

697.

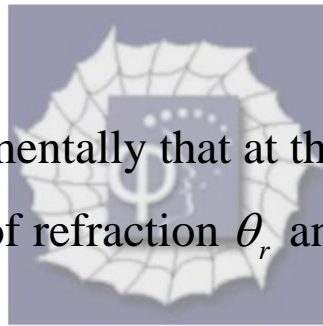
**Problem 48.16 (RHK)**

*When red light in vacuum is incident at the polarizing angle on a certain glass slab, the angle of refraction is  $31.8^\circ$ . We have to find (a) the index of refraction of the glass and (b) the polarizing angle.*

**Solution:**

(a)

It is found experimentally that at the polarizing angle the sum of the angle of refraction  $\theta_r$  and the polarizing angle  $\theta_p$  is  $\pi/2$ .



That is

$$\theta_p + \theta_r = \frac{\pi}{2}.$$

As  $\theta_r = 31.8^\circ$ , we find

$$\theta_p = 90^\circ - 31.8^\circ = 58.2^\circ.$$

(b)

According to Brewster's law, polarizing angle, if light is incident from air/vacuum, and the index of refraction  $n$  is

$$n = \tan \theta_p = \tan 58.2^\circ = 1.61.$$

We thus find that the index of refraction for red light in glass is 1.61.

