General Physics Laboratory I

Week 05: Report Guideline

Experiment 5. Rotational Inertia

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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 quantitative justification. (No quantitative 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.

5. Rotational Inertia

1. Abstract (5pts, < 300 words)
2. Introduction (10pts): Show your conceptual understanding about the subject.
3. Theoretical Background (10pts)
   - ✓ (5pts) Explain about a rotational motion with constant angular velocity (ω) and angular acceleration (α). Give a general equation of of the θ-t graph.
   - ✓ (5pts) Explain about a forced rotational motion in the experiment. Give a general equation of motion with a free body diagram.
4. Methods (5pts)
5. Results (20pts)
   - ✓ (5pts) **Plot θ-t, ω-t, α-t graphs** for all measurements.
   - ✓ (5pts) **Calculate the experimental moment of inertia (I)** using θ-t, ω-t, α-t plots and calculated values of torque.
   - ✓ (5pts) **Calculate the moment of inertia** for each case using masses and dimensions. You can use approximations.
   - ✓ (5pts) **Plot L-t grpahs** using ω-t plot and experimental and calculated value of I. (for Conservation of Angular Momentum data)
   - ✓ Each graph should include **the axis labels**. When you introduce trendlines, you should show **equations and R square values**.
6. Discussion (30pts)
   - ✓ (5pts) Compare the experimental values and the calculated values of I. (5pts) Suggest possible error mechanisms and verify it quantitatively.
   - ✓ (5pts) Compare the moment of inertia right before the collision and right after the collision. (5pts) Discuss angular momentum conservation and error.
   - ✓ (10pts) Justify the approximations in the calculation of I mathematically. ex) considering rod + weight system as a line mass and two point masses.
   - ✓ (Additional) Discuss about your own question and analysis.
7. Conclusion (10pts): Summarize the report effectively.
8. References (10pts)