



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Date: 29/03/2022

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Exp No: 08 Experiment Name: B-H CURVE EXPERIMENT

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: To determine the energy loss of ferromagnetic material by using B-H curve.

APPARATUS:

1. Hysteresis loop traces
2. B-H curve trainer kit
3. CRO [Cathode Ray Oscilloscope]
4. Groves

FORMULA:

$$\text{Energy loss; } E_L = \frac{N_1}{N_2} \times \frac{R_2}{R_1} \times \frac{C}{A_1} \times S_V \times S_H \times A$$

N_1 = no. of turns in primary coil = 200

N_2 = no. of turns in secondary coil = 400

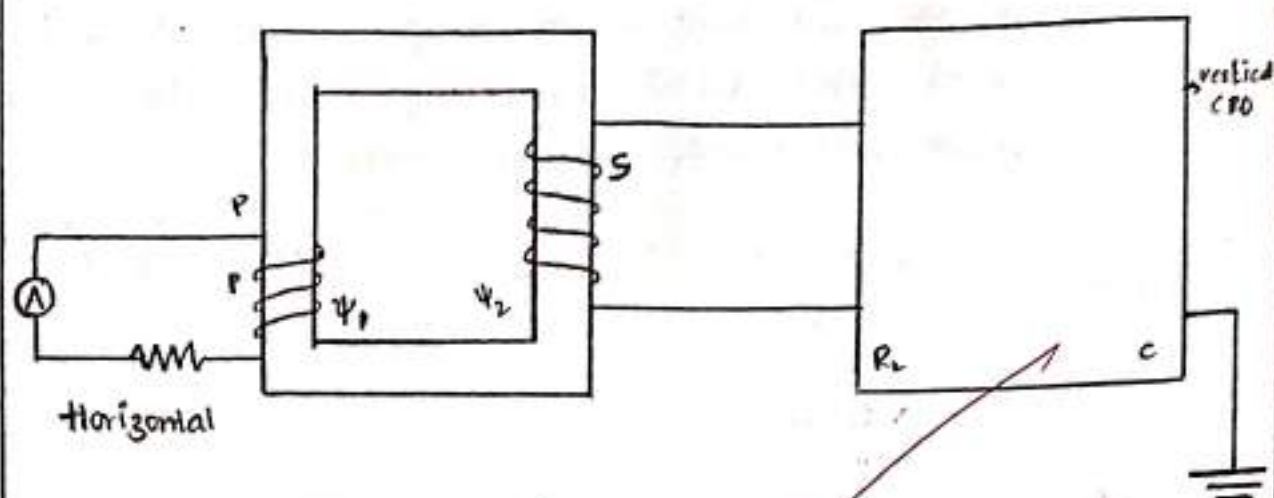
R_1 = variable resistance in primary coil

R_2 = fixed resistance in secondary coil = 3.8 k Ω

C = capacitance in Faraday = 6.8×10^6 F

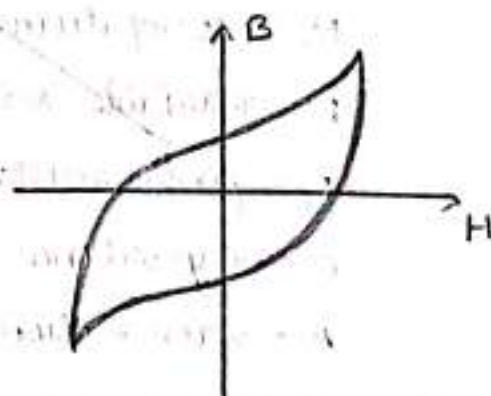
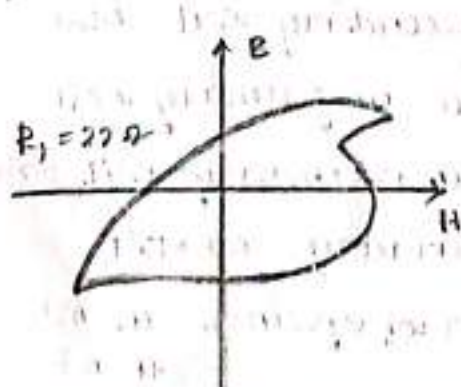
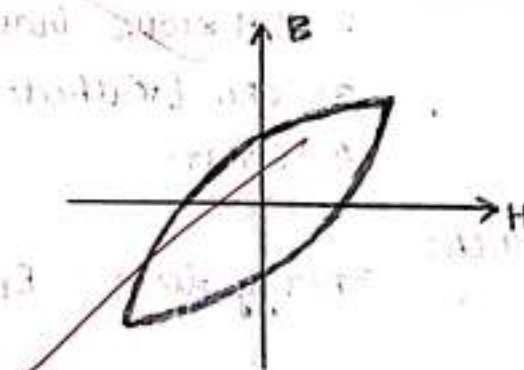
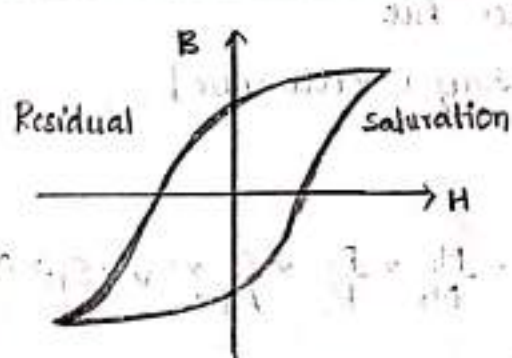
A = cross section area of specimen in m^2 .
= 216 m^2

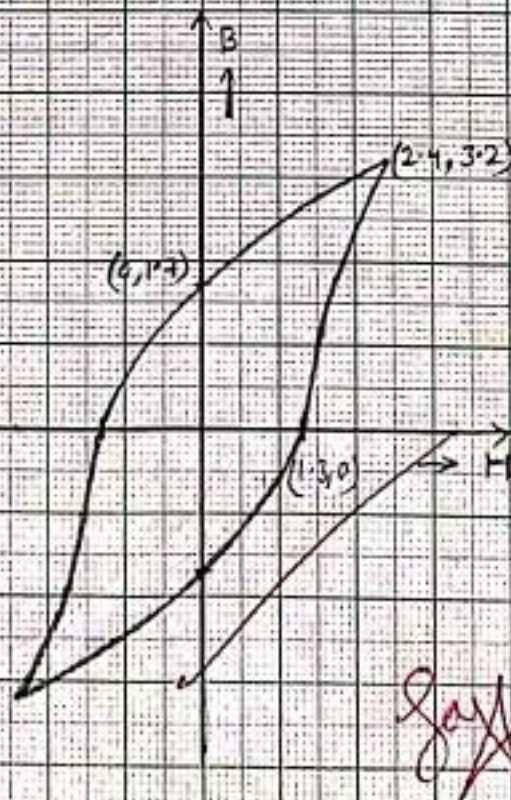
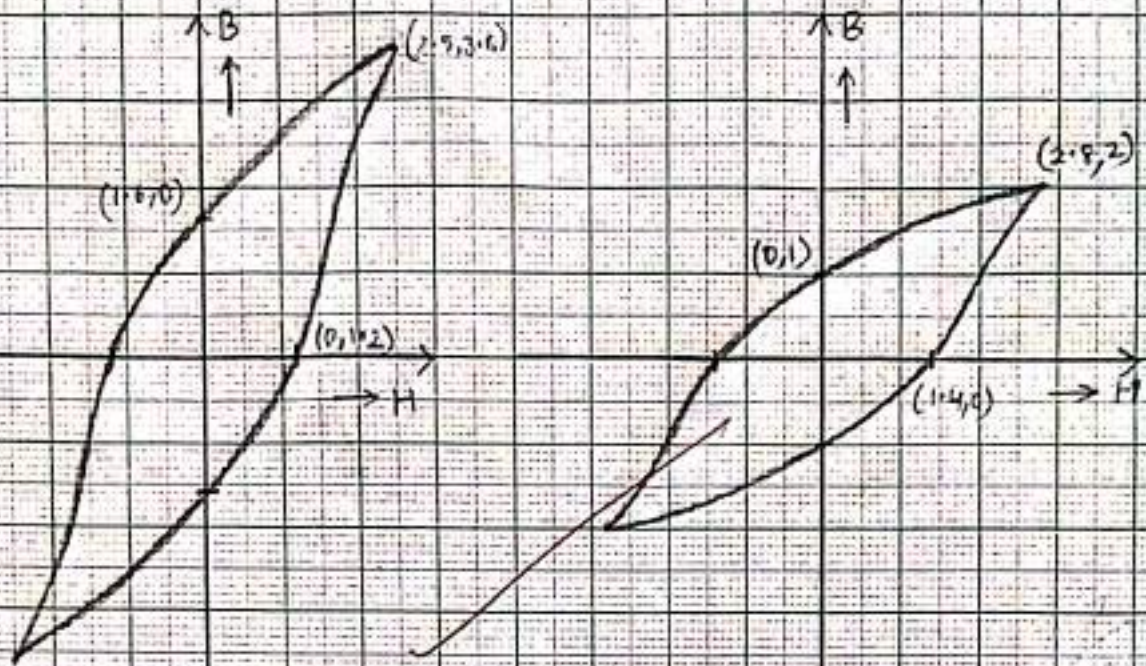
DIAGRAM:



OBSERVATION TABLE:

S.No	RESISTANCE $R_L (\Omega)$	HORIZONTAL SENSITIVITY (SH)	VERTICAL SENSITIVITY (SV)	AREA OF LOOP (m^2)	ENERGY LOSS
1	4.7	0.2	0.5	1.024	4.654×10^{-4}
2	22	0.5	1	0.744	3.612×10^{-4}
3	47	1	0.5	1.198	2.723×10^{-4}





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S_v = vertical sensitivity

S_H = horizontal sensitivity

$L = 28 \text{ cm}$

RESULT:

The energy loss per unit volume of a given magnetic material per cycle is 3.663×10^{-4} Joules.

VIVA VOCE:

1. What is retentivity?

The ability of material to retain a certain amount of magnetic field when the magnetic field is removed achieving saturation.

2. What is Hysteresis loss?

Astorn'metz experiment on power losses in magnetic materials used in electrical machinery led to this first important work. The law of hysteresis deals with the power loss that occurs in an electrical devices when magnetic action is converted to unstable heat.

3. Classify the magnetic material?

The magnetic materials are generally classified into three types based on the behaviour of materials in a magnetising field they are diamagnetic, para magnetic and ferromagnetic materials which (are) detect with this section.

Jay

4. What is co-exivity?

The resistance of magnetic material to change in magnetic field when the magnetizing force is removed after achieving saturation. The resistance of magnetic material to change in magnetization equivalent to the field intensity necessary to re-magnetise the fully magnetized material.

Jay