

Physics Lab Exam Overview (11/16/05)

1. What are the “ground rules?”

“The exam may include experimental techniques, methods of data analysis, and/or concepts covered during the semester in the lab. **All of your graded lab reports for the semester and the lab manual are open for reference during the exam. Textbooks are not open during the exam. Work on the exam is individual.**” (quoted from 2nd page of Physics Lab Syllabus) **Also bring a calculator, pencil with eraser, and engineering paper. Rulers will be available in the lab room. “Excel” will not be available for use during the exam; any graphs must be hand drawn.**

2. How much is the lab exam worth?

The lab exam is 20% of your lab grade. Since the lab is 20-25% (see your lecture syllabus) of your overall course grade, this is 4-5% of your grade for the whole course.

3. How much time is available to do the lab exam?

You have the complete three-hour (2 hr 50 min) lab period to complete the exam, if necessary.

4. What is the format of the lab exam?

The lab exam consists of **five** equally weighted (20 pts each) “mini-experiments” or exercises. **Showing your method of solution is crucial!** Each task is clearly stated (hopefully), but don’t hesitate to ask your TA for assistance or clarification as necessary. At worst they can refuse to answer if the question is something you should already know.

A. For Exercises #1 and 2, all pertinent data needed to complete them is either given in the problem statement or available in your lab manual (we don’t have extra copies to supply during the exam) or in your graded lab reports.

B. For Exercises #3, 4, and 5, some data must be taken with equipment provided. Three equipment stations are provided for each exercise. During the first half of the lab period your TA will rotate you through these with 7-10 minutes per station to get the required data. If you are unable to get the needed data during the first 7-10 minute period, during the last half of the lab period you can return on a space available basis coordinated by your TA to try again.

5. How is the grading of the lab exam coordinated?

The lab director makes out keys to the exams with a breakdown of how many points should be awarded for each part of the problems. Each TA grades the exams for her/his lab sections.

6. Will the lab exam be handed back at the end of the semester?

No, however you are welcome to look at your graded lab exam by contacting your TA sometime after Wednesday of final exam week. Final lab grading sheets showing all report scores and the lab exam scores should be posted by lab section on the bulletin board on the 3rd floor of Webster Hall by late on the Wednesday of final exam week.

7. YOU WILL BE EXPECTED TO ATTEND THE LAB SECTION FOR WHICH YOU ARE REGISTERED. ONLY WITH A VALID REASON AND PRIOR PERMISSION FROM THE LAB DIRECTOR CAN YOU TAKE THE EXAM WITH ANOTHER SECTION.

8. Some Sample Exercises #1 and #2:

For PHYS 101, 201, or 205

(20 pts) 1. **Using graphical analysis** find the mathematical relationship satisfied by the following data:

<u>Distance (m)[y-axis]</u>	<u>Time (seconds)[x-axis]</u>
4.23	1.10
5.86	1.73
10.7	3.64
8.75	2.87
17.2	6.19
14.3	5.08
12.1	4.21

For the object undergoing this motion, find its position, speed, and acceleration when the time equals 10.3 seconds.

For PHYS 102, 202, or 206

(20 pts) 1. A light source is located at the 0.00 cm point on an optical bench. A converging lens with a focal length magnitude of 8.00 cm is located at the 20.0 cm mark on the optical bench. Next a diverging lens with a focal length magnitude of 10.00 cm is located at the 28.0 cm mark on the optical bench.

- Where on the optical bench should a viewing screen be placed in order to see the real image formed by this lens combination?
- Assuming that the light source, or object that is being imaged, has a height of 2.0 cm, what is the height of its image as viewed on the screen?

Draw a ray diagram to scale for this lens configuration. Show all three principal rays for each lens.

Some Sample Exercises #3-#5:

For PHYS 101, 201, or 205

(20 pts) 5. Using the computer and two photogates determine the value of the acceleration of the cart as it rolls down the incline. **Do not adjust the slope of the incline or move the photogates horizontally or vertically!** Take sufficient data so you can calculate a mean value for the acceleration

and the standard deviation of it. When you have finished with Data Studio, please “quit” the program in preparation for the next person.

For PHYS 102, 202, or 206

(20 pts) 5. Using the power supply, the circuit sf40, the electronic balance, and the appropriate measurements calculate the value of the magnetic field produced by the two disk magnets in the “gap” between them. From your measurements also determine which magnet (A or B) is acting as the N pole for producing this magnetic field. **Be sure to record the number (#1 - #6) shown on the magnet pair that you used!**