Physics 105
Homework Submission

Homework problems and data

The homework problems for this course are at the end of this packet. Problems 1-1 through 1-4 belong to assignment 1, problems 2-1 through 2-4 belong to assignment 2, etc. Each of you will do the problems using different data, resulting in answers that are different from those of other students. Blanks are left in the problems where you can write your data. Your data for the entire semester is available over the internet and can be printed out. Go to our course home page, under ``Online Homework" and then click on ``Homework Data Sheet".

Here is an example:

The "problems" (in packet):

1-1. A certain bacterium swims with a speed of [01] _____ μm/s. How long would it take this bacterium to swim across a petri dish having a diameter of [02] _____ cm?

1-2. At the Olympics, an athlete runs the marathon in 2 h, 9 min, [03] _____ s. (This is near the record time.) The marathon distance is 26 mi, 385 yd (1 yd = 3 ft). Determine the average speed of this athlete. Caution: Find the distance in miles and the time in hours to high precision.

The "data" go in the [xx]_____ spaces above before you work the problem. Get your own online.

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Student ID 456
Homework data
Physics 105, Winter Semester
set 1. [01] 3.43 [02] 8.20 [03] 22. [04] 30.2 [05] 39.8 [06] 4.0
[07] -1.4
set 2. [01] 212. [02] 18400. [03] 5.07 [04] 4.22 [05] 10.85 [06]
11.9 [07] 7.4
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The answer range (in packet)

Answers to Homework Problems, Pl

1-1. 5.00, 9.00 h
1-2. 12.100, 12.200 mi/h
1-3a. 70.0, 120.0 km
1-3b. 45.0, 65.0 km/h
1-4a. 3.00, 5.00 m/s
1-4b. −0.25, −0.75 m/s
1-4c. −0.75, −1.25 m/s
1-4d. 0
2-1. 1.20, 1.50 h
2-2. 0.60, 1.20 m/s^2
2-3. −1400, −1800 ±10 m/s^2
2-4a. 0

Class ID Number

If you do not have a course identification number yet, you must obtain one before your homework data sheet will be available. Go to our course home page and click on ``Obtain Class Identification Number (CID)."

Format of internet submission

To get the accuracy you need for submission, you will have to keep enough significant digits. I suggest you generally keep four significant digits (don't round prematurely) for all numbers as you work the problem (for example use 0.005872 not 0.00587 or 0.0059). Significant digits are those that do not include leading (0.00352) or ending zeros (5632000) that may be there just there to fill space rather than indicate precision. See Ch. 1 for a discussion of significant digits.

At the end of the homework problems there is information about the answers. You are given a range of possible values for each answer, along with the units, if any. For example; "40, 800 m" means that your answer will lie between 40 and 800 meters. These numbers also indicate the accuracy to which you must calculate the answer. The *answer range*, not the problem, gives you the digits to keep. In most cases, the lowest digit in the range numbers gives the minimum accuracy of the answer. For example, "40, 800 m" means that the answer must be correct to the nearest 1 m because the one's digit is the lowest given in the range. As another example, "15.0, 60.0 N" means that the answer must be correct to the nearest 0.1 N, but **you can submit as many extra digits as you like**. (Assume that the numbers given in the problem are **exact**. If you are given 2.2 m/s, it means 2.2000000..., to as many digits as you wish to imagine).

In some cases the accuracy is indicated with a ± symbol. For example, "32000, 39000 ± 100 km" means the answer must be correct to the nearest 100 km (for example 36500), but you can submit as many extra digits as you like (36472).

Do not type units into the computer as they are supplied on the form, and write your numbers appropriate for the units indicated. If a very large or very small value is asked for in **scientific notation**, indicate the exponent of 10 with an "e". For example, an answer of 3.00×10^{8} would be submitted 3.00e8, and 1.6×10^{-19} would be submitted 1.6e-19. Do not put any spaces in any entry nor any commas, for example you may have to submit an answer like 120000, but don't use commas.

You are responsible for learning how this works. If you make a mistake in the entry format, you will only lose one of five points on that problem, but you will have to submit it again with new data (see Retries below).

First submission

After working the problems, submit your answers over the internet. Go to our course home page and click on the assignment number. Fill in the answers as indicated. Be very careful in submitting your answers. Also, don't submit the answers until you are absolutely sure you have exactly what you want to submit.

Your homework assignment will be due at 10:00 p.m. on the due date. Submit all of the answers for all problems.

- *Corrections before first deadline*

If you change your mind on an answer for this first try, you can resubmit that answer before it is due. You only need to resubmit the answer you want to change. Leave the other answers blank, and the computer will automatically use previously submitted answers.

- *Grading of first submission*

Shortly after 10:00 p.m. the homework will be graded and you may then see your score on the internet by going to the course home page and clicking on "homework status". You will

see your score and also the correct answers for any problems you missed. You will also see new data that can be used if you want to resubmit an answer on a missed problem.

Retries

You will have 5 tries for each problem. The first try is due at 10:00 p.m. on the days indicated on the course schedule. **All retries** are due at 10:00 p.m. on the next day class meets. After each retry, a new set of data will appear almost immediately at the bottom of the homework status page. Use this new data for the next try. You only need to **resubmit** answers for the problems you **missed** in the previous try. But you must submit answers for the entire problem and for every problem that you missed. The computer will interpret any blank spaces in the missed problems as your submitted answer for that retry and count it wrong. Retries will be graded immediately when submitted. You can continue the process to the next retry and submit any problems you missed on the previous retry.

You will receive 5 points for each problem done correctly the first try, 4 points the second try, 3 points the third try, 2 points the fourth try, and 1 point the fifth try. You will receive no points for a problem until it is done correctly.

Late submission

Late homework results in at least some points being counted as "late points" which are generally worth half credit. If the first try is late, but before the retries due date (next class period), and if all retries are completed before the retries deadline, only one of the points per problem is a "late point". All points from submissions after the retries due date are counted as "late points". Everyone gets **four free late assignments** (these are chosen by the computer to maximize your points). You will receive half credit for all other late points.

Deadlines for late submission

Late homework and all late retries are due by 10:00 pm on the **first day of the exam** covering the chapter the set came from. No points may be earned for these sets after these deadlines, but you may still submit the homework to check your understanding. See the 105 schedule page for these deadlines.

How to use homework to prepare for exams

A lot of students get good scores on HW, but poor scores on exams because they really didn't master the HW…they got help enough to turn it in, and that's about it. The goal is not to memorize the HW (or sample exam), but to master strategy, concepts and skills that you will need to solve new problems…you probably won't see the identical problem on the exam.

If you get help on homework, you need to

1) ask enough questions until you really understand the step, skill or concept you missed, and how it works in other situations.

2) **write down** what your error was, and your new understanding in your own words (you can **use these notes** in reviewing for the exam...they record what you are weak in and errors you will probably repeat).

3) find another problem that uses the same skills, and try it.

4) practice outlining problem strategies. Look at new problems, and write down steps, drawings and concepts that you would use to solve the problem, without actually solving them. Go over these strategies with other students you study with, or ask a TA if that's the right approach.

Problem Solving

The following is a summary of professional research into physics problem-solving. Your goal is to move from the "novice" column to the "expert" column. Notice how expert problem-solvers stop to think about the problem, draw pictures to visualize the problem, plan out their strategy, before beginning, etc.—and *still* manage to solve problems much faster than novices. Short-cuts aren't always short!

Novice problem solver	**Expert problem solver**
Studies worked examples rapidly, without bothering to understand the examples	Studies worked examples until *sure* examples are understood
Consults worked examples later in hopes of finding a plan	Consults worked examples later to verify that chosen plan is correct
Collection of knowledge is a random jumble of miscellaneous facts	Collection of knowledge is well organized in person's head: centered around physical principles and hierarchies (topic trees)
Separates intuition/"real world" knowledge from theoretical/formal knowledge	Constantly integrates "real world" with theoretical knowledge
Little or no planning before trying to solve equations	Develops a definite problem-solving strategy before starting to solve equations
Not able to construct a physical picture of what's going on, or is unable to recognize when chosen picture is inappropriate	Constructs a useful physical picture of the problem
Does not stop to think of a qualitative answer before starting to solve the problem	Uses qualitative physics principles/physical reasoning to have a reasonable answer to the problem in mind before beginning to solve numerically
Focuses on surface structure (physical *items* involved in problem)	Focuses on deeper structure (physical *laws* involved in problem)
Works backward (looks for equation that has the *unknown* in it)	Works forward (looks for equations that include the *given* quantities)
Does not stop to think about the answer that was obtained	Stops to think if answer makes sense (checks against qualitative answer)

Here are web pages with tips on studying and solving problems:

www.oberlin.edu/physics/dstyer/StudyTips.html
www.oberlin.edu/physics/dstyer/SolvingProblems.html