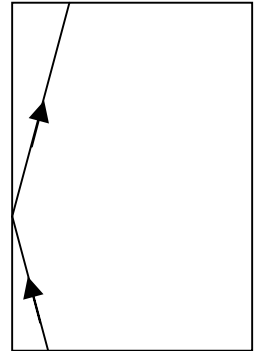


Recitation Instructor (circle one): Able Baker Charlie Easy Fox George

QUIZ #3

Problem 1. A green laser beam travels inside a glass block ($n_{\text{glass}} = 1.3$) along the path shown. It hits the left side at the critical angle and totally internally reflects. After that, it travels into the air above.

- (a) Sketch the path the ray takes when it goes into the air.
(b) What angle does the beam make with the surface of the block once it is in the air? (Use.)



Problem 2. If the laser beam used in problem (1) was, instead, a red laser beam hitting the left side at the same angle as you found above, would it still totally internally reflect?

Problem 3. In problem (1), suppose the wavelength of the green laser beam *inside* the glass block was 408 nm. The wavelength of the beam in air will be different. In the following, use $c = 3.00 \times 10^8$ m/s.

- (a) What is the frequency of the green laser beam in the glass block?
(b) Use the fact that the frequency of light doesn't change as it passes from one medium to another to find the wavelength of the green laser beam in air. (Use $n_{\text{air}} = n_{\text{vacuum}} = 1.00$.)