Physics 131 Spring 2026 Final Exam Notes
Final: Sunday, May 17, 2026
noon–3 pm Farinon Marlo Room

Logistics:

- The final will be designed to be completed in a 2-hour time period, but you may take the full 3-hour period if you wish.
- This will be an closed-book exam, similar in style and format to our previous hour tests.
- You will need a scientific calculator. You may not use a phone or any device that can connect to the internet.
- Put your name on each page. Five points will be awarded for putting your name on each page.
- All problems *must* begin with either a fundamental principle or with an equation from the equation sheet. Simply getting the correct final answer is not sufficient. You must also display correct reasoning for getting that answer. If any question is unclear, please ask immediately. Be sure to show your work **clearly**. Partial credit may be given for work *if* it can be understood.

Topics:

The final exam will be cumulative, incorporating topics covered throughout the semester. The most recent material, namely Chs. 14 and 15, will account for approximately 15–20% of the total.

The final exam will be very similar to individual hour exams in style and format. It will contain a mix of problems of varying degrees of difficulty. Some problems might include qualitative as well as quantitative questions. Some problems may focus on a single topic or chapter, while others may include topics from several different chapters. Consult the syllabus for the specific list of topics.

The following general areas may be covered:

Ch. 1–3	Kinematics
Ch. 4–5	Newton's Laws
Ch. 6–7	Work and Energy
Ch. 8	Linear Momentum
Ch. 9–10	Rotational Motion
Ch. 13	Gravity
Ch. 14	Oscillations
Ch. 15	Waves

Omissions: The following sections originally on the syllabus will not be on the final:

Section 2.6	Velocity and Position by Integration
Section 9.6	Moment of Inertia Calculations
Sections 13.6	Spherical Mass Distributions
Sections 14.6	The Physical Pendulum
Sections 14.7	Damped Oscillations
Sections 14.8	Forced Oscillations and Resonance
Sections 15.5	Energy in Wave Motion
Chapter 16	Sound and Hearing

Problems will typically focus on the underlying fundamental physics rather than obscure applications or complex mathematical manipulations.

You will be provided with an equation sheet similar to those from previous hour tests. A copy is available on the course website.

Lab-Inspired Questions:

There may be lab-inspired questions on the final. For example, there may be questions which are similar to physical situations you encountered in lab. There could also be problems in which you are presented with graphical information (similar to what you have generated in lab) and asked to use the graph to solve a problem. For example, you might be given a graph for an experiment and be expected to use the given slope and intercept to determine some relevant physical quantity. Or you might be given the position as a function of time, $x = 0.34 + 2.2t + 1.4t^2$, and be expected to find the initial position, initial velocity, and acceleration from that equation.

You will not be responsible for calculating or propagating uncertainties, though I do hope you find those topics useful in your future endeavors. You should know how to *interpret* uncertainties such as you obtained in fits in lab. For example, if you predict

$a = 1.5$ and you experimentally measure $a = 1.47 \pm 0.05$, you should know how to draw conclusions based on those numbers. (Any such problems would be clear-cut, either well within one uncertainty or very many uncertainties away.)

Review Strategies

- Review the equation sheet carefully so that you know what the symbols mean and when each equation applies. It is important to understand what the individual symbols mean, but it is also important to understand the broader context for the equations so you know when they do or do not apply, and how to combine them in a particular situation.
- Do not attempt to memorize specific examples. Instead, be sure you understand the basic physical principles applied and the reasoning behind their use.
- Read equations as sentences telling a story, not just as jumbles of symbols.
- Be able to explain a logical chain of reasoning.
- Review homework problems—particularly pen & paper problems.
- Look at related textbook problems. For example, if we did problem 38, look at problems 37 & 39. They are usually similar. Answers to odd-numbered problems are in the back of the book.
- If you want to practice finding a way to start a problem, try reading and setting up lots of other problems from the ends of chapters in the text. You don't need to work through all the arithmetic on every problem, but reading a wide variety of problems is a good way to see many different ways in which similar physics principles can show up.
- Make good use of the Study Area on MasteringPhysics. For example, you can find many worked examples there. You can also find extensive class recordings.
  - The "Conceptual Videos" section of the MasteringPhysics Study area includes a number of short animations illustrating various concepts. These are not indexed in the "Study by Chapter" section, so it is worth browsing through this list of videos.

Problem-Solving Strategies

- Read the whole problem carefully.

- Make a big sketch with clear labels. Use those labels in your equations. This helps make sure your intent is clear, both to yourself and to the grader.
- Try expressing in words what is happening—what is the story?
- Do not memorize specialized equations. Start each problem with a general principle or an equation from the equation sheet. *If you start your solution with a specialized equation that is not on the equation sheet, you may lose substantial credit.* Then, if numerical values are needed, substitute them for the appropriate symbols. This shows that you know what the relevant physics is and what the symbols mean.
- Pay attention to units. They can sometimes be a clue about how to approach a problem. For example, note that power has units of $\mathrm{W} = \mathrm{J/s}$, which is energy divided by time.
- Present your work clearly and carefully so that it can be read and understood.
- Avoid round-off errors. Your final answer should normally be within 1% of the correct answer. Keep additional digits in your intermediate calculations.
- Reread any written explanations to make sure they say what you meant to say.
- Don't panic. You should have plenty of time.
- Get a good night's sleep!