Curie temperature.

6. Determine the carrier concentration of a semiconductor sample using Hall measurement method. Complete the experiment in your Laboratory and hence calculate the Hall co-efficient of the sample.

7. Study the current voltage characteristics of a Schottky diode using a bread-board and other discrete components. Measure diode current at various temperature for a fixed diode voltage. Calculate the barrier-height of the junction using activation energy method.

Marks Distribution

Experiment	: 35 Marks
Viva-voce	: 10 Marks
Laboratory Note Book	: 05 Marks
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Total	: 50 Marks