

# PHYSICS 1020

## Homework #7

(Due April 24, 2017)

1. What is the speed of light in (a) water, (b) diamond, and (c) ethyl alcohol? (Refer to the table of indices of refraction—Table 18.1— of the text.)
2. A diver shines a flashlight upward from beneath the water at a  $42^\circ 5'$  angle to the vertical. At what angle does light leave the water?
3. Rays of the Sun are seen to make a  $31^\circ 0'$  angle to the vertical beneath the water. At what angle above the horizon is the Sun?
4. The critical angle (for total internal reflection) for a certain liquid-air surface is  $47^\circ 7'$ . What is the index of refraction of the liquid?
5. Calculate the image position and height for a 3.0-cm-tall object that is 10 cm in front of a diverging mirror that has a  $-25$  cm focal length.
6. (KJF 18-31) Calculate the image position and height for a 2.0-cm-tall object that is 15 cm in front of a converging lens that has a 20 cm focal length.