HALL EFFECT

Experiment No. 2 (Procedure)

Procedure: -

1. Adjust position of Hall probe to be perpendicular to the pole pieces of the electromagnets.
2. Switch on the electromagnet. Increase the current through the electromagnet and measure the magnetic field B using the Gaussmeter. Adjust B to the desired value (1000G).
3. Place the sample in pole pieces of the electromagnet such that it is perpendicular to the magnetic field. Keeping B constant, vary current I through the sample in suitable steps and note corresponding values of voltage V.
4. Switch off the electromagnet. Keep the sample away from electromagnet. Measure voltage V_0 without field for the same current values as in step 3. Hall voltage $V_H = V-V_0$.
5. Plot V_H versus I and find the slope m.
6. Find Hall coefficient $R_H = md/ B$
7. Also find charge carrier density 'n' using $n=1/ R_H e$.

Observations: -

1. Thickness of the probe (Given), d=0.5 mm= 0.0005 m
2. Constant magnetic field (B)

Observation Table: -

Sr. No.	I (mA)	Voltage with B V (mV)	Voltage without B V (mV)	Hall Voltage VH = V – V (mV)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

Graph and Calculations: -

1. Draw VH versus I and find the slope m.
2. Using the numerical method, outlined using an example below, to find the slope m. Calculate
   a) $R_H = md / B$
   b) $n = 1 / e\, R_H$
3. Write results and conclusion.