

**Phy114: Electromagnetism, Waves and Radiation  
for the Sports Science  
Homework Problems  
Set #7: Due Monday, March 31, 2008**

Note: Students are encouraged to work together and discuss the problems. However, each student must arrive at her/his own final answers. Show all your work. Simply copied homework will result in zero.

1. (10 points) (a) Calculate the speed of light in a diamond. (b) Calculate the critical angle of total internal reflection for the case light incidents on a diamond/air surface.
2. (10 points) How long does it take light to reach the earth from the moon? (*Hint: you will need to find out the distance between the moon and the earth first, say, by doing a Google search.*)
3. (5 points) What is the strength in diopters of a camera lens of 75-mm focal length?
4. (5 points) Calculate the focal length of Prof. Jung's left eyeglass lens of strength -7.0 D.
5. (10 points) A slide projector uses a lens of 12.0-cm focal length. A 35-mm slide (actual dimensions 24x36 mm) is placed 12.5 cm from the lens. (a) How far from the lens must the screen be? (b) What will be the dimensions of the picture on the screen?
6. (10 points) A doctor is examining a mole using magnifying glass of focal length 13.0 cm. The lens is held 11.5 cm from the mole. (a) Calculate the position of the image formed. (b) What is the magnification? (c) What is the height (size) of the image if the mole is 0.30 cm in diameter?