



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad – 500 043

LABORATORY WORK SHEET

Date: 19/08/2022

Roll No: 21A51A6754 Name: P. JYOTHI PRASANNA

Exp No: 11 Experiment Name: HALL EFFECT

DAY TO DAY EVALUATION:

	Preparation	Algorithm	Source Code	Program Execution	Viva	Total
		Performance in the Lab	Calculations and Graphs	Results and Error Analysis		
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	4	4	20

Signature of Lab I/C

START WRITING FROM HERE:

AIM: Determination of charge carrier density in a given semiconductor material.

APPARATUS:

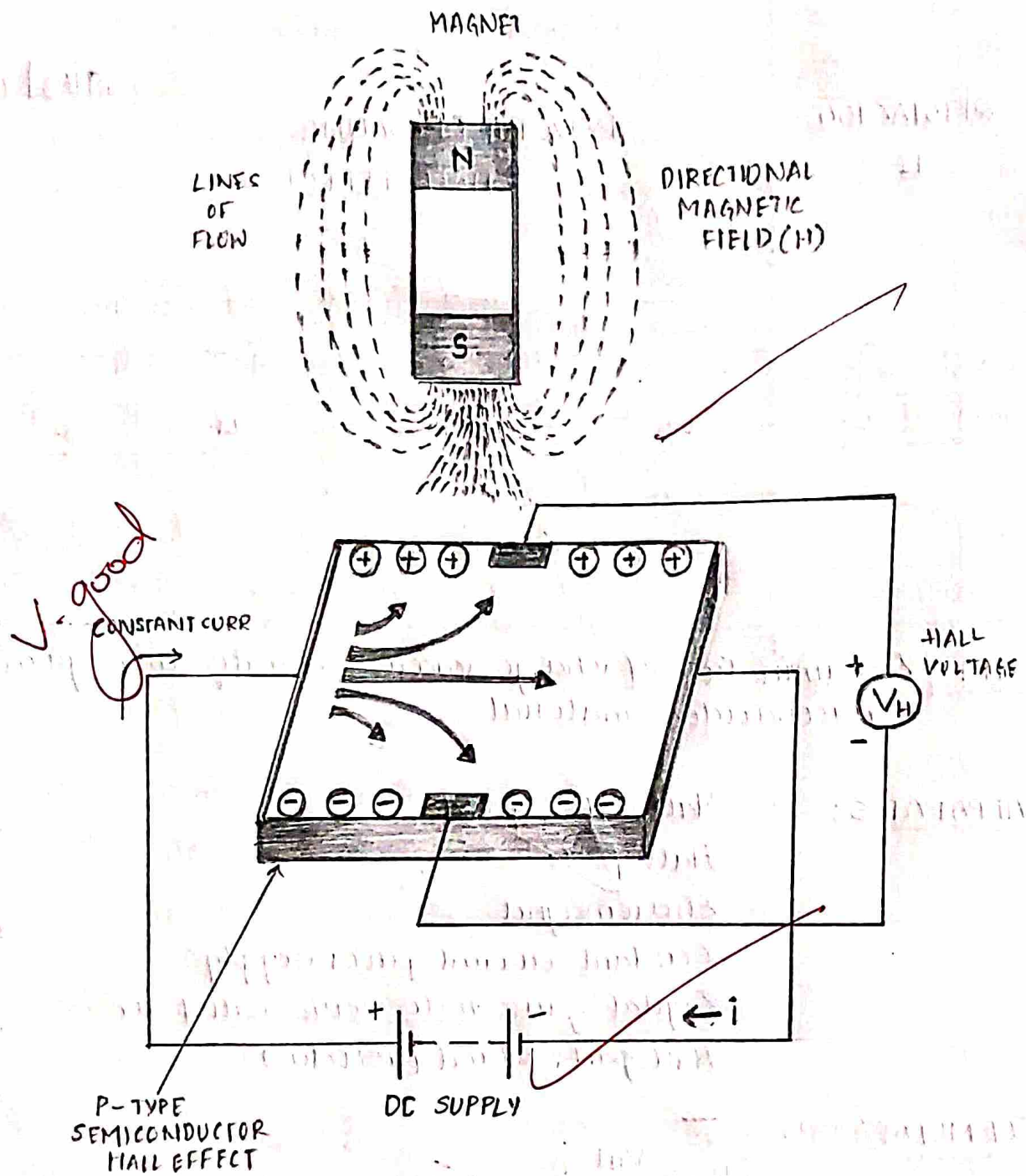
Hall effect panel
Hall probe
Electromagnet
Constant current power supply
Digital gauss meter with hall probe
Hall probe stand (wooden)

FORMULAE:

$$R_H = \frac{V_{Ht}}{I_B}$$

$$n = \frac{1}{e R_H}$$

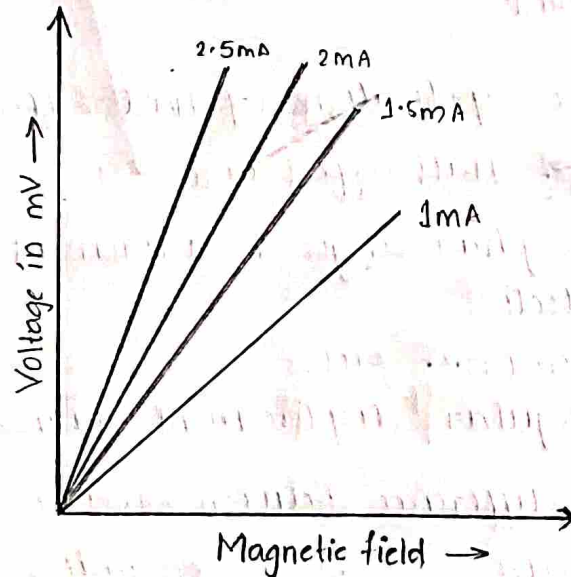
DIAGRAM :



OBSERVATION TABLE :

S.No	Magnetic field (B) (Tesla)	Thickness [m] (t)	Hall Current (I) (mA)	Hall Voltage (V_H) (mV)	$R_H = \frac{V_H t}{I B}$	$n = \frac{1}{R_H e}$
1	2	$0.5 \times 10^{-3} \text{ m}$	$0.2 \times 10^{-3} \text{ A}$	1.1×10^{-3}	1.375×10^{-3}	4.54×10^{21}
2	2	0.5×10^{-3}	$0.35 \times 10^{-3} \text{ A}$	2.0×10^{-3}	1.428×10^{-3}	4.37×10^{21}
3	2	0.5×10^{-3}	$0.64 \times 10^{-3} \text{ A}$	3.7×10^{-3}	1.445×10^{-3}	4.32×10^{21}
4	2	0.5×10^{-3}	$0.84 \times 10^{-3} \text{ A}$	4.7×10^{-3}	1.398×10^{-3}	4.47×10^{21}
5	2	0.5×10^{-3}	$1.14 \times 10^{-3} \text{ A}$	6.5×10^{-3}	1.425×10^{-3}	4.38×10^{21}
6	2	0.5×10^{-3}	$1.44 \times 10^{-3} \text{ A}$	8.2×10^{-3}	1.423×10^{-3}	4.39×10^{21}
7	2	0.5×10^{-3}	$1.66 \times 10^{-3} \text{ A}$	9.5×10^{-3}	1.430×10^{-3}	4.37×10^{21}
8	2	0.5×10^{-3}	$2.06 \times 10^{-3} \text{ A}$	11.7×10^{-3}	1.419×10^{-3}	4.40×10^{21}

MODEL GRAPH :



RESULT :

Carrier concentration $(n) = 4.405 \times 10^{21} \text{ m}^{-3}$

VIVA VOCE :

1. Define Hall Effect

A) Hall effect is the production of a voltage difference (Hall voltage) across an electrical conductor when a magnetic field is applied in a direction perpendicular to that of flow of current.

2. What is Hall co-efficient?

A) Hall co-efficient (R_H) is defined as the ratio between the induced electric field and to the product of applied magnetic field and current density.

3. Write the Hall co-efficient equation?

A) Hall co-efficient (R_H) = $\frac{V_t}{IB}$

where, $V \rightarrow$ voltage difference $B \rightarrow$ magnetic field.
 $I \rightarrow$ current

4. What are the applications of Hall Effect?

A) Applications of Hall effect are :

- * It is used in phase angle measurement.
- * Proximity detectors
- * Hall effect sensors & probes.
- * Linear or Angular displacement transducers.

5. What is the difference between Electric & Magnetic field?

A) A magnetic field is a field explaining the magnetic influence on an object in space.

An electric field is a field defined by the magnitude of the electric force at any given point in space.

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