General Physics Laboratory I

Week 11: Report Guideline

Experiment 10. Measuring the earths magnetic field

Experiment 11. Transformers

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General Report Guideline

1. You can use either Korean or English.
2. I suggest you to write a report with a language with which you can write rigorously. (There is no need to be shy about writing in Korean)
3. However, do not mix two languages. (ex: newton's law는 다음과 같이… → X)
4. No more than 5 pages. The font size must be greater than 9 pts.
5. Only *.doc, *.docx, *.hwp extensions are allowed.
6. Do not make a cover page.
7. **Do not repeat the details in the manual.**
8. Make the report simple but it should contain rigorous answers. / **You should merge different data in one plot.**
9. **If you suggest the origin of the error, please show your systematic justification. (No explanation → No points)**
10. You have to cite every source of theory and information beyond the manual.
11. Clarify a theme and a purpose of each part.

10. Measuring the earths magnetic field

1. Abstract (5pts, < 300 words)
2. Introduction (10pts): Show your conceptual understanding about the subject.
3. Theoretical Background (10pts)
   - ✓ (5pts) Explain about the earths magnetic field.
   - ✓ (5pts) Give an equation about a electromotive force using experimental parameters. (Inner radius, Outer radius, Turns of the coil)
4. Methods (5pts): Please write down the experimental parameters which you used in the report.
5. Results (20pts)
   - ✓ (5pts) Plot the (electromotive force for the coil rotates with x,y,z axis) vs (time)
   - ✓ (5pts) Fit your graphs to the trigonometric function in Origin, MATLAB, Python, … or other fitting tool.
   - ✓ (5pts) Find the amplitudes and the rotational frequencies of the electromotive force.
   - ✓ (5pts) Find the magnitude and the magnetic dip(tilting angle from the ground) of the Earth's magnetic field.
   - ✓ Each graph should include **the axis labels**. When you introduce trendlines, you should show **equations and R square values**.
6. Discussion (30pts)
   - ✓ (10pts) Search the known values in South Korea.
   - ✓ (10pts) Compare your experimental results with the known values.
   - ✓ (10pts) Discuss about the error.
   - ✓ (Additional) Discuss about your own question and analysis.
7. Conclusion (10pts): Summarize the report effectively.
8. References (10pts)

11. Transformers

1. Abstract (5pts, < 300 words)
2. Introduction (10pts): Show your conceptual understanding about the subject.
3. Theoretical Background (10pts)
   - ✓ (5pts) Draw the magnetic field lines(자기력선) for each process. (Two coils, Direction of the currents, Field inside & outside the cores.)
   - ✓ (5pts) Give general relationship of voltages & currents between two coils.
4. Methods (5pts): Please write down the experimental parameters which you used in the report.
5. Results (20pts)
   - ✓ (5pts) Role of the core: Make the data tables in the experimental setup & procedure.
   - ✓ (5pts) Voltage conversion: Make the data tables in the experimental setup & procedure.
   - ✓ (5pts) Voltage conversion: Plot the V_2-V_1 graphs for each case. Add trend-line with a R-squared value.
   - ✓ (5pts) Voltage conversion: Plot the (value of slope) vs (turns of the secondary coil) and include the trend-line with a R-squared value.
   - ✓ Each graph should include **the axis labels**. When you introduce trendlines, you should show **equations and R square values**.
6. Discussion (30pts)
   - ✓ (10pts) Role of the core: What is the role of the magnetic core? and what factor produce the different results for each process?
   - ✓ (10pts) Voltage conversion: Explain the relationship between V_2 and V_1, and explain the meaning of the slope.
   - ✓ (10pts) Discuss about the error.
   - ✓ (Additional) Discuss about your own question and analysis.
7. Conclusion (10pts): Summarize the report effectively.
8. References (10pts)