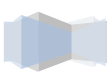
EXPERIMENT NUMBER: 2.6

STUDENT'S NAME:	**Section/Group:**
STUDENT'S UID:	**SUBJECT CODE:**
BRANCH: CSE	**Date of performance:**
SEMESTER:	

- **AIM:-** To determine the Hall Voltage and Hall Coefficient using Hall Effect.

- **APPARATUS-**

S. No.	Equipment	Range	Quantity
1.	Constant current supply	4A & 50V	1
2.	Hall probe	NA	1
3.	Digital Gauss Meter	2-20K gauss	1
4.	N-type Copper crystal	0.7 eV	1
5.	Electromagnet/Solenoids	NA	2
6.	Power supply for crystal	0-8mA & 0-200mV	1



- **CIRCUIT DIAGRAM -**

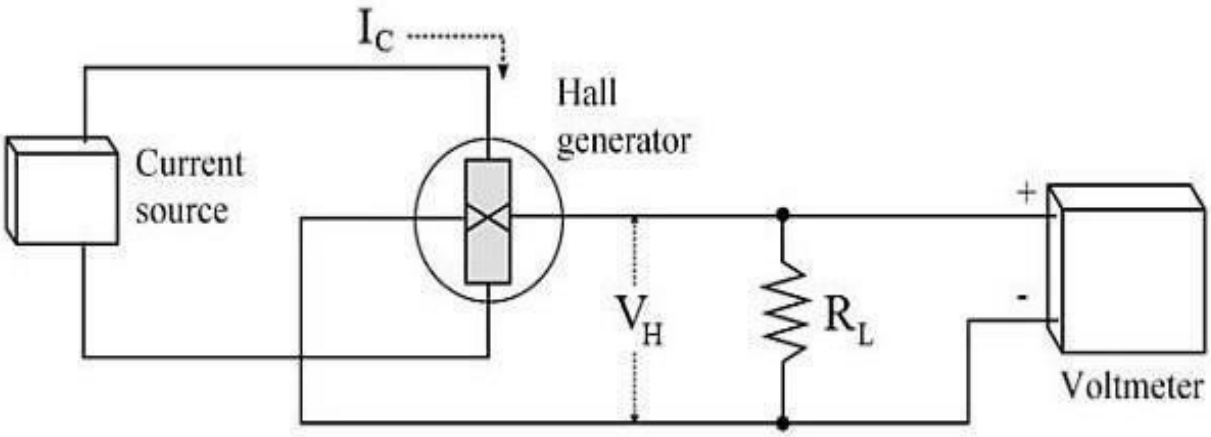


Fig.1:- Schematic representation of Hall Effect in a conductor.

- **OBSERVATIONS-**

Table 1:-

S. No.	**Current** I (A)	**Magnetic Field H** (Tesla)
1	1	0.1482
2	1.5	0.2223
3	2	0.2964
4	2.5	0.3706
5	3	0.4447
6	3.5	0.5188

Magnetic field taken: = 0.1482 TESLA **Material Used =** Gold **Thickness of the material used =** 0.0003 m **Current =** 1 A

Table 2 :-

S.No.	Magnetic field	Thickness (mm)	Hall current	Hall voltage (mA)	$R_h = (V_H * t) / (I_H * B)$
1	0.1482	0.3		518.788	0.7
2	0.1482	0.3		691.717	0.7
3	0.1482	0.3	(mA) 1.5 2 2.5 3 3.5 4	864.646	0.7
4	0.1482	0.3		1037.575	0.7
5	0.1482	0.3		1210.504	0.7
6	0.1482	0.3		1383.433	0.7

- **CALCULATIONS-**

$$= \frac{518.787 * 0.3 * 10^{-3}}{1.5 * 0.1482}$$

$$= 0.7$$

Mean of hall coefficient = (0.7 +0.7 +0.7 +0.7 +0.7 +0.7)/ 6
= 4.2/6
= 0.7 vm/at

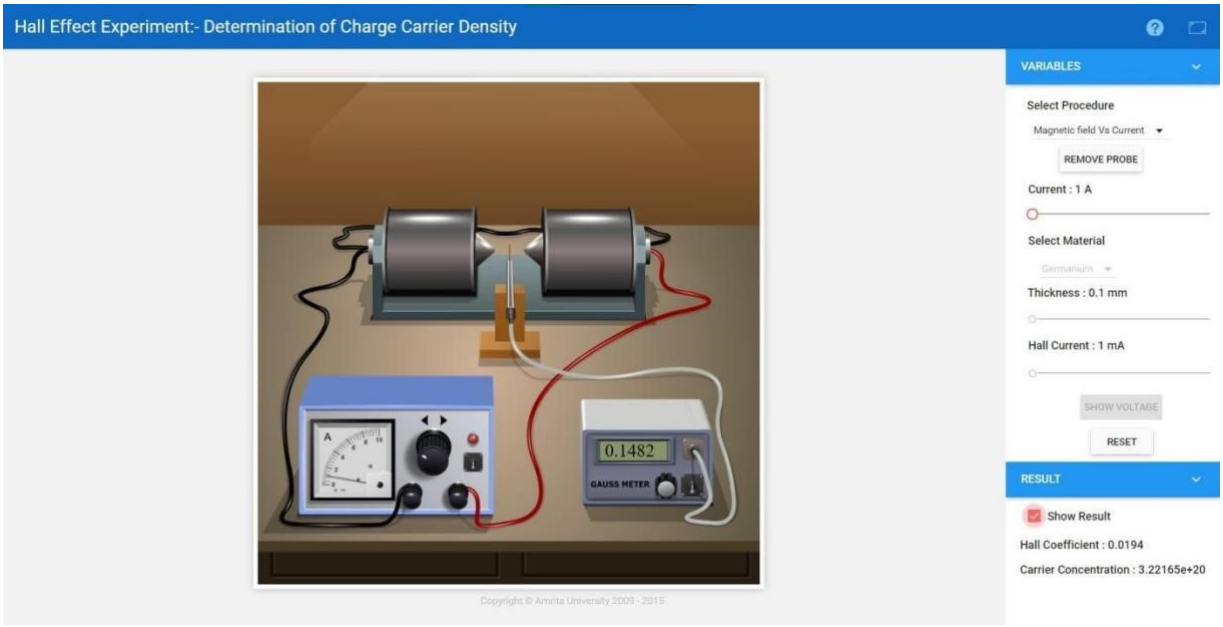
Mean Hall voltage = (518.787+691.717+864.646+1037.575+1210.504+1383.433)/6
= 5706.662/6
= 951.11 mA

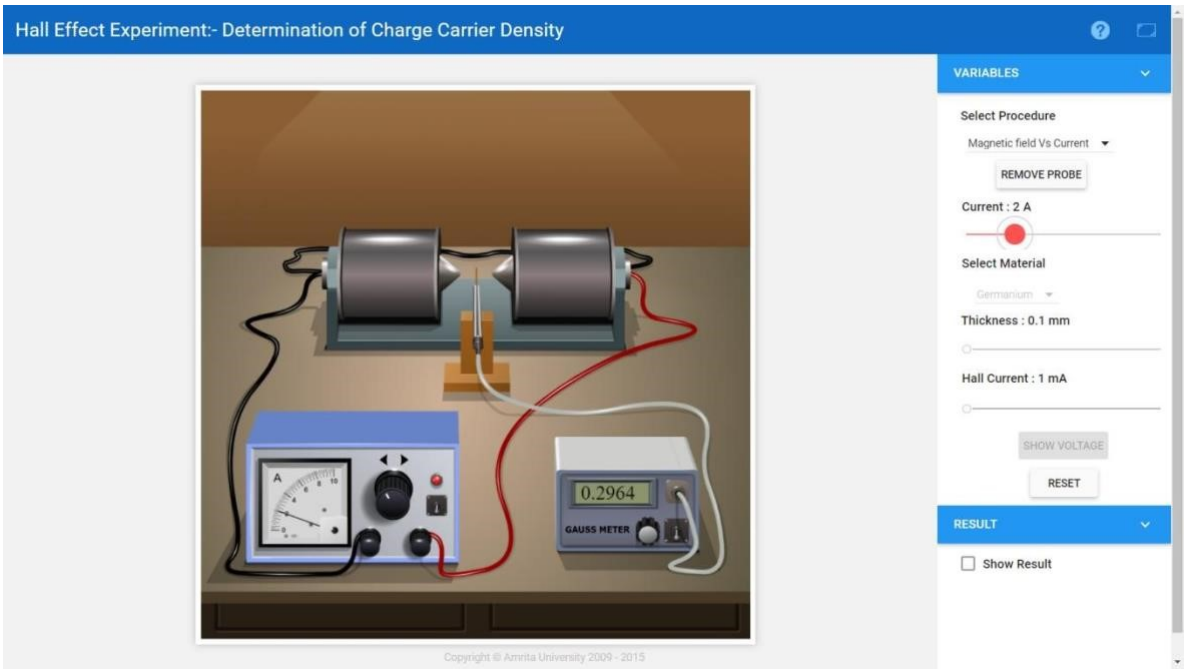
- **PERCENTAGE ERROR**-
  Nil

- **GRAPH (ATTACH IF ANY)-**

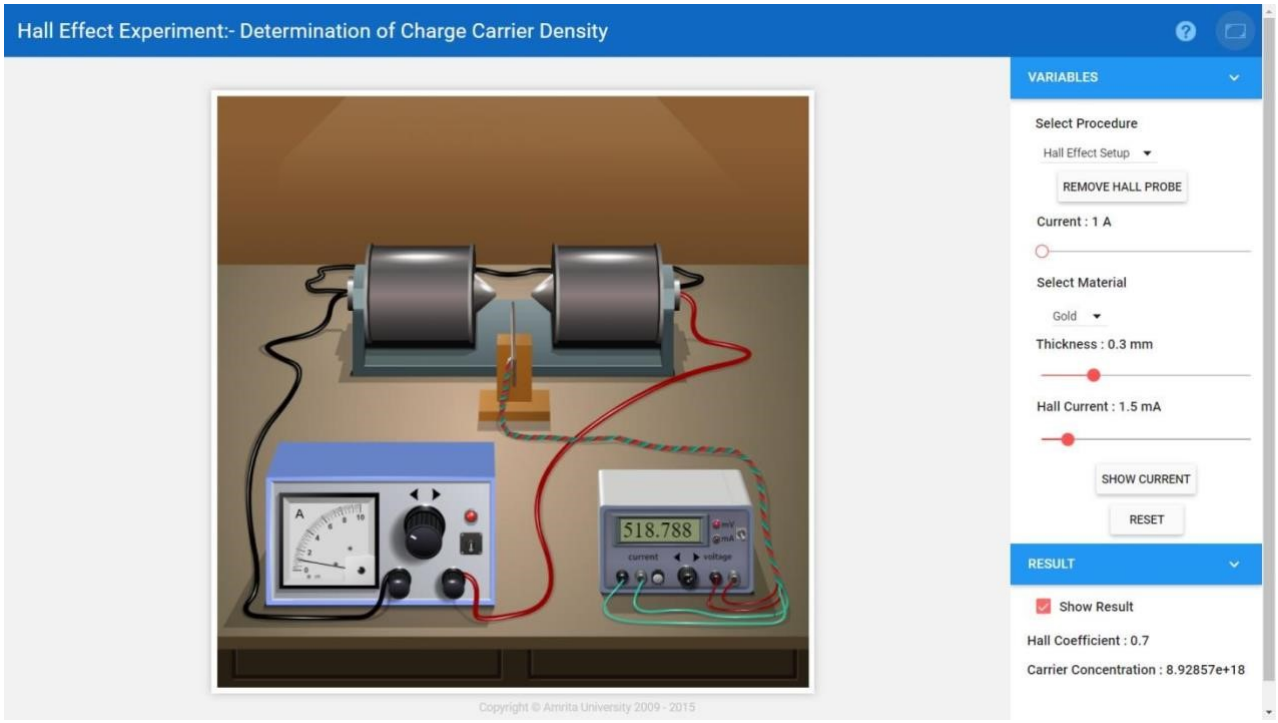
Simulation Screenshots :

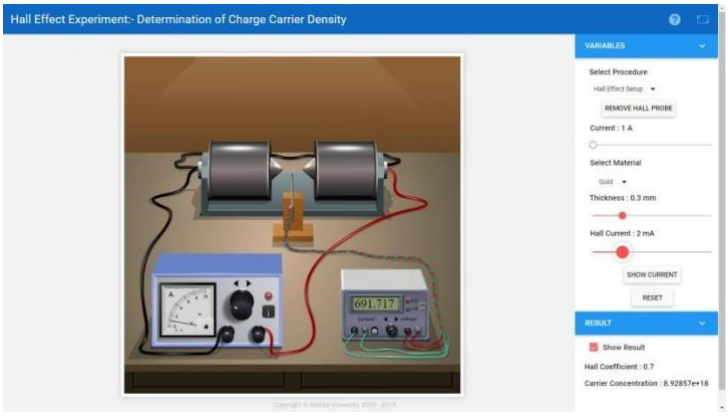
Magnetic Field Vs Current

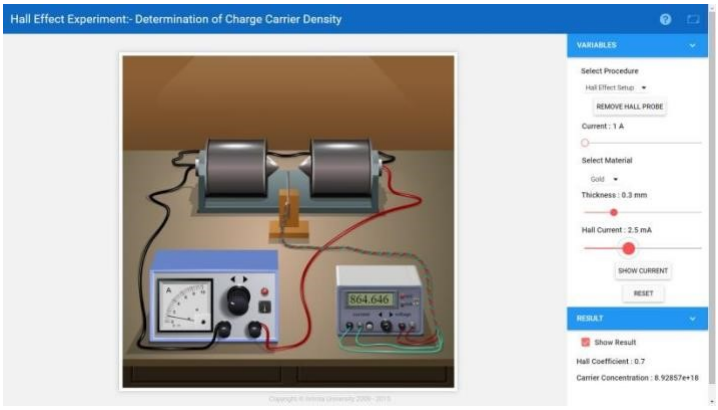


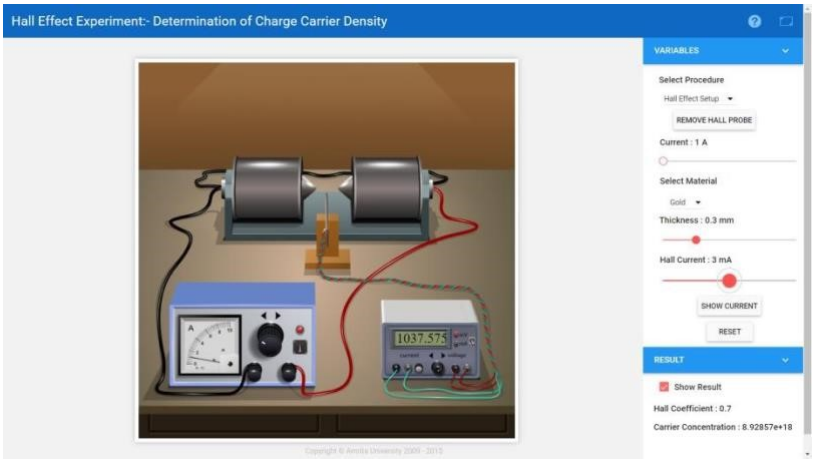


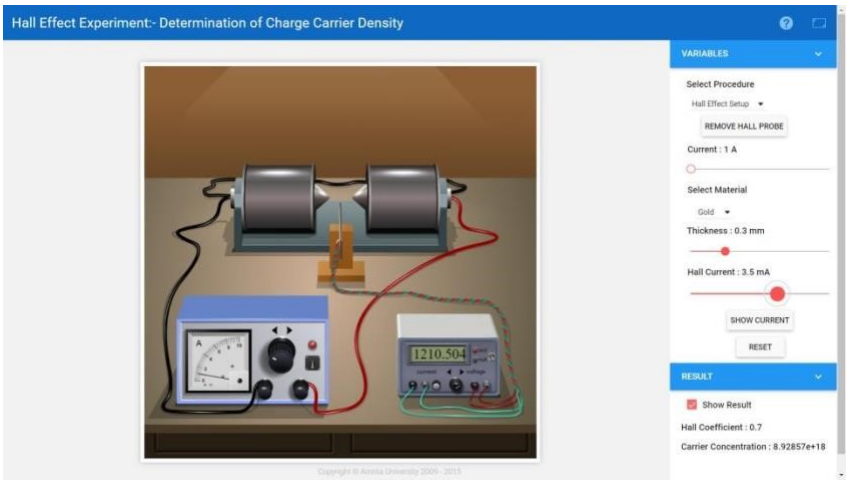
- **HALL EFFECT SETUP**

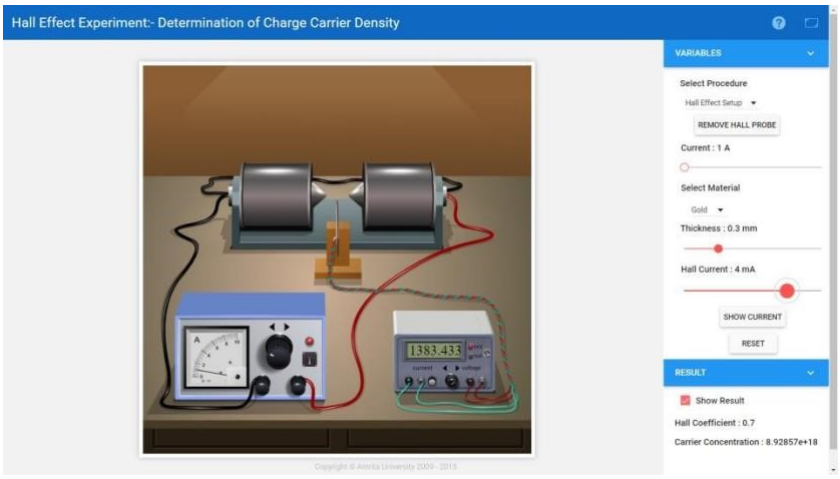



Hall Effect Experiment:- Determination of Charge Carrier Density
VARIABLES
Select Procedure
Hall Effect Setup
REMOVE HALL PROBE
Current : 1 A
Select Material
Gold
Thickness : 0.3 mm
Hall Current : 2 mA
SHOW CURRENT
RESET
RESULT
Show Result
Hall Coefficient : 0.7
Carrier Concentration : 8.92857e+18
691.717


Hall Effect Experiment:- Determination of Charge Carrier Density
VARIABLES
Select Procedure
Hall Effect Setup
REMOVE HALL PROBE
Current : 1 A
Select Material
Gold
Thickness : 0.3 mm
Hall Current : 2.5 mA
SHOW CURRENT
RESET
RESULT
Show Result
Hall Coefficient : 0.7
Carrier Concentration : 8.92857e+18
864.646


Hall Effect Experiment:- Determination of Charge Carrier Density
VARIABLES
Select Procedure
Hall Effect Setup
REMOVE HALL PROBE
Current : 1 A
Select Material
Gold
Thickness : 0.3 mm
Hall Current : 3 mA
SHOW CURRENT
RESET
RESULT
Show Result
Hall Coefficient : 0.7
Carrier Concentration : 8.92857e+18
1037.575





- **SOURCES OF ERROR-**

I. Current should be constant otherwise it will give false value.

II. Error due to parallax should be avoided while measuring thickness

- **LEARNING OUTCOMES**

- It will provide the modest experience that allows students to develop and improve their experimental skills and develop ability to analyzedata.
- Ability to demonstrate the practical skill on measurements and instrumentation techniques of some Physics experiments. Students will develop the ability to use appropriate physical concepts to obtain quantitative solutions to problems inphysics.
- Students will demonstrate basic experimental skills by setting up laboratory equipment safely and efficiently, plan and carry out experimental procedures, and report verbally and in written language the results of theexperiment.
- Students will develop skills by the practice of setting up and conducting an experimentwithdueregardstominimizing measurement error.

- **EVALUATION COLUMN (TO BE FILLED BY CONCERNED FACULTY ONLY)**

Sr. No.	Parameters	Maximum Marks	Marks Obtained
1.	Worksheet completion including writing learning objectives/Outcomes. (To be submitted at the end of the day)	10	
2.	Post Lab Quiz Result.	5	
3.	Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions.	5	
4.	Total Marks	20	
5.	Teacher's Signature (with date)		