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Physics 208-CC3

<div align="center">Lab 6- Electromagnetic Induction -B</div>

Procedure:

1. Connect the terminals of 225-turn coils directly to the galvanometer.
2. Record the observation of the galvanometer needle, which direction of magnet bar moves in and out.
3. Place the second 225-turn coil and connect in series with a switch and the DC supply line.
4. Place the search coil in the center of the large coil.
5. Record the voltage for various angles of orientation from 0 to 90 degrees.
6. Record the voltage for various positions along the axis of the large coil being careful to keep the planes of the two coils always parallel.

Data/Calculations/Questions:

❖ **Formula:**

➢ $B = \mu_0 nI = \dfrac{\mu_0 NI}{2R}$

➢ $(t) = I_0 sin\omega t = I_{rms}\sqrt{2}sin\omega t$

➢ $V = N_1 \dfrac{d\phi}{dt}$

➢ $V = N_1 \pi R_1^2 \dfrac{\mu_0 N_2}{2R_2} I_{rms}\sqrt{2}\omega cos\theta$

➢ $\phi = BA_1 cos\theta$

➢ $V = N_1 A_1 cos\theta \dfrac{dB}{dt} = N_1 (\pi R_1^2) cos\theta \dfrac{dB}{dt}$

theta	cos	Vpk-pk	X	V		Y	V
0	1	2.18	-10	1.8		-15	3.12
10	0.984807753	2.14	-5	2.08		-10	2.5
20	0.939692621	2.02	0	2.18		-5	2.26
30	0.866025404	1.9	5	2.04		0	2.18
40	0.766044443	1.64	10	1.74		5	2.24
50	0.64278761	1.4	15	1.38		10	2.5
60	0.5	1.12	20	1.04		15	3.12
70	0.342020143	0.76	25	0.8			
80	0.173648178	0.36	30	0.58			
90	0	0.1					

cosθ vs V

X&Y vs V
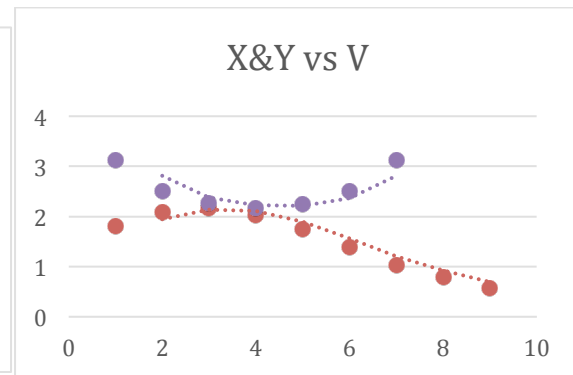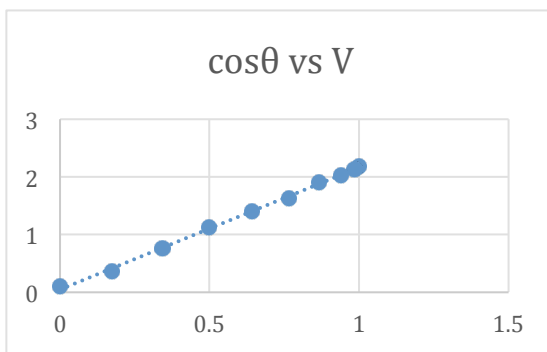
Questions:

1. Because in the ammeter there is a resistor that may could block some current.

2. In assuming that magnetic fields are uninformed but in reality $\Phi = BA\cos\Theta$ it wasn't uniformed causing the outcome to be bit off.

Analysis/Discussion:

Overall, this experiment was successful because we obtained the numbers for the induced voltage that was based on the formula. Even though they're still had some small errs, but it did not affect much of the result. Now we can understand how the angle and distance can affect the induced voltage in this experiment.