

Class ID

(NOT your
university ID)

Homework Exam III

(30% of the entire exam)

Please read the following before you write your name.

Name: _____ (⚡Don't forget your ID number!)

You must follow all of the instruction. Please read every instruction carefully. Asking questions is your responsibility if you are not sure about the meaning of the instruction.

For the first part, it must be **neatly organized and typed**. For the second part, draw arrows as it instructs and print each letter in the designated place.

Discussing with other people is allowed. **However, copying someone's or asking someone to do this exam is strictly prohibited.** The article part must be originated by only you; namely, if it is almost identical with others, it will be recognized as academic dishonesty. (If you are ONLY obsessed with obtaining a better grade, your mind has been polluted by some external environment.)

Missing your class ID or your name will be minus five points for each.

This will be thirty percent of the total points for the third exam. If the report satisfies each item, the full credit will be guaranteed. If not, the whole point will be suspended until you complete each requirement.

Asking the class instructor any questions and consultation is allowed and encouraged especially for students who do not know how to get started.

The due date is on the day of the in-class exam.

(I) Let's write a magazine-like article!

Write an informative article. You, as a journalist, will introduce an interesting finding to general people. The topic must be related to **chapters 20, 21, 22 and 23**. The content must be more than common knowledge among people. Some trivia will be recommended to write. Select one from the following suggested topics, and research on the topic with books, internet, magazine, and other resources to write your own article with one related formula you learned in class.

Total Score

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[1] The topics:

1) Issues related to eyes

The optometric technology has been improved year by year, such as eye glasses, contact lenses and surgery. Pick out one of the interesting topics associated with human eyes and the technological development, etc. (The physics part must be related to chapters 20 through 23.)

2) Animals (or any life) and physics

Some of species have special feature to survive in nature. For example, bees can detect some polarized light for their advantage. Write some interesting features of some specific life utilizing physics principle (from chapters 20, 21, 22, and 23).

3) Diagnostic devices and physics (including devices for forensic and geological sciences)

There are many of devices using physics. For the medical devices, MRI, X-rays, and optical fibers are well-known. Besides the popular devices, introduce some minor devices that most people do not know. (The topic has to be related to chapters 20 through 23.)

4) Entertainment and physics

Movies, animations and video games express quite a few physical phenomena. Introduce any interesting findings from any entertainments with the related chapters' ideas.

5) Energy and environmental issues

These issues are related to healthy and quality human life, ecology, national security, and so on. Quite a few technologies have contributed to environmental products and renewable energy devices. Introduce any devices or inventions that most people do not know well. (It has to be related to chapters 20, 21, 22, and 23.)

[2] The requirements:

- ① The article is for general people who are not physics experts or any other experts.
- ② You must indicate at least **one formula** from the lecture to explain some part of the article qualitatively. **Do not calculate!**
- ③ The topic must be interesting to you at least, and it should be addressed toward general people.

[3] The format and the rules:

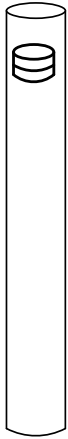
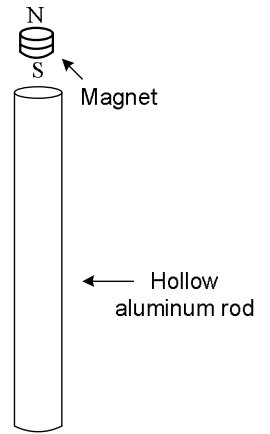
As far as it is typed neatly, the format can be flexible. The length should be about half a page with single line spacing. You are encouraged to express it how interesting your topic is.

After completing the article, check the following:

- ① Is the topic related to one of chapters 20 through 23?
- ② Did you indicate at least one formula, which must be from chapters 20 through 23?
- ③ Is the article interesting to know for general people?
- ④ Is the article beyond the common knowledge, yet not too technical?

(II) Why is the magnet falling slowly in an aluminum tube?

Remember the demonstration and its explanation in the notes. Consider when the s-pole of the magnet is directed downward this time.



1. Draw the direction of magnetic field (flux) to be increased in the left figure.

Write the reason.



2. Draw the direction of induced magnetic field (flux) in the left figure

Write the reason.



3. Draw the direction of the eddy current in the left figure.

Write the reason, or how do you find it?

4. In conclusion, explain what will happen. Does the magnet fall slowly or differently? Write the reason.