General Physics Laboratory I

Week 12: Report Guideline

Experiment 12. Propagation of electromagnetic waves

Experiment 13. Measuring the speed of light

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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.

12. Propagation of electromagnetic waves

1. Abstract (5pts, < 300 words)
2. Introduction (10pts): Show your conceptual understanding about the subject.
3. Theoretical Background (10pts)
   - ✓ (5pts) Explain the standing wave behaviors in Lecher line with equations. (Open, shorted, impedance matched circuits, respectively)
   - ✓ (5pts) Explain how the nodes, antinodes of voltage/currents standing waves are measured in Lecher line.
4. Methods (5pts): Please write down the experimental parameters which you used in the report.
5. Results (20pts)
   - ✓ (10pts) Show the raw data.
   - ✓ (5pts) Find the wavelength.
   - ✓ (5pts) Find the speed of wave.
   - ✓ Each graph should include **the axis labels**. When you introduce trendlines, you should show **equations and R square values**.
6. Discussion (30pts)
   - ✓ (10pts) Show the expected value of the speed. Compare the experimental results with your expectation.
   - ✓ (10pts) What is the physical meaning of the found value of the speed of wave?
   - ✓ (10pts) Discuss about the error.
   - ✓ (Additional) Discuss about your own question and analysis.
7. Conclusion (10pts): Summarize the report effectively.
8. References (10pts)

13. Measuring the speed of light

1. Abstract (5pts, < 300 words)
2. Introduction (10pts): Show your conceptual understanding about the subject.
3. Theoretical Background (10pts)
   - ✓ (5pts) Explain and categorize the optical fibers with respect to the radius of the core, cladding, and the refractive index distribution.
   - ✓ (5pts) Explain and justify the measurement procedure.
4. Methods (5pts): Please write down the experimental parameters which you used in the report.
5. Results (20pts)
   - ✓ (5pts) Show the pictures of oscilloscope traces of input and output lights pulses.
   - ✓ (5pts) Observe the transmission light signal (yellow signal in oscilloscope) and the received light signal (blue signal) and describe it.
   - ✓ (5pts) Find the time delay Δt between the two fibers.
   - ✓ (5pts) Calculate the speed of light using $c = nv = n\frac{\Delta L}{\Delta t} = n\frac{L_{long} - L_{short}}{\Delta t}$
   - ✓ Each graph should include **the axis labels**. When you introduce trendlines, you should show **equations and R square values**.
6. Discussion (30pts)
   - ✓ (10pts) Explain why the received pulse signals were broaden compared to the transmission pulse signals.
   - ✓ (10pts) Compare the result with your expected value.
   - ✓ (10pts) Discuss about the error.
   - ✓ (Additional) Discuss about your own question and analysis.
7. Conclusion (10pts): Summarize the report effectively.
8. References (10pts)