Physics 151—Accelerated Physics I: Mechanics and Thermodynamics
Test I Notes
Monday, February 24, 2025

The test will be a 50-minute, closed-book, in-class test. It will be similar in style and format to the posted examples and to the 2019 test posted on Moodle. You will be provided with an equation sheet similar to the one available on Moodle. You will need a scientific calculator; a graphing calculator is fine, but you may not use a cell phone or other device that connects to the internet.

The test will be cumulative–covering chapters 1 through 7, but the emphasis will be on chapters 5, 6, and 7. Problems from those chapters often include and build upon topics from earlier chapters.

All solutions 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.

The following sections (or portions of sections) will not be on the test:

1.6 Estimates and Orders of Magnitude
1.10 Products of Vectors
- Skip Vector Product

3.3 Projectile Motion
3.5 Relative Velocity
5.3 Friction Forces
- Skip Rolling Friction
- Skip Fluid Resistance and Terminal Speed

5.4 Dynamics of Circular Motion
- Skip Bankded Curves and the Flight of Airplanes
- Skip Fluid Resistance and Terminal Speed

5.5 The Fundamental Forces of Nature
7.4 Force and Potential Energy
7.5 Energy Diagrams

Hints

Some questions may apply concepts from several chapters to a single problem.

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 and the reasoning behind their use.

Read each problem carefully so you are sure you understand the relevant physical situation and what is happening.

Draw pictures with clear labels. Use those labels in your equations. This helps make sure your intent is clear.

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.

If you are unable to obtain a result for some part of a problem and a subsequent part uses that result, use a symbol for the unknown result. For example, write "where v_b (in m/s) is the speed from part b."

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.