

695.

Problem 48.13 (RHK)

We have to find the angle of incidence for light reflected from water to be completely polarized. We have to answer whether this angle depends on the wavelength of the light.

Solution:

The refractive index of water is 1.33.

When a ray of light is incident at the Brewster's angle from a surface of a medium with refractive index n the reflected ray is completely polarized. The relation between the refractive index and the Brewster's angle is

$$\tan \theta_p = n,$$

$$\therefore \theta_p = \tan^{-1}(1.33) = 0.926 \text{ rad} = 53.06^\circ.$$

As the refractive index of light varies slightly with wavelength, this angle (Brewster's angle) will vary slightly with the wavelength of light.