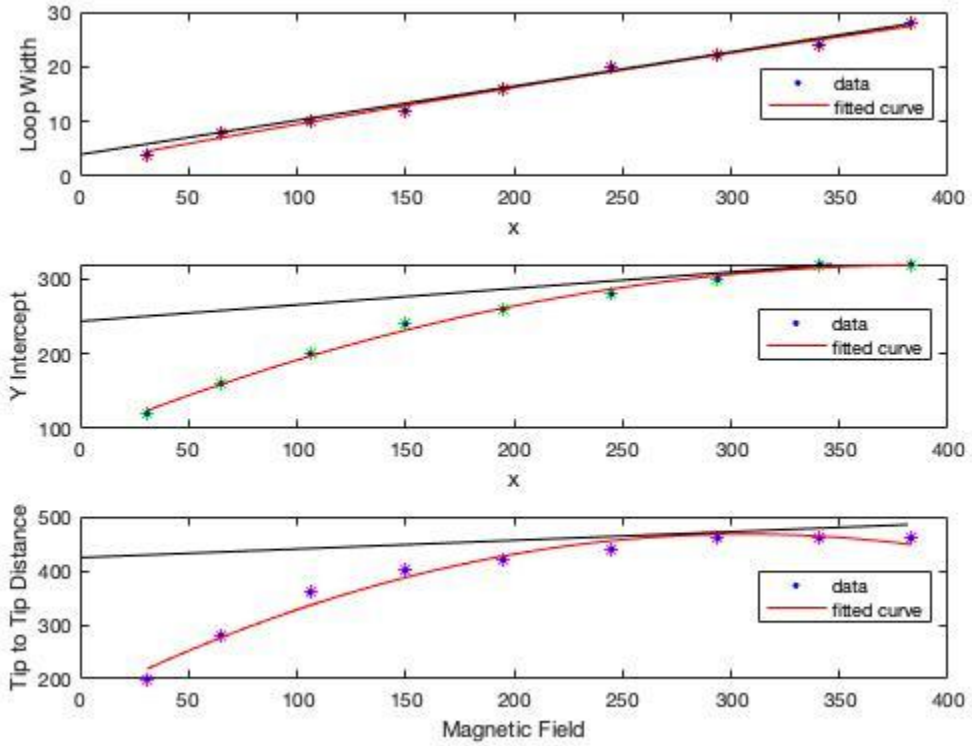
ESO205 Lab-6

SHUBHAM GUPTA 180749 **SEC-3, GROUP-3**

Assignment 6

Experiment 1: Estimate the saturation magnetization and coercivity and plot the MH loop.

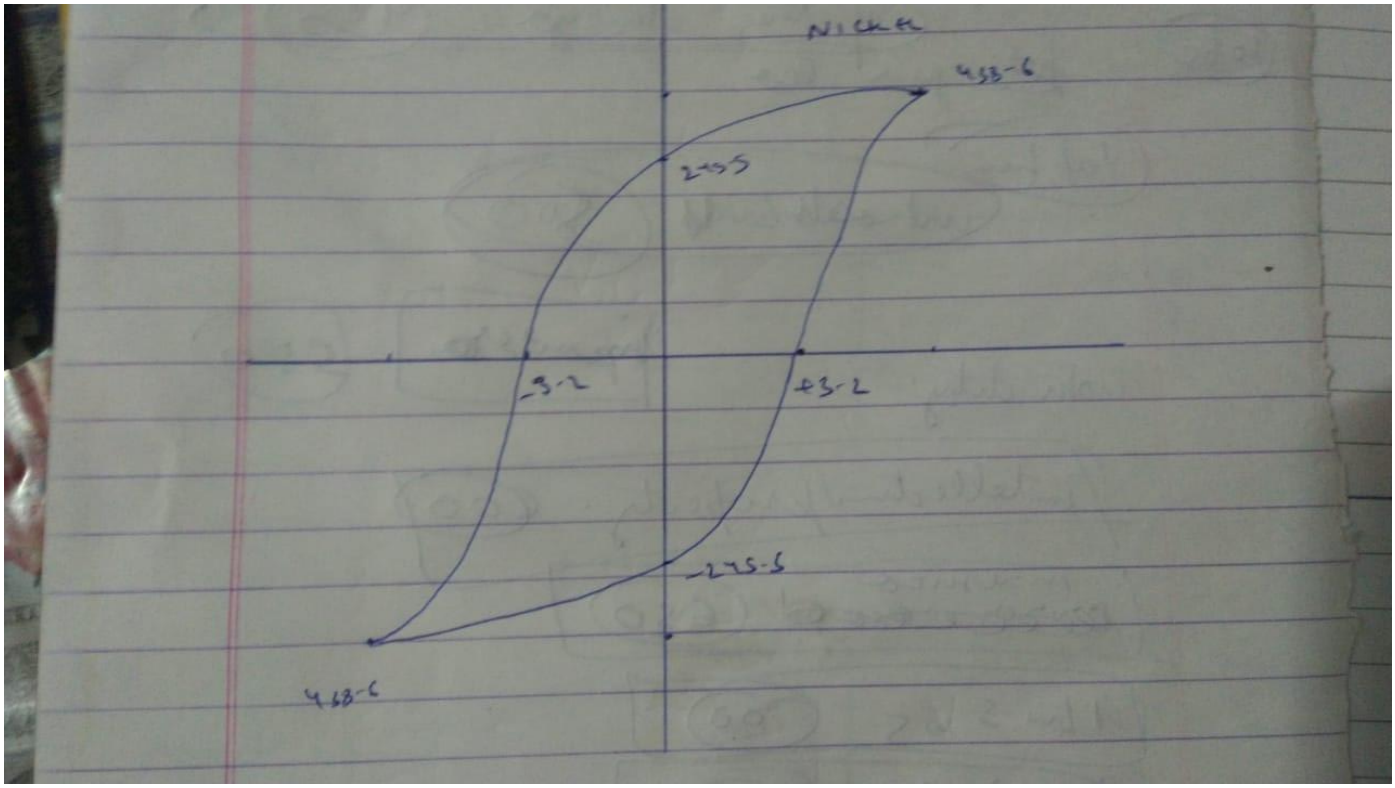
For nickel:

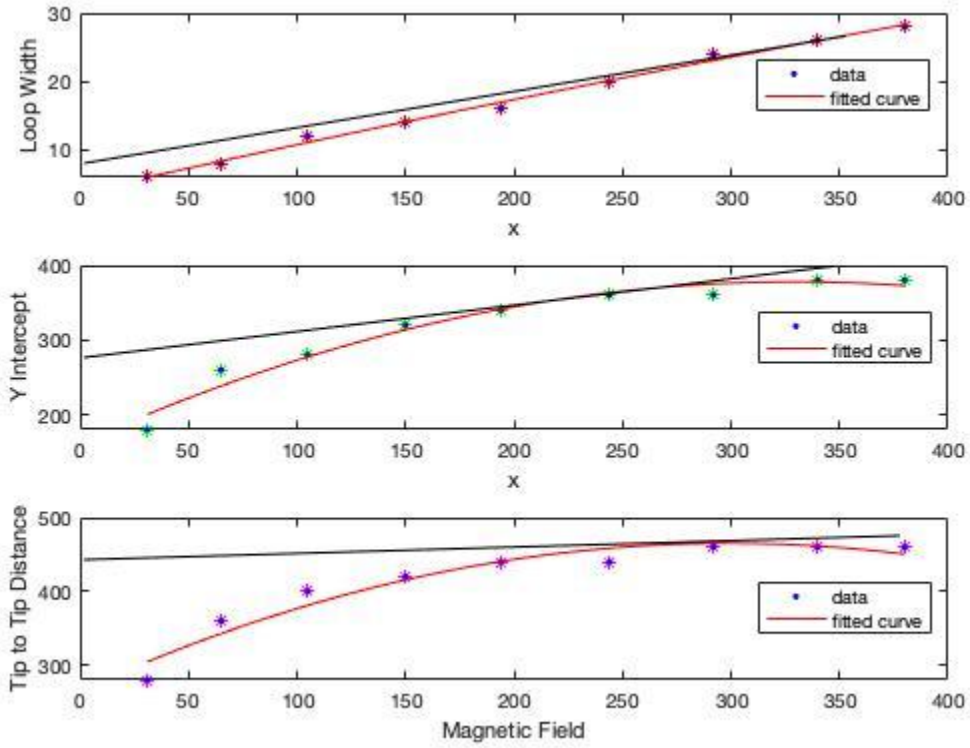


Coersity = 3.2

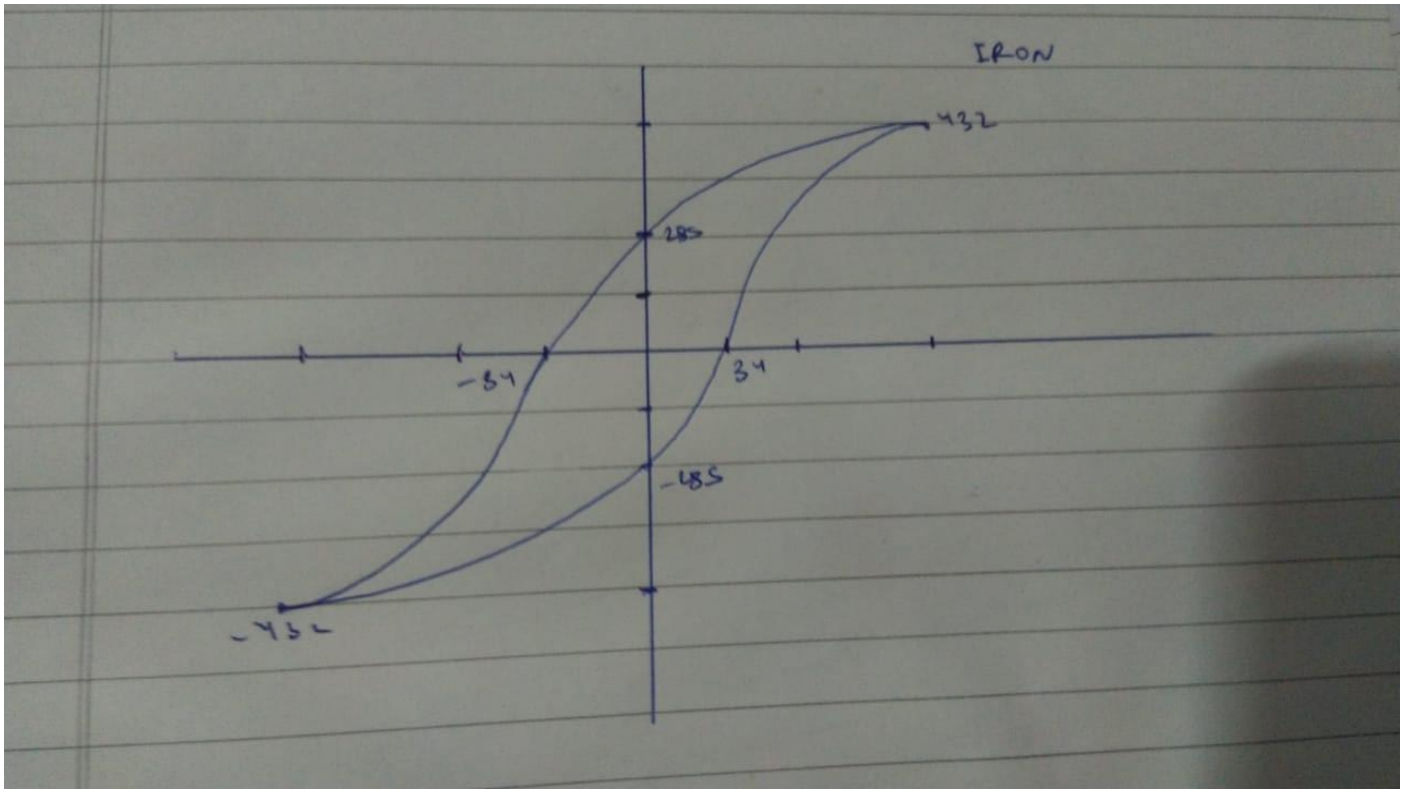
Retentivity = 245.5

Saturation = 438.6


NICKEL
4.68-6
2.95
-3.2
+3.2
-2.95-6
4.68-6


Loop Width
data
fitted curve
x
Y Intercept
data
fitted curve
x
Tip to Tip Distance
data
fitted curve
Magnetic Field

Coersity = 34
Retentivity = 285
Saturation = 432



Experiment 2: Find the resistivity of the sample and the Hall co-efficient.

Part 1: Find the resistivity of the sample

$R_{vertical,\ avg}$ = 9.42

$R_{horizontal,\ avg}$ = 71.13

$$\frac{R_{vertical}}{R_{horizontal}} < 1$$

Therefore, the value of *f*(correction factor) will be calculated using $\frac{R_{horizontal}}{R_{vertical}}$.

$$\rho = \frac{\pi}{\ln(2)}\, t\left(\frac{R_{Vertical} + R_{Horizontal}}{2}\right) f$$

, using this equation

rho comes out to be = **0.05**

I(A)	H (G)	H-e	VH(mv) Hall Vol	Hall voltage VH(mv) opp	voltage difference
0	94	0	105.5	102.9	2.6
0.25	368	274	107.8	100.4	7.4
0.5	647	553	110.6	97.9	12.7
0.75	912	818	113.4	95	18.4
1	1206	1112	115.9	92.8	23.1
1.5	1890	1796	122.5	88.2	34.3
2	2430	2336	127.3	84.1	43.2
2.5	2980	2886	132.2	81.3	50.9
3	3500	3406	136.7	78.3	58.4
3.5	4030	3936	140.9	76	64.9
4	4500	4406	144.4	73.8	70.6

Hall coefficient = 0.00014mV

Part 2: Hall co-efficient for Germanium

plot of ln(ρ) versus 1/T.
find the slope of this curve, this comes out to be 3657.46.
This value corresponds to $\frac{E_g}{2 \cdot k}$ where E_g is bandgap energy and k is Boltzmann's constant.

E_g comes out to be 0.63 eV.
