Physics 153 Section T0H - Week 1

Rik Blok

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1 Marks, Assignments, Tutorials, Resource Center

1.1 MARKS

First Term: 150 marks

Lab: 60 marks

Second Term: 150 marks, obtained as follows:

first midterm = 14 (marks)
2nd midterm = 14
final exam = 105
reading assignments/in-class quizzes = 7
tutorial workshop = 5
homework = 5

One of the midterm marks may be replaced by the final exam mark ONLY if the student misses the midterm for medical or other valid reason.

If tutorial mark is lower than the mark on the final exam it will be replaced by the final exam mark.

If the in-lecture quiz/participation mark is lower than the mark on the final exam it will be replaced by the final exam mark.

1.2 Homework

Students will be assigned homework on FRIDAY(weekN) covering material to be discussed in lecture WED (N), FRIDAY(N), MONDAY(N+1), and possibly WED(N+1).

Homework will be handed in on FRI(N+1) to boxes outside Hebb 13.

Homework is due Friday late afternoon (6pm) and should be returned to the students by the following tutorial session.

ONE random problem will be marked (same problem for the entire class - TA's to be notified when homeworks are handed in).

TAs must also check that at least 75% of the problems have been seriously attempted.

If a student fails to complete 75% of problems on more

than 2 homework assignments, he/she must rectify this before the end of the term to be able to pass the course.

1.3 Tutorials

Tutorials will consist of a 20min lecture by the TA on topics the class is having difficulty with.

The remaining 30 min will be spent in small groups working on a conceptually and mechanically challenging problem(s) assigned by the TA.

The problem solutions will be handed in at the end of the tutorial and marked for EFFORT. (i.e. TAs will assign either 0 or 1 mark to each problem. The student gets 1 mark if there has been a serious attempt leading to an answer whether right or wrong).

The TAs should interact with the students and help them solve the problems HOMEWORK PROBLEMS TO

BE HANDED IN ARE NOT TO BE DISCUSSED IN TUTORIAL (though material bearing on the assignment may be discussed in the 20min lecture).

At the student's request, TAs may choose to discuss previous homework assignments.

1.4 Resource Center

A resource center will be staffed on Thursday and Friday in Hebb 12 for students to drop in for homework help.

Tentative schedule: Hebb12

Thurs 9:30 - 10:30 12:30 - 2:30 4:30 - 5:30

Fri 11:30-12:30 2:30 - 5:30

The AMS also provides a free, drop-in, tutoring service for Physics 153 from 6pm-10pm Mon -Thurs at the

Ridington Room in the Main Library.

2 Tutorial

TA: Rik Blok
e-mail: blok@physics.ubc.ca
web: http://www.physics.ubc.ca/~blok/phys153/

Web page contains some comments about assignments, (homework) mark distribution, and a crib sheet. I'll try to get my notes up there, too.

In these tutorials I will try to explain the important equations you should know. I will not derive the equations but discuss what the symbols mean and what conventions are assumed. Then I will assign a problem which uses the equations.

3 Thin lenses

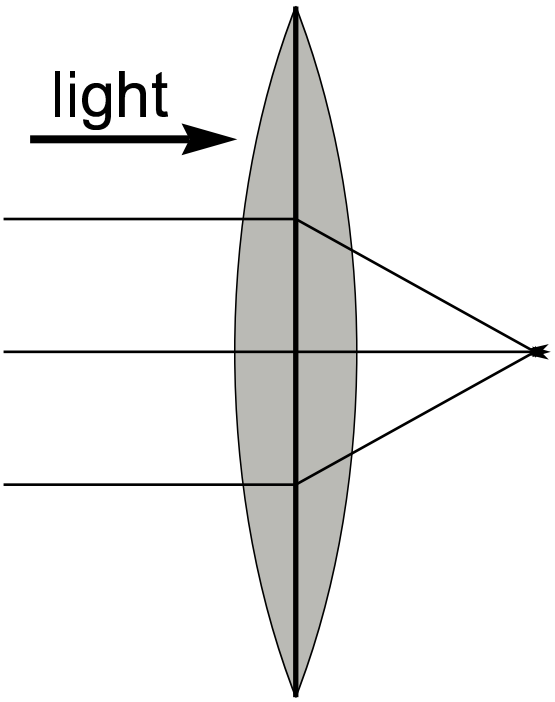
Definitions:

Incident side - front of the lens, where the light rays are coming from

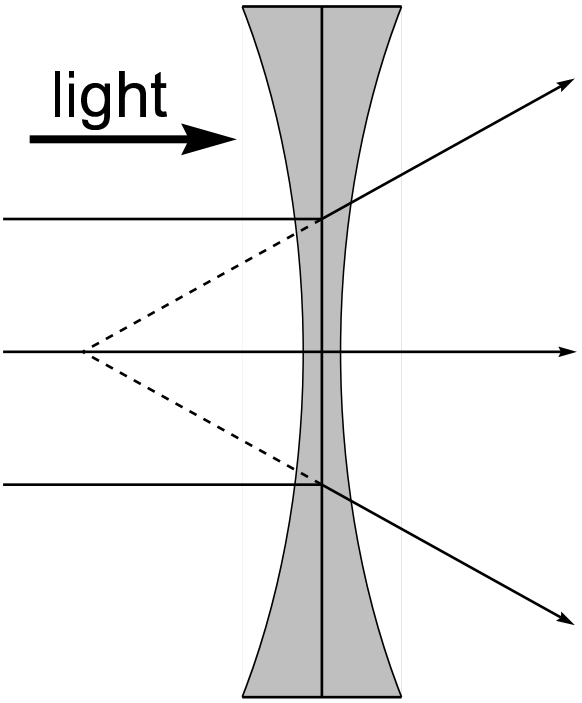
Transmission side - back of the lens, where the light rays are going to

Converging lens - parallel incident light converges to a focal point after passing through the lens

Diverging lens - parallel incident light diverges after passing through the lens



converging lens



diverging lens

3.1 Lens-maker's eq.

Lens-maker's equation gives focal length f from properties of the lens (r_1, r_2, n):

$$\frac{1}{f} = (n-1)\left(\frac{1}{r_1} - \frac{1}{r_2}\right) \tag{1}$$

Definitions:

f - focal point. Positive for converging lens, negative for diverging.

n - refraction index of lens. Assumes lens in vacuum (or air). Otherwise use $n = n_{lens}/n_{medium}$ where n_{medium} is the index of the medium.

r_1 - radius of curvature of first surface of lens (incident side). Defined as positive if center of curvature is on transmission side, else negative.

r_2 - radius of curvature of second surface of lens (transmission side). Again, defined as positive if center of curvature is on transmission side, else negative.

3.2 Thin lens eq.

Once you know the focal length f you can calculate image positions s' from object positions s using the thin lens equation:

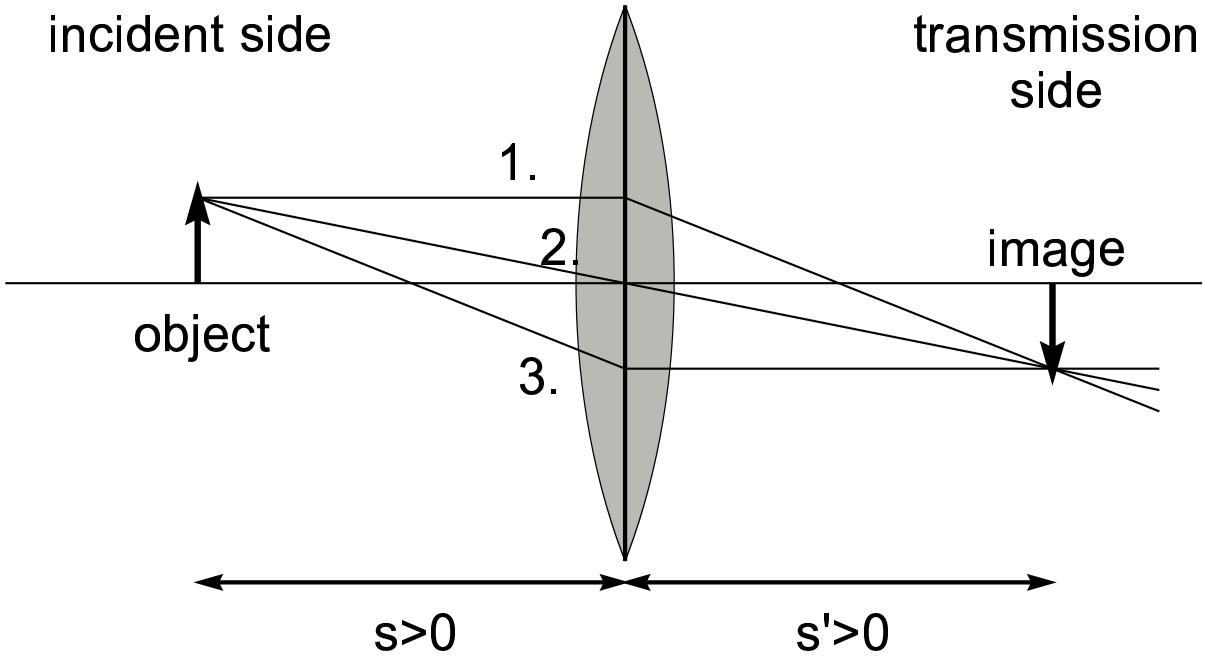
$$\frac{1}{s} + \frac{1}{s'} = \frac{1}{f} \tag{2}$$

Definitions:

s - object distance. Defined as positive if on incident side, else negative.

s' - image distance. Defined as positive if on transmission side, else negative.

3.3 Ray tracing



Draw 3 rays:

1. A ray **parallel** to the axis which is bent through a focal point by the lens.
2. A **central** ray which passes through the center of the lens and is not deflected.

3. A **focal** ray which first passes through the *other* focal point and emerges parallel to the axis after passing through the lens.

4 Assigned Problem

(From Tipler Ch. 31 #60.)

When a bright light source is placed $30\,\mathrm{cm}$ in front of a lens, there is an erect image $7.5\,\mathrm{cm}$ from the lens. *Draw a ray diagram for the lens.* There is also a faint inverted image $6\,\mathrm{cm}$ in front of the lens due to reflection from the front surface of the lens. *Draw a ray diagram for the reflection.* When the lens is turned around, this weaker, inverted image is $10\,\mathrm{cm}$ in front of the lens. *Draw a ray diagram for this reflection. Find the index of refraction of the lens.*